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**PROCEEDINGS OF  
THE 4<sup>th</sup> INTERNATIONAL CONFERENCE  
ON FINANCE AND ECONOMICS**

**ICFE 2017**

**September 21<sup>st</sup> – 22<sup>nd</sup>, 2017**

**Ho Chi Minh City, Vietnam**



# ICFE 2017 - The 4<sup>th</sup> International Conference on Finance and Economics

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# ICFE 2017 - The 4<sup>th</sup> International Conference on Finance and Economics

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## Preface

### Dear Conference Participants!

As hosted by Faculty of Business Administration, Ton Duc Thang University, The 4<sup>th</sup> International Conference on Finance and Economics (ICFE 2017) has been the recognized and interdisciplinary outlet in its field. ICFE 2017 is positioned as the outstanding conference that focuses on substantive issues in business and management. For the public, the Conference serves as a vital link between scholarly research and the reality of the business world by publishing theoretical findings, comments and novel propositions in the field of Management, Marketing, International Business, Economics, Finance, Accounting, Hospitality and Tourism.

ICFE 2017 is fortunate enough to receive a large number of submissions every year. Only a small portion of the volume submission makes it through to publication, and we have the resources to review only those papers that are potentially suitable for publication consideration. Our resources should be acknowledged for their great contribution, thus to University of Economics, Prague (Czech Republic); Tomas Bata University (Czech Republic); Taylor's University (Malaysia); Feng Chia University (Taiwan); and Dresden University of Technology (Germany).

As orientated to link scholarly study to the public, ICFE 2017 has offered fundamentally new insights. With conceptual and methodological rigor, best papers are selected for presentation and inclusion in the conference proceedings, which published in Thomson Reuters Conference Proceeding Citation Index Database.

Our advice to authors for participating this conference is to receive new insights and novel evidence of the research among international scholars. Thank you for your interest in ICFE 2017.

Sincerely,

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*Drahomíra Pavelková, Tomas Bata University, Czech Republic*

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### Message from the Host University

Inheriting the success of previous conferences, ICFE 2017 hosted by Faculty of Business Administration, Ton Duc Thang University (TDTU) will be visited by many international delegations, distinguished guests and scholars this year. I am grateful to all the renowned speakers and delegates for their participation that makes this conference possible.

As found in 1997, TDTU has become a visionary, pioneering, and fast-growing university in Vietnam. In the past 20 years, TDTU has demonstrated excellence in academic performance and was listed in the top ten-preference university. As a comprehensive university, TDTU focuses to improve the quantity and quality of research outputs by establishing many research centers and groups and internationally cooperating with scholars. As a result, the University is now ranked among the largest and fastest developing universities in Vietnam in all aspects. In 2017, TDTU is ranked 2nd among Vietnamese universities and 1st among those regarding scientific research. Accordingly, ICFE 2017 is an annual activity to promote the academic work to public and practice.

On behalf of TDTU, I would like to offer my deeply felt appreciation is sincere to our great partners - University of Economics, Prague (Czech Republic); Tomas Bata University (Czech Republic); Taylor's University (Malaysia); Feng Chia University (Taiwan); and Dresden University of Technology (Germany) for the great contributions and efforts in organizing ICFE 2017. My special thanks also go to the track chairs, reviewers, keynote speakers and participants worldwide, for sacrificing precious time and professionals in proceeding the Conference. With joy and honor, I would like to invite you to join us in the Conference at TDTU and discover the wonderful Ho Chi Minh City in this September 21<sup>st</sup> -22<sup>nd</sup> , 2017.

I am looking forward to seeing you!

Prof. Le Vinh Danh, Ph.D.

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## Evaluation of Commercial Banks' Approach to SME Segment Entrepreneurs. Case Study from the Czech Republic

*Jaroslav Belás, Ján Dvorský, Martin Čepel, Anna Kotásková*

### ABSTRACT

*This paper's aim is to define and quantify SME segment entrepreneurs' notion of commercial banks. A part of this aim is to quantify significant differences in notions based on the entrepreneurs' education, enterprise size and its age. The survey was conducted in the SME business environment in the Czech Republic in 2017. The interviewed were entrepreneurs and managers of selected SMEs, and the survey was done in a questionnaire format. The obtained results were processed using the chi-square and Z-score. It was concluded by this research that entrepreneurs put a large emphasis on cooperation with commercial banks; however, they do not consider credit conditions favorable. Larger and older enterprises view credit conditions as favorable to a greater degree. It was also concluded that entrepreneurs with a college education and larger enterprises view credit conditions as favorable. Entrepreneurs expressed quite intensely that credit conditions are not transparent.*

**Keywords:** *Commercial banks, Credit Conditions, Credit Costs, Small and Medium-Sized Enterprise*

**JEL Classification:** G21, D22

### 1 INTRODUCTION

SMEs represent a significant part of the European Union's economic system (Ključnikov et al., 2016, Potkány et al., 2016, Smékalová et al., 2014). SMEs are the engine of the Czech economy, both in microeconomic and macroeconomic terms (Koráb et al., 2016). In the Czech Republic, they produce more than 50 % of the total added value volume and contribute to the overall employment rate in the economic system by more than 59 % (Kozubíková et al., 2017).

These enterprises have been negatively impacted by the global financial and economic crisis in terms of access to external financial sources which are essential for further growth and sustainability, as well as business globalization (Důbravská et al., 2015).

Given the significant position of SMEs in the economy of countries, the support of their development is one of the EU's priority topics. This topic is supported by many fundamental strategic documents such as the European Charter for Small Enterprises from 2000, the Small Business Act for Europe from 2008 (updated in 2011), 2020 Europe Strategy, and the Entrepreneurship 2020 Action Plan. Despite the complex evaluation of main problems that SMEs face in their business, the creation of new tools of financial and non-financial support, and suggestions of new measures, many EU countries apply these recommendations only on a declaratory level in the long run.

SMEs are very dependent on financing via bank credit and too susceptible to banking sector's wellbeing. Therefore, it is very important to examine SMEs' notions towards commercial banks from a number of different viewpoints (Glova & Gavurová, 2012). The knowledge of

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these notions enables the search for optimal alternatives of supporting SMEs' business activities and increasing their knowledge of potential forms of financing during various life cycle stages.

External financing of SMEs presents a significant opportunity for the stabilization and development of these enterprises' business activities (Virglerova et al., 2017). Commercial banks play an important role in this process. Building effective relations between SMEs and banks presents one of the ways of achieving higher sales on basis of better mutual understanding. Entrepreneurs' attitude should serve as an important signal for banks to correct their business conditions when granting credit. Despite adequate support from international institutions and the implementation of various programs and tools for SMEs, it is necessary to provide continuous, permanent support, monitoring, and creation of complex analyses which would testify not only about quantitative characteristics of SMEs' development, but would also provide qualitative information regarding entrepreneurs' notions towards the issue of SMEs' financing and development.

This paper examines SME entrepreneurs' notions of commercial banks. Its uniqueness lies in the fact that these notions are analyzed and quantified based on entrepreneurs' education level and the size and age of their enterprises.

The structure of the paper is as follows: important attributes of the SMEs – commercial banks relationships are described in the theoretical part. These are followed by the research methodology, data, results, and discussion. The basic results are then presented in the conclusion.

## 2 THEORETICAL BACKGROUNDS

The impact of the financial crisis on the concerned segment of SMEs was widely discussed a few years ago. During the period of financial crisis, the credit spread between large and small enterprises intensifies due to the higher risk perception by most of the SMEs, resulting in credit denial and consequently, deterioration of their financial situation (Svabova and Durica, 2016).

The increased credit costs for SMEs increase the probability of their default and hence, make them more vulnerable in the financial distress periods (Ardic, 2012; Casey & O.Toole, 2014; Kundin & Erecgovac, 2011; Ozturk & Mrkaic, 2014, Kliestik et al., 2015a). Increasing bank funding costs are associated with higher interest rates for the SMEs, but not for the large enterprises (Ozturk & Mrkaic, 2014).

Factors such as the size and age of the enterprise seem to influence their access to credit financing (Gavurova & Glova, 2012). It is closely connected with the degree of business risk which SMEs have to face during their business life cycle and which is a considerable factor of their economic effectiveness (Kliestik et al., 2015b). New and early-stage SMEs are facing more intense problems with bank financing than their more established counterparts (North *et al.*, 2010).

It can be assumed that credit conditions have improved significantly since the financial crisis.

Banks represent the main source of access to financing for SMEs in most countries; however, the general characteristics of SMEs have also tended to discourage banks from investing in small enterprises, and thus, they prefer to lend to larger enterprises instead, resulting in a worsening of the conditions under which SMEs have to obtain their much needed financing (Chiou et al., 2012). In this context Pervan et al. (2015) state that bank size and GDP growth

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are significant variables with a positive influence on bank profitability, and credit risk has a negative significant impact on profitability.

One of the major constraints in financing the SMEs from the commercial banks and thus one of the reasons for the extension of the financial gap is the attitude of the entrepreneurs and the information gap (Feakins, 2004). Commercial banks often think that SME owners do not provide enough information about their enterprises willingly, therefore the information gap is a significant problem when providing loans for them (Ramlee & Berma, 2013). Higher-quality, lower-cost information is a key to unlocking more sources of finance for SMEs.

SMEs need transparent rating procedures as well. Due to higher risk awareness of the finance sector and the needs of Basel II, many SMEs will be confronted for the first time with internal rating procedures or credit scoring systems by their banks. The bank will require more and better quality information from their clients and will assess them in a new way. In order to reduce this uncertainty and to allow SMEs to understand the principles of the new risk assessment, UEAPME demands transparent rating procedures – rating procedures may not become a “Black Box” for SMEs: the bank should communicate the relevant criteria affecting the rating of SMEs, the bank should inform SMEs about its assessment in order to allow SMEs to improve (European Association of Craft, Small and Medium-Sized Enterprises, UEAPME, 2004).

The influence of entrepreneurs’ personal characteristics was discussed in the studies of different authors. Deakins et al. (2010) state that young entrepreneurs and new businesses have difficulties gaining loans due to lack of business experience or no business track record. North et al. (2010) claim that the age of the SME and the stage of its development are important, and that older SMEs are facing fewer problems with bank financing.

The study by Bruns and Fletcher (2008) identifies several factors that are most important for the decision making process of the loan officer. They found that the availability of collateral, past financial position and business competence are the determinant factors for enhancing credit. Moreover, CEO’s maturity and human capital, business plan, and borrowers share to the investment plays an important role in granting the credit.

On the other hand, it is important for banks to carefully monitor entrepreneurs’ notions towards the convenience and transparency of credit conditions. It can be assumed that the mutual understanding between the bank as the lender and the enterprise as the debtor helps increase the volume and effectiveness of their business. The results of the research on entrepreneurs’ notions and the comparison of results based on the entrepreneurs’ education, size of the enterprise and its age can be used in this process. Results obtained in this process can help banks more accurately specify credit conditions for respective customer segments.

### **3 AIM, METHODOLOGY AND DATA**

This paper’s aim is to define and quantify SME segment entrepreneurs’ attitudes towards commercial banks. A part of this aim is to quantify significant differences in attitudes based on the entrepreneurs’ education, size of the enterprise and its age.

The survey was conducted in the SME business environment in the Czech Republic in 2017. The interviewed were entrepreneurs and managers of selected SMEs, and the survey was done in the form of a questionnaire. The questionnaire contained a total of 45 business queries that students had to rate by agreeing to the classical five-level Likert scale: 1 - I

strongly disagree, 2 - I do not agree, 3 - I do not agree or disagree; 4 - I agree, 5 - I definitely agree.

Research material was designed to expose entrepreneurs' notions of credit risk and its determinants. As a part of this research, entrepreneurs' attitudes towards commercial banks were investigated.

Four scientific hypotheses were set for this paper:

H1: Banks help entrepreneurs in achieving their financial goals. This attitude was presented by a minimum of 60 % of entrepreneurs. There are no statistically significant differences in entrepreneurs' attitudes based on their education and the size and age of their enterprises.

H2: Banks' credit conditions are convenient for entrepreneurs. This attitude was presented by a minimum of 50 % of entrepreneurs. There are no statistically significant differences in entrepreneurs' attitudes based on their education and the size and age of their enterprises.

H3: Banks' credit conditions are viewed by entrepreneurs as transparent. This attitude was presented by a minimum of 50 % of entrepreneurs. There are no statistically significant differences in entrepreneurs' attitudes based on their education and the size and age of their enterprises.

H4: Credit costs are convenient for entrepreneurs. This attitude was presented by a minimum of 50 % of entrepreneurs. There are no statistically significant differences in entrepreneurs' attitudes based on their education and the size and age of their enterprises.

The validity of each hypothesis was verified by us through the Pearson statistics. This method allows us to quantify statistically significant differences within the defined sets of respondents. Description of Chi - square test of a good correlation is according to Řezánková (2007) approximates as follows. We test the hypothesis  $H_0: \pi_i = \pi_{i,0}$ , where  $i = 1, 2, \dots, K$  ( $K$  the number of categories) a  $\sum \pi_{i,0} = 1$ , against the alternative hypothesis  $H_1: H_0$  does not apply. Unless the constants  $\pi_{i,0}$  are equal, then the null hypothesis could be expressed as  $H_0: \pi_1 = \pi_2 = \dots = \pi_k$ . For  $n\pi_{i,0} \geq 5$  the Chi-square statistics given by the relation is being used:

$$\chi^2 = \sum_{i=1}^K \frac{(n_i - n\pi_{i,0})^2}{n\pi_{i,0}}$$

where:  $n\pi_{i,0}$  is the theoretical (expected) occupancy of the  $i$ -th category in the selection of the range of  $n$ . This random variable has provided the true hypothesis  $H_0$ , chi - square separation with  $(K - 1)$  degree of freedom, i.e.  $\chi^2 \sim \chi^2_{[K-1]}$ . Calculated value of the test criterion  $\chi^2$  is therefore could be compared with quantile  $\chi^2_{1-\alpha}[K-1]$

The validity of each hypothesis, was verified by us through the p-value on a significance level of  $\alpha = 0,5$ . Also the calculated value is greater than 0.05, and  $H_0$  is true. If the calculated p-value is less than 0.05, we did not confirm the validity of  $H_0$  and thus the validity of the hypothesis  $H_1$  can be confirmed.

When calculating the p-values in the chi-square method we have used freely accessible calculator available at: <http://www.socscistatistics.com/tests/chisquare2/Default2.aspx> For the detection of statistically significant differences in the individual answers to the questions we have used freely accessible calculator for calculating the Z-Test available on: <http://www.socscistatistics.com/tests/ztest/Default2.aspx>).

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For research purposes, businesses from the Albertina database, covering the scope of all the SME businesses in the Czech Republic, were selected. The selection of the addressed enterprises was carried out using a random selection method. The sample comprised 352 businesses (58 % success rate of business addresses) which provided feedback. Statistical data were collected from all 14 regions of the Czech Republic. The structure of the socio-demographic characteristics of the addressed entrepreneurs was as follows: males 265 (75.4 %), females 87 (24.6 %), university education 171 (48.6 %), secondary education with a graduation 139 (39.5 %), secondary education without closing exam 42 (11.9%). The structure of enterprises was as follows: enterprises up to 10 employees 233 (66.2 %), up to 50 employees 67 (19.0 %), up to 250 employees 52 (14.8 %). Within the surveyed enterprises, 227 enterprises (64.5 %) performed business activities for more than 10 years, 64 (18.2 %) from 5 to 10 years, and 61 (17.3 %) within 5 years. The survey was dominated by a number of business sectors: 130 enterprises (36.9 %), trade 90 (25.6 %), construction 63 (17.9 %).

## 4 RESULTS

Based on the research results, it can be concluded that 67 % of the Czech entrepreneurs consider banks helpful in achieving their financial goals. Chi-square testing criteria values indicate that there are no differences in the overall response structure in terms of the entrepreneurs' education and size and age of their enterprises. The Z-score testing criteria values indicate no differences in the positive responses structure in terms of the entrepreneurs' education and size and age of their enterprises. *H1 was confirmed.*

**Tab.1** - Presents the evaluation of commercial banks by Czech entrepreneurs – Evaluation of banks by entrepreneurs

<i>Banks help entrepreneurs achieve their financial goals.</i>	CE	OE	Micro	OC	10+	10-	p-value Z-score CE/OE Micro/OC 10+/10-
1. fully agree	15	7	14	8	13	9	
2. agree % rate (1+2)	100 67.3%	114 66.9%	135 63.9%	79 73.1%	141 67.8%	73 65.6%	0.3843 0.1236 0.4965
3. no attitude	22	23	33	12	27	18	
4. disagree	32	29	44	17	38	23	
5. fully disagree	2	8	7	3	8	2	
Total:	171	181	233	119	227	125	
chi-square p-value	7.3166 0.1201		3.0398 0.5512		2.0375 0.7289		

Notes: CE – respondents with college education, OE – other education, Micro – microcompanies, OC – other companies, 10+ - companies operating for more than 10 years, 10- - companies operating for less than 10 years

Based on the research, 42 % of Czech entrepreneurs agree with the claim that banks' credit conditions are convenient for them. It was concluded that larger and older enterprises tend to agree with this claim to a greater degree (p-value=0.0220/0.0045). *H2 was not confirmed.*



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**Tab.2** - Evaluation of credit conditions by entrepreneurs

<i>Banks' credit conditions are convenient.</i>	CE	OE	Micro	OC	10+	10-	p-value Z-score CE/OE Micro/OC 10+/10-
1. fully agree	4	4	3	5	6	2	
2. agree % rate (1+2)	79 48.5%	62 36.5%	81 36.1%	60 54.6%	91 42.7%	50 41.6%	0.0220 0.0045 0.9840
3. no attitude	43	58	76	25	65	36	
4. disagree	36	46	60	22	51	31	
5. fully disagree	9	11	13	7	14	6	
Total:	171	181	233	119	227	125	
chi-square p-value	5.4172 0.2471		13.2603 0.0100		0.8405 0.9329		

**Tab.3** - Evaluation of credit conditions' transparency

<i>Banks' credit conditions are transparent.</i>	CE	OE	Micro	OC	10+	10-	p-value Z-score CE/OE Micro/OC 10+/10-
1. fully agree	4	6	8	2	7	3	
2. agree % rate (1+2)	61 38.0%	57 34.8%	78 36.9%	40 35.3%	70 33.9%	48 40.8%	0.4065 0.9760 0.1498
3. no attitude	53	67	78	42	78	42	
4. disagree	48	43	60	31	61	30	
5. fully disagree	5	8	9	4	11	2	
Total:	171	181	233	119	227	125	
chi-square p-value	2.8542 0.5825		0.9850 0.9120		4.0786 0.3955		

The research showed that only 36 % of Czech entrepreneurs agree with the claim that banks' credit conditions are transparent. Testing criteria values confirmed that there are no statistically significant differences in the overall response structure and the positive responses structure. *H3 was partially confirmed.*

Based on the research, only 27 % of Czech entrepreneurs agree with the claim that credit costs are favorable. Testing criteria confirmed that there are statistically significant differences in the overall entrepreneurs' response structure in terms of their education and the size of their enterprise. College educated entrepreneurs and larger enterprises tend to consider credit costs favorable to a greater degree. *H4 was not confirmed.*

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**Tab.4** - Evaluation of credit costs

<i>Credit costs are favorable.</i>	CE	OE	Micro	OC	10+	10-	p-value Z-score CE/OE Micro/OC 10+/10-
1. fully agree	9	2	3	8	7	4	
2. agree % rate (1+2) 27%	60 40.4%	43 24.9%	59 26.6%	44 43.7%	68 33.0%	35 31.2%	0.0193 0.0232 0.6965
3. no attitude	55	73	93	35	87	41	
4. disagree	42	48	64	26	50	40	
5. fully disagree	5	15	14	6	15	5	
Total:	171	181	233	119	227	125	
chi-square p-value	14.9196 0.0048		14.5931 0.0056		4.8869 0.2991		

## 5 DISCUSSIONS

SMEs' main problem is not only the lack of financial resources, but also the lack of knowledge on how to obtain them. The correct choice of financial resources accompanies and influences enterprises throughout their entire existence. SMEs' choice of financial resources is therefore as important and strategic area as the choice of the type of business activity. SMEs' dependence on bank financing deepened significantly particularly during the time of crisis (Sinicakova et al. 2017). However, it is evident even in the post-crisis era that SMEs continue having a problem obtaining credit, particularly in peripheral economies. According to research conducted by the European Central Bank (2013) on SMEs' access to financing in the Eurozone, a similar situation exists in many other European countries where the credit conditions for SMEs are visibly fragmented.

The discovered notions of SMEs' business segments towards commercial banks that were examined within the frame of research hypotheses are determined also by experience with financing during individual SMEs' life cycle. SMEs often use a combination of various financing resources during their life cycle, while the transition from one form of financing to another is highly problematic. It causes distinctive disparities in financing and education between the enterprise's growth phases. This issue was handled by the Action Plan on SME Financing established in 2011 by the European Commission with the aim of adopting regulatory measures, financial programs and initiatives focused on the simplification of SMEs' financing. Some of these initiatives are still active today, e.g. initiatives aimed at solving SMEs' limitations in the area of education and information via the Enterprise Europe Network (European Commission, 2015).

The researched notions of SMEs business segments towards commercial banks based on the factors of achieving financial targets, credit availability, perceived transparency of credit conditions, and adequacy of credit costs coincide with an opposite trajectory – namely the banks' notion of the SME segment. It is the process of banks trusting SMEs. Investors and providers of financial resources have a permanently limited access to reliable, available and

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comparable information on SMEs. Therefore, SMEs are more often dependent on financing by local commercial banks. This phenomenon is characteristic of many European countries.

One of the main challenges that are part of the priority agenda of the European Commission is ensuring SMEs' adequate access to financing. Given the dependence of the Czech SMEs on financing via bank credit, this segment is too susceptible to banking sector's wellbeing.

Looking at the quantitative results of these analyses, it can be stated that this research demonstrates that entrepreneurs respect the importance of banks in financing their business activities, as 2/3 of them confirmed that banks help them in achieving their financial goals. However, their view of the convenience, transparency, and cost of credit conditions was somewhat skeptical.

A similar research was conducted by Ključnikov et al. (2016). The following conclusions were drawn based on data from 2015: It was concluded that while the importance of the credit risk increased during the crisis, the level of knowledge of conditions under which commercial banks provide loans is relatively low between entrepreneurs. Entrepreneurs presume that the credit conditions in commercial banks are not transparent. They found that 63.45 % of Czech entrepreneurs agree with the statement that the importance of credit risk increased during the crisis. Older enterprises perceive the growth of credit risk more intensively in comparison to young enterprises. Only 29.01 % of Czech entrepreneurs in the segment of SMEs agreed with the statement that entrepreneurs are well informed about the conditions under which commercial banks provide loans. At the same time, they found that there were statistically significant differences in the opinions of entrepreneurs based on their education, enterprise size and age. Only 30.24 % of entrepreneurs presented the view that the conditions under which banks provide loans to SMEs are transparent.

A comparison of these researches conducted two years apart yields very similar results. The financial crisis and its implications called for higher bank regulations. The new regulation system known as Basel III requires banks to grow their own capital and tighten their credit criteria. These factors can lead to lower access to credit and increased credit costs.

Andries & Ursu (2016) present an interesting opinion on the influence of financial crisis on bank effectiveness. Their results show that the crisis has a significant and positive impact on both the cost and profit inefficiencies of the commercial banks from the EU, and that this impact is higher on Eurozone banks. In terms of cost efficiency, the most affected by the crisis are the large publicly traded banks operating in old EU member countries. With regard to the profit inefficiency, the global financial crisis seems to have had a lower impact on large public banks. Knezevic & Dobromirov (2016) are of the opposite opinion. Their results show that bank-specific and market-specific factors have influence on bank profitability, but macroeconomic factors do not. They find that influence of liquidity ratio and a measure of financial development on banks' profitability are in contrast in Serbia compared to the EU countries. The results also show that different factors influence profitability of domestic and foreign banks and that crisis has an opposite effect on profitability of domestic and foreign banks.

## 6 CONCLUSIONS

This paper's aim is to define and quantify SME segment entrepreneurs' attitudes towards commercial banks. A part of this aim is to quantify significant differences in attitudes based on the entrepreneurs' education, size of their enterprise and its age.

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The study shows that 67 % of Czech entrepreneurs consider banks helpful in achieving their financial goals, while a smaller entrepreneur group of 42 % agrees with the claim that banks' credit conditions are convenient for them. Only 27 % of entrepreneurs agree with the claim that credit costs are favorable. Only 36 % of Czech entrepreneurs see credit conditions as transparent.

This research confirmed that the transparency of credit conditions and their convenience for SMEs remain a significant problem in the credit process, and that banks do not pay enough attention to these attributes.

It is necessary to better communicate credit conditions and rating requirements in the process of providing credit to entrepreneurs, as well as optimize the cost policy for this important segment of the national economy.

The study has some limitations, mainly in the limited sample of respondents. Nevertheless, it can be assumed that it brings interesting scientific information that can help understand the opinions of entrepreneurs in the field of cooperation with commercial banks better. The results of this research present a valuable platform for policy makers, professionals, and experts specialized in the support of SMEs' development and increasing the competitiveness of the regions. This issue resonates in many international documents and is active in the processes of a number of international institutions, therefore the research presents a great potential for a broader mapping of SMEs' notions towards the banking sector and the financing of their business activities.

Future research will focus on a deeper understanding of attitudes and motives of entrepreneurs in the field of external financing risk management.

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# Factors Impact to the Level of Non-Financial Information Disclosure of the Companies Listed on the Ho Chi Minh City Stock Exchange - Vietnam

*Ha Xuan Thach, Duong Hoang Ngoc Khue*

## ABSTRACT

*The purpose of the paper is to identify the factors that can affect the level of non-financial information disclosure by the listed companies on the Ho Chi Minh Stock Exchange (HOSE). To evaluate the nonfinancial information disclosure level, a disclosure index of a company was prepared and the multiple regression analysis was used to test the hypotheses. The paper has been conducted on the sample of 93 the listed companies on HOSE. The finding indicated that the company size (SIZE) and company profitability (ROE) have a positive and significant effect on the level of non-financial information disclosure of the listed companies on HOSE.*

**Keywords:** *Information Disclosure, Non-financial information, Disclosure, Mandatory Disclosure, Voluntary Disclosure.*

**JEL Classification:** G21, D22

## 1 INTRODUCTION

The accounting information has an important role on the level of micro and macro management. It affects directly a wide range of stakeholders and determines the successes or failures in the making business decisions.

The growth of the capital market in Vietnam, the information demand of interested parties has increased ceaselessly. And not just financial information, interested parties, especially international investors, also use the non-financial information and operational information to help them make strategic decisions. If the companies do not take efforts to minimize negative impacts on environment and society, they will not be possible to attract and retain professional investors (ĐTCK, 2016). In addition, the investors are not only base on the financial indicators for making business decisions, but they also need to consider integrating the assessment of non-financial factors including environmental, social and corporate governance in their business decision establishment.

The listed companies need to disclose adequately financial and non-financial information for investors who have a company's overall picture. Therefore, the study of factors affecting the level of nonfinancial disclosure is necessary.

## 2 THEORETICAL FRAMEWORKS AND LITERATURE REVIEW

### 2.1 Theoretical Framework

#### Agency theory:

The agency theory was developed by Jensen and Meckling (1976), which explains the relationship between principals as shareholders and agents as company's managers. In this



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relationship, shareholders (principals) delegates managers (agents) to perform work. Agency theory addresses problems that arise due to differences between the goals or desires between shareholders (principals) and managers (agents). Between shareholders and managers exist benefit conflict (agency problem). Shareholders expect good executive managers to increase stock value. Executive managers pursue the goals different from shareholders' and the benefit conflict arises.

According to the agency theory, the separation between the ownership and management of enterprises in large size, the managers that the persons directly run the activities of enterprises, actively grasp the information of enterprises and can maximize their benefits but can hurt the benefit of shareholders. Meanwhile, shareholders who do indirectly manage enterprises should have less opportunity to access company's information directly, which affects the making decision of shareholders.

## **Signalling theory:**

The signaling theory deals with the issue of information asymmetry problems (Akerlof, 1970), which shows how information asymmetric problems can be reduced by the parties with more pieces of information signaling it to others. In the case of nonfinancial information, managers provide additional information signals including environmental, social and business governance information to investors to help them have information adequately in making investment decisions.

According to signaling theory, managers who expect a high level of future growth signal that to investors. Managers of firms with neutral news also have an incentive to report positive news, and they are not suspected of having poor results. Managers of firms with poor performance have incentives not to report their bad news (Cotter, 2011)

## **2.2 Literature Review**

To date, there have been many research to evaluate the level of disclosure of nonfinancial information in the countries in the world, for example: Meek et al (1995), Robb et al (2001), Hossain (2008), Arif and Tuhin (2013), Zare et al (2013), Mohammed & Islam (2014), Hasan and Hosain (2015), Ta (2012), Nguyen (2015). The purpose, methodology, and finding of this study are following as:

The study of Meek et al (1995) examines factors influencing the voluntary disclosure of three types of information, including strategic, non-financial, and financial. The study had been conducted in the annual reports of multinational countries from the U.S, U.K and Continental Europe. These factors included company size, country/region, listing status and to a lesser extent, industry were the most important factors explaining disclosure overall, the importance of the factors varies by information type. The multiple regression analysis was used to test the hypotheses. The findings showed that company size was a factor explaining voluntary disclosure.

Robb et al (2001) aimed to examine the relationship between non-financial disclosure and firm characteristics. The firm characteristics included industry classification, country of domicile, geographic dispersion, cross-listing, and company size in Australia, Canada, and the United States. The study included a 192 company sample of Australian, Canadian and US companies from the following industries: automobiles, chemicals, construction, electronic equipment, machinery, and transportation equipment, and pharmaceuticals. These

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manufacturing industries were selected because they disclosed a significant amount of information in their annual reports and typically engage in a considerable volume of international business transactions. The findings showed that firms that were more internationally oriented, and/or companies that were larger, tended to provide more non-financial disclosure.

The research of Hossain (2008) was an empirical investigation of the extent of both mandatory and voluntary disclosure by listed banking companies in India. The disclosure index of listed banking companies was prepared with 184 items which 101 and 81 were mandatory and voluntary respectively. The study evaluated three types of information including strategic, nonfinancial, and financial. The study has been conducted on the sample of 102 listed banking companies on the Tehran Stock Exchange. The multiple regression analysis was used to test the hypotheses. The findings showed that company size, profitability affected the disclosure of information. Results also indicated that the level of compliance in mandatory disclosure was high while the level of voluntary disclosure was very low.

The study of Arif & Tuhin (2013) aimed to measure the extent of disclosure of voluntary nonfinancial information in the annual reports of listed banks in Bangladesh. An unweighted disclosure index with 48 items has been used to measure the extent of nonfinancial information disclosure. The study has been conducted on the sample of 20 listed banking companies on the Dhaka Stock Exchange. The study examined the factors contained Size, Age, Profitability to affect to the level of voluntary disclosure of nonfinancial information. The results showed that out of three company specific attributes, age and size were significant in explaining the level of voluntary disclosure of nonfinancial information.

Zare et al (2013) examined the factors influencing the non-financial information disclosure quality in the firms listed in Tehran stock exchange. The study had been conducted on the sample of 102 firms listed in Tehran stock exchange in 2008 – 2012. The regression analysis was used to test the hypotheses. A model including 50 indexes based on Iran accounting standards and other regulations concerning disclosure were used to measure nonfinancial information disclosure quality. The findings indicated that firm life and profitability had positive and significant effects on non-financial information disclosure quality and financial leverage had the negative and significant effect on it.

The study of Mohammed and Islam (2014) was to find out the important company characteristics that could affect disclosing non-financial information by the company. The study had been conducted on the sample of 22 listed pharmaceutical and chemical companies in Bangladesh. An unweighted disclosure index with 63 items had been used to measure the extent of nonfinancial information disclosure. It reported the results of the association between company specific characteristics and non-financial information disclosure of the sample companies. It also showed the results of an investigation to the extent of affecting company characteristics on disclosing non-financial information by Bangladesh companies. The findings indicated that the enhanced use of nonfinancial information was effectively assessed by evaluating two company characteristics such as size and age as significant in explaining the level of non-financial information disclosure. The important characteristics were useful in making the effective investment decision by the investors.

Hasan and Hosain (2015) investigated factors influencing mandatory and voluntary disclosure of firms listed in Dhaka Stock Exchange, Bangladesh. They have been conducted on the sample of 54 listed companies in Bangladesh for a data period of 2010 to 2013. Findings indicated on an average 71% of the companies analyzed disclose the above-average number of additional information. The explanatory analyses had shown that firm size in terms

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of total asset and status of the company significantly and positively affect the level and extent of voluntary disclosure in the annual report of Bangladeshi companies. Using panel data regression analysis this study had found that company age and the status of the company had appeared to be significant factors for mandatory disclosure. On the other hand company size in terms of total asset and sales, and company profitability was also found to have no effect on mandatory disclosure.

The study of Ta (2012) related to voluntary disclosure information in the annual reports of non financial listed companies in Vietnam. The study had involved listening to the gap between Financial Analysts' requirements and Financial Managers' viewpoints of information disclosure with the meeting ability of available information in the Vietnamese nonfinancial listed companies' annual reports. Investigating annual reports of 199 non-financial listed companies in Vietnam in 2009, the results suggest that both Financial Analysts (F.A) and Financial Managers (F.M) had a high agreement about the important level of items, and the preparers needed to disclose much more information in annual reports to meet the requirements of users. The research also found that the low level of disclosure about the corporations' human resources in a developing country like Vietnam was obviously similar with that in developed countries like Japan and Ireland since this data was difficult to retain. The results of the study might be of interest of those who were concerned with upgrading the quality of Vietnamese corporate annual reports to help the users make a good and timely decision in business and investment basing on the accurate and up-to-date data sources.

Nguyen (2015) attempted to identify the factors affecting voluntary information disclosure base on a survey on annual reports of 106 HOSE listed enterprises. The results showed that the company size and profitability affected the level of voluntary disclosure. Through the findings, several implication were suggested to enhance the level of the information disclosure of firms listed on the stock exchange.

## 3 RESEARCH METHODOLOGY

### 3.1 Hypothesis Development

#### **Profitability:**

According to signaling theory, managers who expect a high level of future growth signal that to investors. Managers of firms with neutral news also have an incentive to report positive news, and they are not suspected of having poor results. Managers of firms with poor performance have incentives not to report their bad news (Cotter, 2011). The most researcher had found a positive relationship between profitability and the extent of disclosure, for example, Hossain (2008), Arif and Tuhin (2013), Zare et al. (2013). Therefore, the first hypothesis is constructed as follows:

*H<sub>1</sub>: Profitability is positively related to the level of non-financial disclosure*

#### **Age:**

Company age is a factor that affects the level of non-financial disclosure, and older companies disclose more information than younger companies (Arif & Tuhin, 2013; Mohammed & Islam, 2014; Zare et al., 2013). However, the study of Hossain (2008) showed that company age factor did not affect the level of disclosure. The study of Hasan & Hosain (2015) showed that company age significantly influenced the level of information disclosure. Thus, it is not possible to reach a conclusion that long established companies can disclose

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more information or be more compliant than newly established companies. This leads to the second hypothesis as follows:

*H<sub>2</sub>: Company Age is related to the level of nonfinancial disclosure*

## **Leverage:**

According to agency theory, the firms with high debt are obliged to disclose more information to satisfy their creditor. However, the firms with high debt are sometimes poor performance. According to signaling theory, managers of firms with poor performance have incentives not to report their bad news (Cotter, 2011). The study of Zare et al. (2013) showed that financial leverage had a negative impact on the level of non-financial disclosure. Thus, it is not possible to reach a conclusion that higher financial leverage companies can disclose more information than the lower financial leverage companies. Therefore, the third hypothesis is constructed as follows:

*H<sub>3</sub>: Financial Leverage is related to the level of nonfinancial disclosure*

## **Company Size:**

The company size is a potentially important explanatory variable to establish an association with the extent of disclosure. According to the agency theory, the separation between the ownership and management of enterprises in large size, the managers that the persons directly run the activities of enterprises, actively grasp the information of enterprises and can maximize their benefits but can hurt the benefit of shareholders. Meanwhile, shareholders who do not directly manage enterprises should have less opportunity to access company's information directly, which affects the making decision of shareholders.

Previous studies have also shown that the larger the scale of business, the more informal the tendency to provide non-financial information, such as Meek et al. (1995), Hossain (2008), Mohammed & Islam (2014), Hasan & Hosain (2015). Thus, the following fourth hypothesis is established:

*H<sub>4</sub>: Company size is positively related to the level of non-financial disclosure*

**Tab.1** - Summary of the research hypotheses:

Hypotheses	Description	Predicted Signs
H <sub>1</sub>	Profitability is positively related to the level of non-financial disclosure	+
H <sub>2</sub>	Company age is related to the level of nonfinancial disclosure	+/-
H <sub>3</sub>	Financial Leverage is related to the level of nonfinancial disclosure	+/-
H <sub>4</sub>	Company size is positively related to the level of non-financial disclosure	+

## **3.2 Research Model**

Based on theoretical framework and literature review, regression model designed to test the firm features influencing the level of nonfinancial information disclosure is as follows:

$$\text{NFID} = \beta_0 + \beta_1 \text{AGE} + \beta_2 \text{SIZE} + \beta_3 \text{PRO} + \beta_4 \text{LEV} + e$$

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**Tab.2** - Proxies for Explanatory Variables

Variable Name	Description	Variable Type	Measure method
NFID	Disclosure of non-financial information	Quantitative	Issuing checklist
AGE	Years of establishment of the enterprise	Quantitative	The year when the firm established until December 31, 2015
SIZE	Company size	Quantitative	Logarit of market capitalization
PRO	Company Profitability	Quantitative	Dividing net profit by total equities (ROE)
LEV	Leverage	Quantitative	Dividing total debts by total assets
$\beta$	Partial regression coefficient		
e	The error of the model		

### 3.3 Selection of Sample:

The study covers 100 out of 282 non-financial companies listed on HOSE. The sample period in this study is only for the year ending on December 31, 2015. The study requested 100 annual reports and the other reports which accessed by companies' website. After eliminating outliers, the usable sample includes 93 companies listed on HOSE.

### 3.4 Selection of Nonfinancial Information

The study has used a model including 114 indexes base on the Global Initiative Report GRI4, the prior nonfinancial information researches, Vietnamese accounting standards and other regulations concerning disclosure.

**Tab.3** - The selection of nonfinancial items in the disclosure index

Title		Disclosed
General corporate Information	10	Annual Report
Yearly Operations	33	Annual Report
Corporate strategy	5	Annual Report
Report and assessment of the Board of Management	3	Report on Board of Management
Corporate Governance	22	Report on Corporate Governance
Environmental and Corporate social disclosure	5	Annual Report, Sustainability Report, company's website
Company's Industry Information	11	Annual Report
Company's trends information	6	Financial Statement, Annual Report
Customer/Client satisfaction information	5	Website
Human Capital Information	5	Annual Report
Supply Chain Information	3	Annual Report, website
The other nonfinancial information	6	Annual Report, website
Total	114	

Source: Authors

The indexes were used to measure the level of non-financial disclosure. The items are disclosed in annual reports, sustainability reports, corporate governance reports, and on company's websites.

#### 4 RESULTS AND DISCUSSIONS

From the descriptive statistics in Table 4, the mean value of non-financial information disclosure index is 67.24 items, whereas the highest value of non-financial information disclosure index is 95 items, and the lowest value is 25 items.

**Tab.4** - Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
NFID	93	25	95	67.24	13.720
AGE	93	5	63	23.76	13.821
ROE	93	0.004	0.401	0.13734	0.085468
LEV	93	0.038	0.971	0.45255	0.206965
SIZE	93	4.1304	10.5986	7.350796	1.395479

Source: Authors' estimation

**Tab.5** - Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.478 <sup>a</sup>	0.228	0.193	12.325

a. Predictors: (Constant), SIZE, AGE, ROE, LEV

Source: Authors' estimation

**Tab.6** - Analysis of Variance ANOVAb

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3950.939	4	987.735	6.502	0.000 <sup>a</sup>
	Residual	13367.857	88	151.907		
	Total	17318.796	92			

a. Predictors: (Constant), SIZE, AGE, ROE, LEV

b. Dependent Variable: NFID

As can be seen from Table 5, the value of the correlation coefficient (R) is 0.478 and it shows a moderate ascending relationship between the variables in the model. The coefficient of multiple determinations ( $R^2$ ) is 0.228 which means that the model explains 22.8% of the variability of the dependent variable around its mean. The adjusted coefficient of determination is 0.193 and standard error of the estimate is 12.325

The results of [analysis of variance](#) in table 6 show that the significance value is 0.000 (Sig = 0.000), which is below 0.05. That indicates the presence of a linear relationship between dependent variable (NFID) and independent variables.

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**Tab.7 - Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Hằng số)	40.846	7.074		5.774	0.000		
	AGE	- 0.010	0.096	-0.010	-0.101	0.920	0.928	1.077
	ROE	49.117	16.605	0.306	2.958	0.004	0.820	1.220
	LEV	-6.763	7.479	-0.102	-0.904	0.368	0.689	1.451
	SIZE	3.120	1.163	0.317	2.683	0.009	0.627	1.596

a. Dependent Variable: NFID

To test the relationship between the independent variables and NFID, all the variables have been put into the multiple regressions. Table 7 states the regression results of the relationship between company age, profitability, company leverage, company and the level of non-financial information disclosure. It shows there are two variables with significantly positive relation with NFID, including ROE (sig = 0.004 < 0.05) and SIZE (sig = 0.009 < 0.05).

Based on the outcome above the standardized regression equation stand for:

$$\text{NFID} = + 0.306 \text{ ROE} + 0.317 \text{ SIZE}$$

The coefficient,  $\beta_2$  for independent variable profitability (ROE) is equal to 0.306 and shows that the level of non-financial information disclosure is significantly and positively associated with Profitability measured by Return on Equity (ROE). This means that if the variable ROE increases by one unit, NFID index increases by 0.306 units, ceteris paribus. Hypothesis 1 has been accepted (sig < 5%)

The coefficient,  $\beta_4$  for independent variable company size (SIZE) is equal to 0.317 and shows that the level of non-financial information disclosure is significantly and positively associated with company size measured by market capitalization (SIZE). This means that if the variable SIZE increases by one unit, NFID index increases by 0.317 units, ceteris paribus. Hypothesis 4 has been accepted (sig < 5%)

The company age (AGE) is lack of statistical significance to show its impact on nonfinancial information disclosure in our multivariate analysis and hence Hypothesis 2 could not be supported

The leverage variable (LEV) is lack of statistical significance to show its impact on the annual reports' information disclosure in our multivariate analysis and hence Hypothesis 3 could not be supported

## 5 CONCLUSIONS AND POLICY IMPLICATIONS:

### 5.1 Conclusion

The purpose of research examines the level of non-financial information disclosure by the listed companies on the Ho Chi Minh Stock Exchange (HOSE). The paper also identifies the factors that can affect the level of non-financial information disclosure. Findings indicate that companies disclose 67.24 items in average out of 114 items possible. The explanatory analysis had shown that the company size measured by market capitalization (SIZE) and

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company profitability measured by Return on Equity (ROE) have the positive and significant effect on the level of non-financial information disclosure of companies listed on HOSE. However, the company age in terms of AGE and leverage variable in terms of LEV does not significantly affect the level of nonfinancial information disclosure.

## 5.2 Policy implications:

Based on the findings several implications are suggested to enhance the level of the non-financial information disclosure of companies listed on HOSE follow as:

The State Securities Commission and Ho Chi Minh City Stock Exchange should have a closely monitored mechanism the companies which have suffered losses for many years and small size. These companies will tend to publish information lesser, hide or not disclosed information. Besides that, the developing of the information systems publicize information fully, timely and accurately;

The listed companies are necessary to develop an internal information disclosure process which is rigorous and scientific. The process ensures companies disclose information timely, accurate, and compliant with the disclosure requirements of the organization. The requirements include disclosure quickly, ensuring the accuracy of information and effective supervision principles.

In addition, the listed companies have attributed increases in non-financial disclosures such as environmental, societal and community, which will enhance their good image, and company value. It makes the information's capital market transparency which creates investors' trust for the capital market.

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## **Analysis of the Relationship between the Error Rate in the Selected Accounting Areas and the Size of the Company**

*Kolářová Eva, Homola David*

### **ABSTRACT**

*The quality of accounting information is of great importance in world of economic decisions. Properly prepared accounting information is one of the basic inputs of every entity. Accounting provides information about the overall financial position of a company and is also necessary for communication with government bodies, for example as a basis for correct income tax calculation. Timely and accurate data are important for making the right decisions. Accounting units often commit errors that affect the quality of the data they provide. This study examines how the company's size affects this quality. Specifically, this study attempts to focus on the areas of error that are, according to previous research, the most critical to quality of accounting information.*

**Keywords:** *Accounting, Error, Quality of accounting information, Company size*

**JEL Classification:** M21, M41

### **1 INTRODUCTION**

The decision-making of economic subjects in the world of finance and trade is based on the information they have access to. The primary source of this information is the company's financial statements and the data contained therein. Accounting information, for the majority of interest groups, has become one of the most crucial sources of information about a company (Otrusínová and Šteker, 2013). It is necessary for the economic subject to make a decision on the basis of correct information.

Generally, the characteristics of the information can be divided into quantitative and qualitative characteristics. Quantitative characteristics are based on data and the ability to evaluate individual items of accounting data and financial statements in correct monetary value. The qualitative aspect of accounting information is a less definable area. But the quality of data contained in accounting information systems has a significant impact on both internal business decision making and external regulatory compliance (Chen, Miao and Shevlin, 2015). To a large extent, there is a human factor that influences the resulting data. For example, a human factor can cause errors in financial statements that can easily be overlooked. In order to provide relevant information, the accountant should always follow the rules and principles on which accounting data processing is based (Puican, Avram and Dutescu, 2011). But of course, human motivation and personal interests can lead to deliberate mistakes or inaccuracies in the financial statements that result in an inaccurate description of the actual business situation. The quality of accounting information can also be significantly influenced by corporate culture of the company or a country (Nusa, 2015).

This is the reason why this article focuses on most common areas of errors which are affecting quality of accounting information. The large variety of uses that accounting

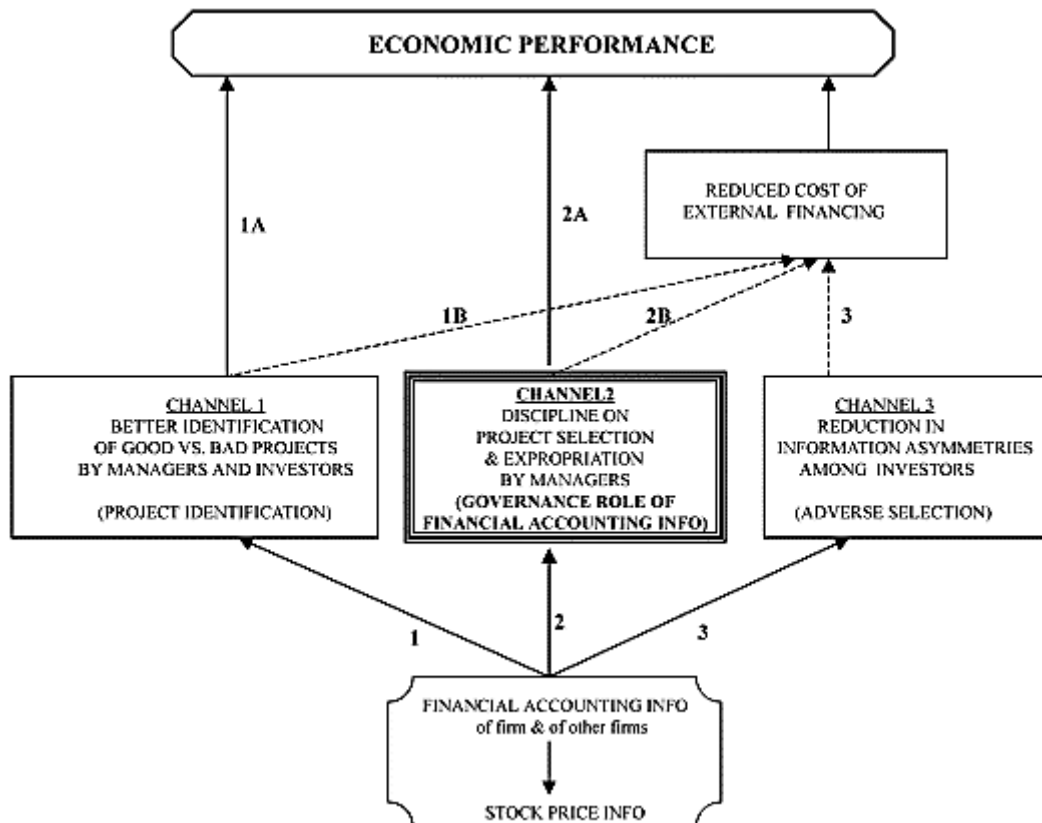
information is needed for, as well as wide range of informational needs that every reader of accounting information has require that certain criteria are to be established, with regards to the quality of accounting data, and these criteria must be fully met (Cozma-Ighian, 2011). It was previously researched that some form of control over accounting outputs reduces risks of error and mistakes. For example the quality of audit-partner decreases the probability of annual report misstatements (measured by restatements) and also various levels of quality control help further decrease such risks (Wang, Y., Yu, L., and Zhao, Y., 2015).

There have been several researches in the past regarding quality of accounting data. For example, the methodology for managing the risks associated with data quality was presented by (Bai, Xue, Nunez, Manuel; Kalagnanam, Jayant R., 2012). In their model they aim to develop effective control strategies to mitigate data quality risks. Complicated topic of quality of accounting information is research focus of our research group in Faculty of Management and Economics at Tomas Bata University in Zlín, where we also aim to create the methodology for evaluation of the quality of accounting information.

## **2 THEORETICAL BACKGROUND**

The financial accounting information affect economic performance of an entity through at least three channels as illustrated in Fig. 1. First, we expect financial accounting information of entity and their competitors to help managers and investors identify and distinguish between good and bad investment opportunities. The absence of reliable information in the economy impedes the flow of human and financial capital towards good investments and away from the bad, even without moral hazard. Hence, even in the absence of agency conflicts between managers and investors, high quality financial accounting data will enhance efficiency of decision making by providing useful information that enables managers and investors to identify value of presented business opportunities with less error. This leads directly to more accurate allocation of capital by investors and managers to their most profitable use, as indicated by arrow 1A in Fig. 1. In addition, the lower estimation risk perceived by investors will likely reduce the cost of capital, further contributing to economic performance as indicated by arrow 1B, the governance role of financial accounting information contributes directly to economic performance through the more efficient management of assets in place, from managers' better selection of investments, and the reduced expropriation of investors' wealth by the managers, arrow 2A. The governance role of financial accounting information also enhances economic performance indirectly by lowering the risk premium demanded by investors to compensate for the risk of loss from expropriation by opportunistic managers, arrow 2B (Bushman, R.M., and Smith, A.J. 2001). Vlckova and Friebel (2015) divide elements that have a negative effect on the quality of accounting data into three groups. The first group covers misrepresentation of data, errors and fraud and includes creative accounting, accounting frauds carried out by the management or employees and accounting errors arising from lack of knowledge. The second group represents accounting methodology, which is connected with mistakes in the method of calculating depreciation, asset valuation etc. The last group covers the influence of the information system, where an error can be caused by lack of information or by accounting legislation changes in the information system. The research results showed that the most important aspects that influence the quality of accounting data are creative accounting, valuation, internal control, accounting fraud carried out by the company management, lack of information and poor internal communication.

Schiffer (2010) states that entities occasionally commit errors in their activities that need to be removed. Under the Accounting Act, it is important for accounting to provide a true and fair view of the financial position of the enterprise.



**Fig.1** - Three channels through which financial accounting information may affect economic performance.

Source: Bushman, R. M.

Dušek (2014, pp. 12-31) says that the goal of the entity is to minimize the number of occurrences of errors. This issue is not avoided by any entity, with the likelihood of error occurring being high.

Schaeffer (2002, pp. 57-58) states that the errors that occur in the accounts are very costly for individual companies. Most of the errors are the result of incomplete information. They occur if the bookkeeping fails. They also appear in cases where the supplier sends an unclear or misleading text of the invoice, resulting in an incorrectly paid amount. Sometimes there is also a problem in reporting bad information from other parts of business unit. For this reason, it is necessary to create communication channels and an internal control system at a higher level.

According to Dušek (2014, pp. 106-107), errors can be divided according to several criteria. Depending on what they are impacting, errors can be broken down into errors affecting only accounting, tax-related errors and deliberate errors that affect financial and economic view of the entity. By frequency, the errors can be divided as random and systematic, by the number of occurrences they can be divided as individual and numerous ones. Additionally, there are six potential misstatements in accounting that are related to accounting operations and financial statements:

- Operations are not booked completely.

- Posted operations are not valid.
- Operations are booked incorrectly.
- Operations are charged into the wrong period.
- Assets or liabilities are incorrectly valued.

Accounting balances are presented in a misleading manner or do not contain all the information necessary for a fair presentation and compliance with accounting standards or legal requirements.

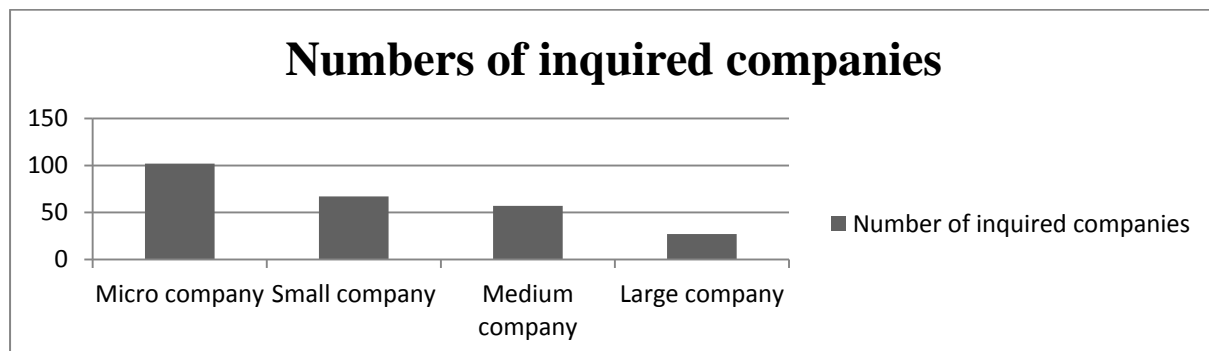
### 3 RESEARCH METHODOLOGY

The main aim of this work is to cover problems in data quality and to determine the relationship between data quality and company size. In the Czech Republic, companies are divided into four groups by size. Size is determined by criteria stated in Table 1. If company exceeds at least 2 of 3 criteria in current economical year it is categorized to that category.

**Tab.1** - Perceived level of risk of an error. Source: own processing

Criteria	Micro	Small	Medium	Large
Total assets (mil. CZK)	9	100	500	over 500
Net turnover (mil. CZK)	18	200	1000	over 1000
Average number of employee	10	10	250	over 250

The survey was conducted in the spring of 2017 using questionnaires. The research was done at the Faculty of Management and Economics of Tomas Bata University in Zlín and also at the Student Accountant and Tax office. In the questionnaire were specified research questions that focused on the quality of accounting information and error rate. A total of 249 questionnaires were collected from all groups of companies. Each questionnaire was statistically analyzed and synthesized. Statistical methods such as regression analysis were used. Respondents came from a wide range of companies, from profitable to nonprofit. The questions in the questionnaire aimed at ascertaining fundamental characteristics, such as the business field of activity and further, how the enterprise rates the risk of errors in individual financial statement areas. There split of companies is shown in Figure 2.



**Fig.2** - Number of inquired companies. Source: own making

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Questions which were evaluated:

In the field of accounting, evaluate your perceived level of risk of an error in valuation.

In the field of accounting, evaluate your perceived level of risk of an error in adjustments.

In the field of accounting, evaluate your perceived level of risk of an error in accruals.

In the field of accounting, evaluate your perceived level of risk of an error in estimates.

From all questionnaire questions, only those that we considered the most critical in error area were selected.

Formulated hypothesis was as follows:

H<sub>1</sub> - The likelihood of errors occurring in accounting is more likely for micro and small companies than for medium and large companies.

Several statistical procedures have been used. The normal distribution was tested by the Kolmogorov-Smirnov test, but also by Shapiro-Wilk's test to find out whether the data originates from the normal distribution. A correlation analysis was carried out too using the correlation coefficient. Each question was set to scale from 1 to 5. Scale 1 was not considered critical, scale 2 was the least critical, scale 3 was slightly critical, scale 4 was somewhat critical and scale 5 was the most critical.

## 4 RESULT AND DISCUSSION

For calculation level of risk of an error, we used basic statistic characteristic. Basic methods include Arithmetic average, standard deviation, variance and modus. With these methods, we have found useful information.

The arithmetic average is the most important of all averages. Because we have a range from 1 to 5, we can state from the table that the highest risk is at the valuation of 2.953 and the smallest at the 2.506 for adjustments.

The standard deviation is basically a variation from the average, and shows how far the answers to the questions are diverted from the average. The largest variations for large size companies were for estimates at 2.147, for small companies 1.678 for estimates also, micro and medium-sized companies shown highest variance for accruals of 2.066 and 2.012 respectively.

Variance is defined as the average of squared deviations of individual values from their arithmetic mean and cannot be interpreted.

The mode value is also interesting. It is the most frequent change in the value. For micro-companies, the mode was 2.625 on average, which means that these companies have many answers in neutral zone. This was caused by the fact that micro companies do not do some of the risk items. For small companies, the mode was 3.50. For medium companies, the mode was 2.75. And for large companies, there was a 2.125 mode. Based on this breakdown, we can state that the perceived risk level is the highest for small companies.

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**Tab.2** - Perceived level of risk of an error. Source: own processing

	Questionnaire questions – Level of risk of an error in	Arithmetic average	Standard deviation	Variance	Mode
1.	Valuation	2.953			
	Micro	2.853	1.262	1.592	3
	Small	3.819	1.542	2.378	4
	Medium	2.474	1.269	1.610	1
	Large	2.000	1.778	1.333	1
2.	Adjustments	2.506			
	Micro	2.559	1.911	1.382	4
	Small	3.048	1.465	1.210	4
	Medium	2.526	1.708	1.307	4
	Large	1.889	1.704	1.305	2
3.	Accruals	2.558			
	Micro	2.412	2.066	1.437	1
	Small	3.000	1.524	1.234	4
	Medium	2.263	2.012	1.418	1
	Large	2.556	1.375	1.173	1
4.	Estimates	2.886			
	Micro	2.588	1.966	1.402	4
	Small	3.190	1.678	1.295	4
	Medium	2.684	1.686	1.298	3
	Large	3.111	2.147	1.465	5

It follows from the calculation of Table 1 the level or perceived risk on scale from 1 to 5 was for:

- Micro companies – 2.603
- Small companies – 3.273
- Medium companies – 2.487
- Large companies – 2.389

In order to confirm our hypothesis, we performed further tests in Table 3 below. We have chosen a 5% significance level for our test. To test the normality, we joined micro and small companies and then medium and large companies. K-S test is the Kolmogorov-Smirnov test and the W-S test is Shapiro-Wilk's test. By using these tests, we have been trying to determine which items are significant.

For items that are insignificant, the answer „I do not know” plays significant role. For micro and small companies, these answers formed a large part of responses because adjustments and estimates are often not created by these types of companies.

We also focused at the assumption of strong correlation between the size of company and the perceived risk of error. The likelihood of error in accounting is more likely for micro and small companies than medium and large companies.

Relevant questions were selected for this assumption. If the regression coefficient approaches zero, there is a very low dependence.



**Tab.3** - Test of normality for perceived risk level. Source: own processing

	Questionnaire questions		K-S test	Result	S-W test	Result
1.	Perceived risk level in valuation					
	Micro	Small	0,083	Significant	0,054	Significant
	Medium	Large	0,165	Significant	0,186	Significant
2.	Perceived risk level in adjustments					
	Micro	Small	0,001	Insignificant	0,001	Insignificant
	Medium	Large	0,156	Significant	0,053	Significant
3.	Perceived risk level in accruals					
	Micro	Small	0,113	Significant	0,086	Significant
	Medium	Large	0,200	Significant	0,096	Significant
4.	Perceived risk level in estimates					
	Micro	Small	0,008	Insignificant	0,004	Insignificant
	Medium	Large	2,000	Significant	0,195	Significant

It follows from the calculation of Table 3, that there is a very low dependence on micro and small companies for questions:

- Level of risk of an error in adjustments
- Level of risk of an error in estimates

To calculate the regression line parameters, we use Table 4 and using the regression coefficient (1) slope of a straight line was calculated, which indicates the average change in the dependent variable y for unit change in the independent variable x, where n represents the number of questions.

$$(1) \quad b_{xy} = \frac{n \sum_{i=1}^n x_i y_i - \sum_{i=1}^n x_i \sum_{i=1}^n y_i}{n \sum_{i=1}^n y_i^2 - \left( \sum_{i=1}^n y_i \right)^2}$$

n – Number of questions

x – Independent variable

y – Dependent variable

The regression coefficient value was -0.193, and the regression line equation was  $Y = 3.405 - 0.193 x$ . The equation determines linear regression, where “x” is the independent variable, is perceived level of an error, and “y” is the dependent variable, size of a company. The correlation coefficient was calculated from the comparison pair x and y. The correlation coefficient was calculated as  $r = - 0.318$ . The result points to a very weak correlation between perceived risk of an error and company size.

**Tab.4** - Perceived risk of an error. Source: own processing

Perceived risk of an error in question	Micro and Small = x	Medium and Large = y
No.1	3.336	2.237
No.2	2.804	2.207
No.3	2.706	2.410
No.4	2.889	2.899

## 5 CONCLUSIONS

The main aim of this work was to discuss the quality of data and problems of error and their impact on the company. This document sought to demonstrate the dependence between company size and the risk of an accounting error. Errors may occur in many areas of accounting, but only the areas with the highest error rates were selected for this study. In the first part of this paper the authors discuss mainly the influence of data quality on decision making in the company. On the basis of critical literature, a hypothesis was established. The assumption of errors is more in micro and small companies than in medium and large companies.

To prove this hypothesis, we focused on questions, for which we predicted the highest error rate. From the table No.1, that the perception of the risk of error in micro, medium and large companies are the same, only small companies differ from the average of companies is 31 percent.

We also assumed, that the risk of error in micro and small companies is highest than in medium and large companies, we performed test of normality for risk, and also used regression dependence, we calculated the dependence between the perceived risk of error and the size of the company. The hypothesis was rejected.

The role of this article, as well as further research at Tomas Bata University in Zlín, is to provide an empirical study that will discuss errors caused by human factor. In conclusion there are no differences in perceived risk of error among micro and small companies and large and medium-sized companies.

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## A DEA 2 Stage to Measure the Efficiency of Governance and Loan Loss Provision in US Banks

*Le Hong Hanh*

### ABSTRACT

*This paper measures the efficiency of Governance and Loan loss provision controlled of top 20 largest banks in United State for the first half of 2017 using DEA- 2 stage model. The variable return to scales technology is applied to identify the efficiency frontier. The result suggested that most of banks are at optimal efficiency for the first stage (Governance) but not for the second stage (Loan Loss provision), and only 20% banks are at optimal efficiency for both stages. This study proposed that banks with higher board size, more number of audit committee meeting, proportion of non-executive director tends to obtain better bank performance. This experiment also suggested that banks with lower ROE and Debt to capital ratio appear to have higher efficiency score in Loan loss provision controlled.*

**Keywords:** *US banks, DEA-2stage, Loan Loss provision, Governance*

**JEL Classification:** G21

### 1 INTRODUCTION

Mechanism of the bank operation basically is composed by two main activities: Receiving deposits and offering loans. The former, banks pay the interest for depositors, and use deposited money for the latter. The problem is, even banks nowadays tighten loan applications, sometimes and somehow, there are some clients cannot pay back. Bad debt, or even worse, loan loss is defined as the amounts of money that bank are not able to collect from the customers after granting debts. This type of exposure is blamed as the main reason for the financial crisis 2008 in United States of America.

There are several reasons that cause loan losses, which might come from both customers and bank's officers. Sometimes, the loan loss is unexpected when the customer becomes default for business failed. However, sometimes, the banks' officers are the one who have to take the responsibility for manipulating loan applications. In the period before financial crisis 2008, there are several banks approved mortgage loan applications without examining. It is believed that governance also play an extremely important key role in bank's operation. Hence, after 2008, research about bank's officers behavior or bank governance draw attention from many researchers, who want to figure out the real influence of banks' governance via typical group of variables relating to board management, role of executive chef or the proportional of board independence ( Pablo (2008), Chen (2016), Vicent(2011), Salim (2016).

When banks do not reserve enough money for loan loss, imagine what might happen when depositors come and ask for withdrawing their money? Hence, for every single bank, bank manager need to set aside a certain amount of money as a reservation. This refers as Loan

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loss provision. Loan loss provision (hereby LLPs), in a simple definition, is the amount that bank set aside as an offset for uncollected loan and loan payments.

Bank manager needs to precise the appropriate amount to avoid the trade-off between ‘too little’ and ‘too much’. When the bank reserves ‘too little’ mean it is not self-protected enough, and could lead to bank default and failure. In the contrary, if bank reserves ‘too much’ mean it is over-protected, which means bank is paying for opportunity cost. Hence, the appropriate amount is very important point. However, there are some arguments that LLPs are manipulated by bank’s governance for several purposes such as: Management hypothesis, Signaling hypothesis, and income smoothing (Ahmed (1999), Berger (1997), Beaver (1997), Asokan Anandarajan (2003), William (2004)).

The motivation of this research is to measure the efficiency of Bank governance and Loan Loss provision to total loan ratio. To obtain the objective, DEA 2 stage is applied with variable return to scale technology. DEA model is highly appreciated since the first proposed in the late seventies.

In short, my research will answer for the following question: (\*) How well US top banks manage the governance? (\*\*) How efficiency of these banks on Loan loss provision controlled? (\*\*\*) Which variables are more important in increasing the efficiency?

The paper is organized as follows: The first section gives a brief introduction and motivation for my research. The second section introduces an overall literature reviews. Methodology and data are outlined in the fourth section. Empirical result is presented in the fourth part. The conclusion and suggestions for further research are drawn in the final section.

## 2 LITERATURE REVIEWS

### Governance variables

A number of research papers investigated on the relationship between governance variables and the banks performance. Chugh, Meador & Kumar (2011) and Coleman (2007) proposed that the greater of board size may achieve the better performance. Pablo (2008) experiments the dual role of governance via the role of boards of directors for 69 commercial banks from six OECD countries and suggested that there is the inverted U-shaped relation between bank performance and board size, and between the proportion of non-executive directors and performance. This result is homogeneous with Chen (2016), Salim (2016), Pablo (2008). However, Vicent(2012) proposed the important role of the existence of CRO in bank and rejected most of *standard corporate governance* such as board size, board independence, proportion director with finance background, Institutional shareholding, etc. by showing the insignificantly and negatively related to the banks’ performance. Cheng Wu, (2005) also concluded that board size is negatively and significantly correlated to firm performance and governance.

David(2012) proposed that firms with higher institutional ownership took more risk prior to the crisis and firms with more independent boards raised more equity capital. Paul (2003) constructed ‘Governance Index’ for 1500 large firms during the 1990s and find that firms with stronger shareholder rights had higher firm value, profits and sales growth.

### **Loan Loss provision variables**

Loan loss provision is significantly decided by bank managers, and sometimes is used as a tool to manipulate the income statement. As far as I know, most of research use LLPs as an independent variable to show its affection on three main arguments: Management hypothesis, Signaling hypothesis and Income smoothing (Ahmed(1999), Asokan Anandarajan (2003), Beaver, Ryan, and Wahlen (1997), William (2004), Berger (1997).

There is very few research use LLPs as a dependent variable. Jill (1994) estimated the Loan loss provision by 7 independent variables which belongs to 3 main groups: Bad debt, Income, and common trends to all banks during a given year. The result showed that: The average net charge-offs and loan is exposure to underdeveloped nations or foreign loan exposure, are positive and significant at 5% level. Nominal off-balance sheet asset exposure is significant and negative. Income before taxes and loan-loss provision is not significantly different from zero. This result is heterogeneous from the result of Ma (1998) and Greenawalt and Sinkey (1988)

Drew Dahl, on FDIC Banking Review, considered loan loss (not provision) depends on: Performing loans and non-performing loans, Logarithm of asset, CAMELS rating, Equity Allowance and Monitoring. The result suggested that auditors tended to have a significantly positive effect on provisions for loan losses. Graham Bird (1989), in his book 'loan loss provision and the third world debt', mentioned the factors influencing Provisioning: return of bank, risk of bank, Environmental factors, Money-center banks requirement, the world macroeconomic outlook and market valuation. .

### **DEA model**

Since was the first introduced by Charnes, Cooper and Rhodes (1978), Data envelopment analysis is becoming more and more popular. There are numerous research papers, some theoretical and some applied in several fields such as finance, banking, funding allocation. Seiford(1994) listed no fewer than 472 relevant published and Tavaras (2002) the number of relevant contributions are more than 3000 articles. Developing from original DEA model, DEA 2 stage model is the way to combine 2 separate DEA model: The output variables of the first process is the input variables of the second process.

DEA 2 stage is applied widely in banking sectors. Seiford and Zhu's (1999) utilized DEA 2 stages model to examines the performance of the top 55 US commercial banks via 2 production process that separate profitability and marketability. There are several research paper apply DEA 2 stage on bank sector (Berger & Humphrey (1997); Fethi & Pasiouras (2010); Liang, Li, Cook, & Zhu (2011); Wang et al. (2013); Wu, Liang, Yang, & Yan (2009)). Ke Wang et al.(2014) measured the efficiency of 16 Chinese commercial banks via 2-1-2 structure via 2 separate stages: Deposit producing and Profit earning. Joseph (2010) also contributed a huge research with major Canadian bank on 816 branches on three dimensions: production of staffing, profitability and intermediation. Peter (2014) applied DEA 2 stage model to major Brazilian banks via 2 stages: Cost efficiency and productive efficiency. As mentioned earlier, most of the research focuses on measuring the efficiency of cost and productive process. To the best of my knowledge, there is not any paper apply DEA 2 stage model on measuring the efficiency of loan loss provision.

### 3 METHODOLOGY AND DATA

#### 3.1 Methodology

Data Envelopment Analysis (hereby DEA) is a powerful technique for benchmarking developed by Charnes, Cooper and Rhodes (1978), originally to evaluate nonprofit and public sector organizations. A short definition of DEA is that it provides a mathematical programming method of estimating best Decision making units frontier and evaluating the relative efficiency of different entities. In DEA literature, these are typically called Decision making units (DMUs); in my research, DMUs refer to the evaluated bank.

DEA allows multiple outputs and inputs to be taken into account. The number of outputs and inputs are not limitless from a practical point of view. However, some scientific contributions argue that the number of DMUs should be 3 times the sum of total number of inputs and outputs. DEA compares several *decision making units* with the same variables of input and output, to calculate and identify which one is *more efficient* than the others by creating an efficient frontier. Basically, there are 2 ways of creating an efficient frontier are: CRS and VRS frontier. CRS is constant return to scale technology, which is appropriate when all DMUs are operating at an optimal scale. Meanwhile, VRS – variable returns to scale technology, is appropriate when DMUs are not operating at an optimal scale. The latter is usually used in the case when DMUs face imperfect competition and follow government regulations.

Originally, Charnes, Cooper and Rhodes (1978) proposed the linear program is used to find the set of coefficients (u and v) that will give the highest possible efficiency ratios (calculated by output to input) for each DMUs. If  $\theta$  is efficiency score,  $\theta=1$  identify the best DMU, if  $\theta$  less than 1 means the DMUs are inefficiency rating.  $\theta$  is calculated by solving the following equation:

$$\text{Maximize } \theta = \frac{\sum_{r=1}^s u_r y_{ro}}{\sum_{i=1}^m v_i x_{io}}$$

This is subject to the constraint that when the same set of u and v coefficients is applied to all other DMUs being compared, no DMU will be more than 100% efficient as follow:

$$\text{DMU } j: \frac{\sum_{r=1}^s u_r y_{rj}}{\sum_{i=1}^m v_i x_{ij}} \leq 1$$

In which:

- j: the number of DMU which involves in DEA calculation
- $DMU_j$ : Decision Making Unit j
- $\theta$ : efficiency score off the DMUs being evaluated by DEA
- $y_{rj}$ : amount of outputs r used by DMU j
- $x_{ij}$ : amount of input I use by DMU j
- i : the number of inputs used by DMUs
- r : the number of output generated by DMUs
- $u_r$ : coefficient or weight assigned by DEA to output r
- $v_i$ : coefficient or weight assigned by DEA to input I

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In the scope of this paper, DEA creates an efficient frontier that envelope the best banks (which are considered as efficiency). Eventually, the banks which are not located at the border are inefficiency, or less efficiency than the others. By determining the inefficiency DMUs, DEA proposes the potential adjustment of inputs and outputs to make that inefficiency becomes efficiency. It is noteworthy that the DMU which is efficiency is only in comparison with other units in this database, not to theoretical standard. The best practice units obtain the efficiency score (hereafter ES) ES=1. The inefficiency units obtain the ES less than 1.

## 3.2 Data and variables

The inputs and outputs are selected to measure 2 stages: Governance efficiency and Loan Loss Provision controlled efficiency. This selection process is based on literature reviews. However, it is noteworthy that these are traditional variables. Bank's governance variables include: Size of board, Audit committee meeting, and percentage of non-executive director and CEO duality. Bank's performance include: ROE, Market capitalization/Book value and Total debt/Total capital. The output is Provision for loan to total loan ratio.

**Tab.1** - Variables description

	<i>Acronym</i>	<b>Variable</b>	<b>Explanation</b>
Input layer	I1	Size of board	Number of Directors of the company's boards, as reported by the company. Full time Directors only. Deputy members of the Board will not be counted
	I2	Audit committee meeting	Number of meeting of the Board's Audit Committee during the reporting period
	I3	% non-executive director	Percentage of non-executive directors on the company board serving on three or more boards at other public, actively traded companies
	I4	CEO duality	Indicates whether the company's CEO is also chairman of the Board.
Intermediate layer	M1	ROE	Measure of a corporation's profitability by revealing how much profit a company generates with the money shareholders have invested, in percentage
	M2	Market capitalization / book value	Measure the relative value of a company compared to its market value
	M3	Total debt / total capital	Measure of a company's financial leverage that presents its total debts as a percentage of total capital
Output layer	O1	Provision for Loan loss to total loan	Provision for loan losses over the year as a percentage of average total loans. This ratio gives an indication of management's expectation of future loan loss. Calculated by: T12 Provision for Loan losses / Average Total loan)*100



The data from 20 top US banks are collected as the report first half of 2017. These are banks which have more than 4 million USD dollars in total assets. Hence, totally there are 20 DMUs. All data for these banks were obtained from Bloomberg database. The descriptive statistics of the input, intermediate, and outputs layers of these 20 observations are presented in Table 2.

**DEA efficiency measurement process:**

Two separate DEA analyses have been applied to measure the efficiency of 2 separate sets of outputs using VRS model (Variables return to scale technology). The reasons that motivate to use VRS model are: (1) Even they are large bank but the different in total asset among them is big, (2) These banks have to follow government regulations, (3) As the financial complicated environment, I suppose that they are not in a perfect competition environment.

The structure of model is 4-3-1 which means: 4 variables for the input layer, 3 variables for intermediate layer and 1 variable for output layer.

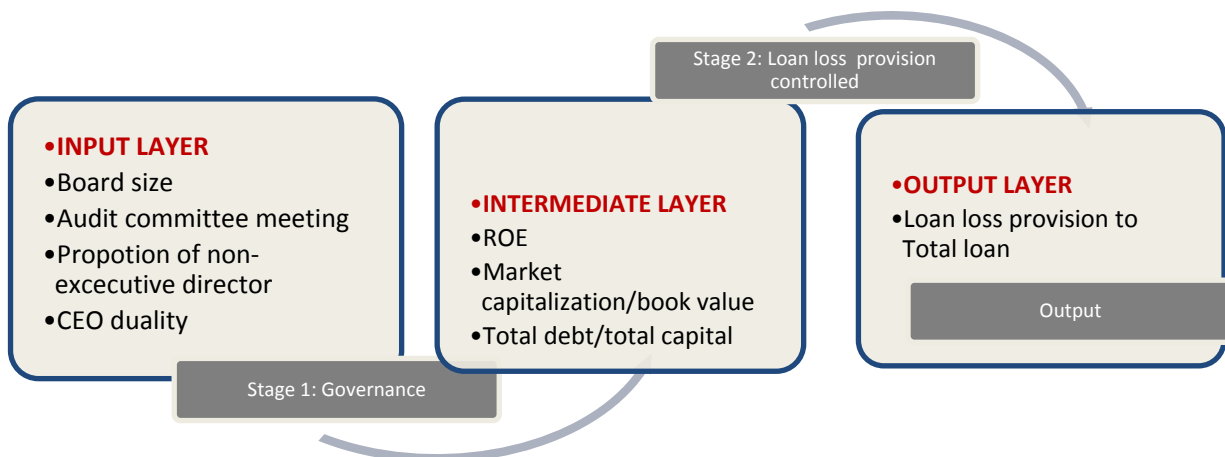
The first stage measures the efficiency of the banks’ performance (intermediate layer) based on the bank’s governance (input layer). The second stage measures the Loan loss provision rate (output) based on the banks’ performance (intermediate layer, which is output of first stage and input of the second stage) (Figure 1).

**Stage 1:** The first DEA measurement is built to measure the efficiency of 3 outputs with 4 inputs.

- The inputs include: Size of board (I1), Audit committee meeting (I2), Percentage of on non-executive directors (I3), CEO Duality (I4),
- Outputs include (intermediate layer): ROE (M1), Market capitalization to book value (M2), Total debt/total capital (M3)

**Stage 2:** Measure Loan Loss provision to total loan ratio efficiency:

- The inputs include: ROE (M1), Market capitalization to book value (M2), Total debt/total capital (M3)
- The output include: Loan loss provision to total loan ratio (O1)



**Fig.1** - DEA 2 stage efficiency measurement process

**Software**

Software R is used with package ‘benchmarking’ to measure the efficiency of process.

#### 4 EMPIRICAL RESULTS

DEA 2 stage is applied for the set of data using variable return to scales technology (VRS) and input orientated efficiency. There is the significant different between 2 stages. The mean of efficiency score for 2 stages are 0.931 and 0.844 respectively. (Tab.3)

The first stage showed higher ES and has more efficient DMUs than the second stage. The discrepancy between these two outcomes suggested that even when one bank is evaluated as efficiency in performance based on the governance indicator, that bank could be inefficiency in controlling Loan loss provision.

**Tab.2** - Descriptive statistics

Variable	Mean	S.E	Median	S.D	Kurtosis	Skewness	Range
<b>I1</b> Size of board	13.15	0.56	13.00	2.52	1.63	0.84	11.00
<b>I2</b> Audit committee meeting	11.20	0.99	12.00	4.44	-0.76	-0.06	16.00
<b>I3</b> % non-executive director	5.32	2.01	0.00	9.01	2.45	1.79	28.57
<b>I4</b> CEO duality	0.65	0.11	1.00	0.49	-1.72	-0.68	1.00
<b>M1</b> ROE	8.49	0.46	8.35	2.05	0.70	0.69	8.48
<b>M2</b> Market capitalization / book value	1.43	0.10	1.37	0.44	2.63	1.26	1.89
<b>M3</b> Total debt / total capital	51.21	3.37	52.38	15.06	-0.86	-0.41	47.90
<b>O1</b> Provision for Loan loss to total loan	0.33	0.06	0.36	0.27	2.58	0.71	1.23

Note: S.E: Standard error; S.D: Standard deviation

**Tab.3** - Result of VRS efficiency score.

	1 <sup>st</sup> stage	Proportion	2 <sup>nd</sup> stage	Proportion
<b>Mean Efficiency</b>	0.931		0.844	
<b>Number of Efficiency DMUs</b>	12	60	6	30
<b>0.9 – 1</b>	3	15	2	10
<b>0.8 – 0.9</b>	2	10	4	20
<b>0.7-0.8</b>	2	10	6	30
<b>0.6-0.7</b>	1	5	2	10
<b>0.0-0.5</b>	0	0	0	0

For the first stage, there are 12 Efficiency DMUs or 12 banks (60%) operate efficiency, the rest obtain efficiency score higher than 0.6 but less than 1. However, for the second stage, there are only 6 banks at efficiency frontier (30%). 70% of banks, which equivalent to 14 banks, are not located at the frontier efficiency. 20% of the bank have the ES at the second stage higher than at the first stage. C US Equity, CFR US Equity, IBKC US Equity, TFSL US Equity are four banks at optimal efficiency (ES =1) for both stages. (Tab.4)

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The outcomes are investigated more deeply. 60% of banks have the efficiency score of the second stage smaller than the first stage, 20% of them stay constant and the rest of banks (20%) have the ES of the second stage higher than the first stage. There are 3 banks (PNC US Equity, BBT US Equity, HBAN US Equity) are both referred as ‘low inefficiency score’. (Tab.4).

**Tab.4 - The efficiency score of each bank**

<b>Ticker</b>	<b>Full- Name</b>	<b>ES 1</b>	<b>ES2</b>	<b>ES1-ES2</b>
WFC US Equity	Wells Fargo & Co	1.00	0.66	0.34
CAT1 US Equity	Caterpillar Inc.	0.99	0.84	0.15
JPM US Equity	JPMorgan U.S. Equity	1.00	0.71	0.29
BAC US Equity	Bank of America	0.74	0.90	-0.16
C US Equity	Citigroup US	1.00	1.00	0.00
CFG US Equity	Citizens Financial Group	0.81	1.00	-0.19
USB US Equity	US Bancorp	1.00	0.71	0.29
NYCB US Equity	New York Community Bancorp	1.00	0.83	0.17
BKU US Equity	Bank United Inc.	1.00	0.65	0.35
CMA US Equity	Comerica Incorporated	1.00	0.94	0.06
CFR US Equity	Cullen/Frost Bankers	1.00	1.00	0.00
ASB US Equity	American Saving bank	1.00	0.82	0.18
NBTB US Equity	NTP Bancorp	1.00	0.72	0.28
WTFC US Equity	Wintrust Financial Corporation Common Stock	0.92	1.00	-0.08
VLY US Equity	Valley National Bancorp	0.94	0.77	0.18
PNC US Equity	PNC Financial Services Group	0.84	0.78	0.06
IBKC US Equity	IBERIABANK Corp	1.00	1.00	0.00
TFSL US Equity	TFS financial Corp	1.00	1.00	0.00
BBT US Equity	BB&T Corp	0.62	0.85	-0.23
HBAN US Equity	US Huntington Bancshares Inc/OH	0.75	0.71	0.04

The average comparison between subset groups is investigated. The subsets are created as follows: After measuring the efficiency, for the first stage, the total data is divided into 2 groups: Efficiency (E-stage1) and Inefficiency groups (Ine-stage 1) (Tab.5). Efficiency group includes banks with ES=1, and the rest are included in the Inefficiency group. It is interesting to note that the average value of Total, in most of the cases, is between Efficiency and inefficiency groups. Broadly speaking, values for average of most of E-stage 1 group are higher than Ine-stage 1 group. Hence, this might lead to an general conclusion that banks with higher Board size, Audit Committee meeting, Percentage of non-executive director, CEO Duality, tend to perform more efficiency than the others (the performance ratios are ROE, Market capitalization /Book value and Total debt/Total capital).

The similar process is applied for the second stage. The 2 subsets are E-stage 2 and Ine-stage2. There is also the different between E-stage and Ine-stage, and average of total value is in between. However, for this stage, the different is not very significant as the 1 stage. The reason might be the number of efficiency score is not big enough to create the different.

However, it can be reported that banks with lower ROE and Total debt/total capital tends to have more chance to be at optimal efficiency for the Loan Loss provision controlled.

**Tab.5** - Compare the average of subset groups of stage 1

Variable	E- stage 1	Ine- stage 1	TOTAL
<b>I1</b>	12.42	14.25	13.15
<b>I2</b>	11.83	10.25	11.20
<b>I3</b>	7.53	2.00	5.32
<b>I5</b>	0.50	0.88	0.65
<b>M2</b>	8.77	8.06	8.49
<b>M4</b>	1.54	1.28	1.43
<b>M5</b>	54.74	45.92	51.21

*Note: E-sample: Efficiency sample: the group with ES=1, Ine-sample: Inefficiency sample: the group with ES<1*

**Tab.6** - Compare the average of subset groups of stage 2

Variable	E-stage 2	Ine-stage 2	TOTAL
<b>M2</b>	7.21	9.04	8.49
<b>M4</b>	1.52	1.40	1.43
<b>M5</b>	42.99	54.73	51.21
<b>O1</b>	0.38	0.31	0.33

*Note: E-sample: Efficiency sample: the group with ES=1, Ine-sample: Inefficiency sample: the group with ES<1*

## 5 CONCLUSION

Even though it has been nearly a decade since the bankruptcy of Lehman Brother, which used to be one of the biggest banks in US, the stories and behind reasons lead to this failure, still is discussed nowadays. Hence, it is not exaggerated to say that US banks, especially the top big ones, have significant influence on economic system not only in US, but also in the world. Therefore, it is important and also interesting to analysis about the efficiency on these banks.

DEA, at the present, is considered as a ‘new’ method; however, there are several publications that use this model and applied for several fields. As mentioned in literature reviews part, most of these articles focus on the performance of bank more than on loan issues.

In this paper, DEA 2 stage is applied via variable returns to scale technology (VRS) to calculate the efficiency score. The result suggested that most of banks are operated relatively efficiency in both stage. For the first stage, the average efficiency score is 0.931 and for the second stage is 0.844. It is also noted that these banks seem to operate more efficiency at the first stage more than in the second stage.

There are only 4 banks (C US Equity, CFR US Equity, IBKC US Equity and TFSL US Equity), are considered as at optimal efficiency for both Governance and Loan loss provision controlled. Besides, 3 banks (PNC US Equity, BBT US Equity and HBAN US Equity) are referred as ‘low inefficacy score’ for both paces.

The results also proposed that the banks with higher board size, number of audit committee meeting, proportion of non-executive director and CEO duality tends to obtain better bank

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performance. This experiment suggested that banks with lower ROE and Debt to capital ratio appear to have higher efficiency score in Loan loss provision controlled.

In this pilot research, I focus only on calculating the efficiency of bank on 2 stages: Governance and Loan Loss Provision controlled. I am currently working on the next step of this project by evaluating the efficiency and predict the appropriate value for each variable that help banks obtain the optimal efficiency.

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## The Effects of Paris Climate Agreement on Stock Markets: Evidence from the German Stock Exchange

*Huy Nguyen Anh Pham, Van Tran Hong Nguyen*

### ABSTRACT

*The paper investigates the effects of the 2016 Paris Climate Agreement on the German stock market. Our sample includes 20 announcements around the Paris Climate Agreement and 17 industries in Germany. We adopt and modify event study methodology developed by Brown and Warner (1980, 1985) and find that Paris Climate Agreement affected polluting industries in the short-term in terms of risk and return. Furthermore, we observed diamond risk structures when (1) COP 21 took place and (2) Paris Climate Agreement came into force. Our results suggest that Paris Climate Agreement is achieving its objectives in the short-term.*

**Keywords:** *Paris Climate Agreement, Event Study, Abnormal Return, Systematic Risk, Diamond Risk Structure*

**JEL Classification:** G1, G14, G19

### 1 INTRODUCTION

The 2015 Paris Climate Agreement at Conference of Parties (COP) 21, known as 2015 Paris Climate Conference, was a historic achievement in the war against climate change and the agreement has drawn an enormous attention from many countries across the globe. According to UNFCCC (2015)<sup>1</sup>, it was the first time in over 20 years of UN negotiations, a COP aimed to reach an agreement on a legally binding and worldwide climate agreement. The Paris Climate Agreement has five important points including (1) forcing participating countries to submit their national climate goals every five years and the target is expected to represent a “progression” beyond the previous target”, (2) limiting the increase of global temperature at 1.5 degrees Celsius above preindustrial levels, (3) setting a long-term emissions reduction goal in which the aim is to achieve net-zero emissions between 2050 and 2100, (4) establishing global stock-taking sessions every five years to review collective progress of participating countries toward the temperature and long-term emissions reduction goals and (5) forming a legally binding accountability framework for participating parties. Following the Paris Climate Agreement<sup>2</sup>, the countries that signed and ratified the agreement will control, plan and frequently report their own contribution toward global warming mitigation. Unlike its predecessor, the Kyoto Protocol, the Paris Climate Agreement follows a “bottom up” approach in which the national reduction targets will be voluntarily submitted to the agreement and these targets are not legally enforced. Moreover, the agreement encourages the participating parties to set ambitious targets and strive to achieve their goals.

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<sup>1</sup> Accessed the following website on 01/07/2017: <http://unfccc.int/resource/docs/2015/cop21/eng/109r01.pdf>

<sup>2</sup> Accessed the following website on 01/07/2017:

[https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg\\_no=XXVII-7-d&chapter=27&clang=\\_en](https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en)

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As a leading nation in the European Union (EU), Germany has ratified to cut down 2.56% of greenhouse gases (GHG) emission in the Paris Climate Agreement that ranks the highest among the EU countries and 6<sup>th</sup> in the world. It is considered as an ambitious goal since Germany is one of the world's top GHG emitters (Netherlands Environmental Assessment Agency, n.d.) and the country relies heavily on fossil fuel for electricity, thus the Paris Climate Agreement has put an enormous pressure to reduce GHG emission on the German sectors.

This paper focuses on the effects of 20 announcements around the Paris Climate Agreement between 2014 and 2016. Following Brown and Warner (1980, 1985), Ramiah, Pham and Moosa (2016) and Pham, Ramiah, Moosa and Nguyen (2017), we use event study methodology to examine the changes in the wealth of shareholders and the systematic risk of German sectors. The general observation is that several polluting industries are negatively affected by the announcements around Paris Climate Agreement and the changes in systematic risk of the industries create diamond risk structures.

## 2 LITERATURE REVIEW

Global warming and its consequences have been recognized as a major threat to many nations around the globe. One of the main reasons of global warming is the increase in GHG emissions due to the exponential growth in industrial activities. The importance of the reduction in GHG emissions has been emphasized by many researchers and scientists. Currently, several international climate agreements/treaties have been in place and many countries have implemented a numerous amount of environmental regulations to force the industries to cut down their CO<sub>2</sub> emissions. Kyoto Protocol, for instance, was one of the first international treaty that forced the participating countries to reduce their GHG emissions (UNFCCC, 1998). At the regional level, European Union (EU) has implemented various environmental regulations to mitigate the effects of global warming. The most notable effort of the EU is that they have successfully established the European Union Emission Trading System<sup>3</sup>. After the expiration of the Kyoto Protocol, Paris Climate Agreement has become the most important environmental agreement at the international level although it has received criticisms on its focus on the threshold of 1.5 degree Celsius (Simon, 2016).

The increase in the amount of environmental regulations has been greatly supported by the environmentalist, the industries, however, are facing adverse effects of these environmental regulations. Many studies have examined the effects of environmental news on different stock markets such as Hamilton (1995), White (1995), Klassen and McLaughlin (1996), Bosch, Woodrow and Lee (1998), Lanoie, Laplante and Roy (1998) and, Lorraine, Collison, and Power (2004). Generally, the authors find that unfavourable environmental news tend to produce negative abnormal returns and vice versa. Furthermore, the findings of those studies indicate that stronger and better environmental management will lead to positive stock returns.

On the other hand, Ramiah, Martin and Moosa (2013) found evidence showing that the environmental regulations might not achieve their desire effects. The authors showed that the Australian electricity sector did not experience any reaction following the announcements of green policy and hence, they suggested that the sector might have the ability to pass the costs onto consumers. Their results support the findings of Veith et al. (2009) that indicate

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<sup>3</sup> Access the following website on 20/07/2017: [https://ec.europa.eu/clima/policies/ets\\_en](https://ec.europa.eu/clima/policies/ets_en)



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European electricity providers can pass the costs which were caused by the rising price of European emission allowances to the consumers.

Other studies have examined the changes in systematic risk following the announcements of environmental policies. Ramiah et al. (2013), for instance, found that both sectoral short-term and long-term systematic risks were affected by the environmental policies. Furthermore, the authors showed evidence of “diamond risk structure” when the Australian Parliament had some disagreement about certain policies. In addition, other evidence of various systematic risk patterns was found by Ramiah, Pichelli and Moosa (2015a and 2015b) in which the results showed that the systematic risk of polluting (environmentally-friendly) sectors increased (decreased) over time in the U.S. and China.

The literature has shown that several studies investigate the effects of environmental regulations on the stock markets in terms of risk and return. However, there is little evidence showing the effects of Paris Climate Agreement on the German stock market. Therefore, our study attempts to contribute to the literature by examining the effects of announcements around Paris Climate Agreement on risk and return of the German sectors.

### 3 METHODOLOGY

Following Brown and Warner (1985), Ramiah, Pham and Moosa (2016) and Pham, Ramiah, Moosa and Nguyen (2017), we calculate abnormal returns (AR) by adjusting the daily returns to obtain *ex post* abnormal returns where adjustments are approximated by the CAPM. We then group the AR into industries to acquire the industry ( $I$ ) abnormal returns at time  $t$  ( $AR_{it}$ ) and use the t-statistic to find out if the AR are statistically significant. Following the announcements around Paris Climate Agreement, possible outcomes include (1) positive AR if the announcements have positive effect on the industries, (2) negative AR if the announcements have negative effect on the industries and (3) no AR if the announcements have no effect on the industries. According to the efficient market hypothesis (EMH), the stock reacts instantly to any available information and it is reflected on the stock price. The market, however, might anticipate the announcements around Paris Climate Agreement that leads to the failure of EMH and the German industries/sectors might over-react or under-react to these announcements. Thus, we estimate the cumulative abnormal returns (CAR) five days before and after the announcement dates to check the existence of market anticipation and find out if the market price continues to deviate from its mean price. We use the t-statistic to determine if the results are statistically significant.

One of the criticisms of the Brown and Warner (1985) approach is the bias in the calculation of t-statistic because the distribution of abnormal returns is not normal. Thus, we adopt the Corrado (1989) non-parametric ranking test as the first robustness test. The advantage of this test is that it normalises the distribution of abnormal returns and a non-parametric t-statistic is estimated to determine if abnormal returns exist on the event day. Furthermore, we employ the non-parametric conditional distribution approach (Chesney et al., 2011) as the second robustness test. The advantage of this approach is that the Kernel estimation does not require the specification of a regression equation or the distribution of the error term.

As Paris Climate Agreement comes into effect, businesses might have to operate in a different environment that leads to changes in systematic risk. We modify the asset pricing model and include interaction variables to capture the changes in systematic risk. Following Ramiah, Martin and Moosa (2013), Ramiah, Pham and Moosa (2016) and, Pham, Ramiah,

Moosa and Nguyen (2017), we create an aggregate dummy variable ( $AD_{Paris}$ ) to represent all the announcements that has the value of one on the event date and zero otherwise. We then multiply the  $AD_{Paris}$  by the German market risk premium to create the first interaction variable.

The first risk model to calculate the aggregate effect of the announcements on the German stock market is as follow:

$$\tilde{r}_{it} - \tilde{r}_{ft} = \beta_i^0 + \beta_i^1[\tilde{r}_{mt} - \tilde{r}_{ft}] + \beta_i^2[\tilde{r}_{mt} - \tilde{r}_{ft}] * AD_t + \beta_i^3 AD_t + \tilde{\varepsilon}_{it} \quad (1)$$

where  $\tilde{r}_{it}$  is industry  $i$ 's return at time  $t$ ,  $\tilde{r}_{ft}$  is the risk-free rate at time  $t$ ,  $\tilde{r}_{mt}$  is the market return at time  $t$ ,  $AD_{Paris}$  is a dummy variable that takes the value of one on the announcement date and zero otherwise,  $\tilde{\varepsilon}_{it}$  is the error term,  $\beta_i^0$ , is the intercept of the regression equation ( $E(\beta_i^0) = 0$ ),  $\beta_i^1$  is the average systematic risk of the industry and  $\beta_i^2$  captures the aggregate change in systematic risk of Equation (1).

The problem of Equation (1) is that each announcement may have opposite effects on the industries and their outcomes may cancel each other and hence, we employ the second model whereby we create an individual dummy variable ( $ID_{Pn}$ ) for each announcement ( $n$ ). The  $ID_{Pn}$  takes the value of one on the announcement date and zero otherwise. Similar to Equation (1), we multiply each individual dummy variable by the German market risk premium to obtain interaction variables and the short-term change in systematic risk are shown by the coefficients of the interaction variable. The model is then written as follows:

$$\tilde{r}_{it} - \tilde{r}_{ft} = \beta_i^0 + \beta_i^1[\tilde{r}_{mt} - \tilde{r}_{ft}] + \sum_{n=1}^N \beta_i^2[\tilde{r}_{mt} - \tilde{r}_{ft}] * ID_{Pn} + \tilde{\varepsilon}_{it} \quad (2)$$

Moreover, we estimate the long-term effects on systematic risk by re-estimate Equations (2) in which the individual dummy variables (ID) take the value of zero prior to the announcement date and one for the subsequent periods.

#### 4 DATA

We collect the return index of 16 industries, DAX30 as market return and 3-month deposit rate as risk-free rate for the period between 2013 and 2017 from Datastream. The announcements around Paris Climate Agreement are collected from the European Council<sup>4</sup>. Table 1 lists 20 important events around the Paris Climate Agreement from 2014 to 2016.

<sup>4</sup>Access the following website on 20/07/2017:

<http://www.consilium.europa.eu/en/policies/climatechange/timeline/>

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**Tab.1** - Announcements around Paris Climate Agreement

Date	Event	Description
23/10/2014	1	Agreement on the climate and energy policy framework for 2030.
3/06/2015	2	The intended nationally determined contribution (INDC) is submitted to the UNFCCC by the EU.
18/09/2015	3	The EU solidifies its objective of keeping global warming below 2°C.
10/11/2015	4	EU's climate finance contributions towards the \$100 billion per year pledged by developed countries by 2020.
30/11/2015	5	COP 21 took place with the attendance of about 150 countries for a climate change agreement.
11/12/2015	6	The last day of COP 21.
12/12/2015	7	Paris Climate Agreement was reached.
17/12/2015	8	EU leaders invited the Commission and the Council to assess the results by March 2016.
18/12/2015	9	The last day of the occurrence when EU leaders welcomed the historic climate deal
15/02/2016	10	The Foreign Affairs Council adopted conclusions on European climate diplomacy after COP21.
4/03/2016	11	At the Environment Council, ministers discussed the follow-up to the Paris Agreement on climate change and its implications for EU climate policy.
22/04/2016	12	Signing of the Paris agreement. From this moment on the document is open for signature for one year.
20/06/2016	13	The Environment Council adopted a statement on the ratification of the Paris Agreement.
30/09/2016	14	The Environment Council decided to go ahead with ratification at EU level.
4/10/2016	15	Council adopted the decision on the EU ratification of the Paris Agreement which comes into effect from the moment of deposit of the decision.
5/10/2016	16	EU officially ratified the Paris Climate Agreement.
7/10/2016	17	EU celebrates the deposition of instruments of the Paris Climate Agreement.
11/10/2016	18	The Economic and Financial Affairs Council adopted Council conclusions on climate finance.
25/10/2016	19	EU will scale up its international climate finance contribution towards the \$100 billion per year goal set for industrialised countries by 2020 and through until 2025.
4/11/2016	20	Paris Agreement entered into force.

## 5 FINDINGS

Table 2 shows 11 different sectors experiencing positive ARs, negative ARs and mixed reactions following these announcements. When we estimate the CAR, we find that a few sectors reacted before and after the announcement dates (see Tables 3 and 4). Generally, we observe that German sectors react differently to the announcements around the Paris Climate Agreement. However, we find that telecommunication is the only sector which has no reaction to the announcements of the Paris Climate Agreement.

**Tab.2** - Industrial Reactions following Announcements around Paris Climate Agreement

Industry	Date	AR (%)	t-stat
Automobile	15/02/2016	2.45	2.37
Banks	10/11/2015	-1.73	-2.26
Basic Resources	11/12/2015	-7.91	-6.29
Construction	15/02/2016	1.96	2.17
	4/03/2016	1.94	2.12
Consumer Discretionary	10/11/2015	-1.41	-2.10
	18/12/2015	1.36	1.99
	15/02/2016	3.57	4.68
Financial Services	5/10/2016	-2.20	-2.66
Industrial	23/10/2014	-1.17	-2.22
	15/02/2016	1.67	2.94
Media	18/12/2015	1.44	2.01
	30/09/2016	-1.44	-2.06
Retail	11/10/2016	1.49	2.08
Software	18/09/2015	1.28	2.04
Technology	15/02/2016	1.84	2.35

### 5.1 Analysis of Abnormal Returns

We find 5 sectors that exhibit positive reactions are automobiles, construction, retail, software, and technology (see Table 2). Technology industry, for instance, is considered as an environmentally-friendly industry and hence, its positive reaction to the announcements around the Paris Climate Change is expected. However, the results show that polluting industries such as automobiles and construction experience positive reactions. The results are consistent to the findings of Veith et al. (2009) and Ramiah et al. (2013) in which the authors posit that polluting industries could pass on the costs to the customers.

On the contrary, we observe that banks, basic resources, and financial services experience negative ARs. The basic resources industry, for instance, had a negative AR of -7.10% with a t-statistic of -6.29 in the last day of COP 21. This industry is a polluting industry and the Paris Climate Agreement, which aims to reduce carbon dioxide emissions, was signed after the conclusion of COP, therefore the negative reaction from basic resources industry was predictable. When we employ the robustness tests, the result of Corrado ranking test supports this finding. However, we find that banks and financial services industries react negatively to the announcements around Paris Climate Agreement. These industries are the main lenders of the polluting projects and the risk of these projects increases following Paris Climate

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Agreement that may make it harder or longer for the lenders to recoup their money. Thus, the negative AR reflect the changes in operating environment of these industries. The robustness tests only support the result of financial services industry.

Furthermore, our results indicate that several sectors exhibit mixed reactions. Consumer industry, for example, had a negative reaction of -1.41% (with a t-stat of -2.10) on 10 November 2015 when the developed countries pledge to contribute \$100 billion dollars per year to EU's climate finance. This sector, however, had positive reactions of 1.36% (with a t-stat of 1.99) and 3.57% (with a t-stat of 4.68) when there were announcements around the conclusion of the historic climate deal on 18 December 2015 and 15 February 2016 respectively.

**Tab.3** - Robustness Tests for Industrial Reaction following Announcements around Paris Agreement

Industry	Date	tCorrado	Chesney	
			CP	t-stat
Automobile	15/02/2016	1.86	0.08	1.69
Banks	10/11/2015	1.54	0.28	0.64
Basic Resources	11/12/2015	-2.74	0.50	0.00
Construction	15/02/2016	1.91	0.13	1.29
	4/03/2016	0.84	0.22	0.85
Consumer Discretionary	10/11/2015	-1.87	0.50	0.01
	18/12/2015	0.34	0.45	0.14
	15/02/2016	1.80	0.49	0.02
Financial Services	5/10/2016	-2.87	0.02	2.80
Industrial	23/10/2014	-1.41	0.40	0.26
	15/02/2016	1.71	0.24	0.77
Media	18/12/2015	0.61	0.49	0.01
	30/09/2016	-2.02	0.04	2.21
Retail	11/10/2016	2.41	0.48	0.05
Software	18/09/2015	2.83	0.13	1.30
Technology	15/02/2016	2.32	0.46	0.11

### *Market Anticipation*

The debate about Paris Climate Agreement had been around before it came into force. Therefore, it is possible that the information is leaked or the market has anticipated the news before it is officially announced. Table 4 displays the industries' cumulative reaction five days before the event date. Our results show evidence of market anticipation in which we find 4 industries including construction, financial services, media and technology experiencing negative CARs 5 days before the signing of Paris Climate Agreement on 22 April 2016. The construction industry, for instance, experienced a negative CAR(-5) of -4.09% (with a t-stat of -2.26).

**Tab.4** - Sectoral Reactions due to Market Anticipation to the Announcements

Sector	Date	CAR(-5) (%)	t-stat
Automobile	23/10/2014	2.85	2.31
	4/03/2016	7.71	2.87
Banks	4/03/2015	5.57	2.63
Basic Resources	17/12/2015	-8.17	-2.77
	18/12/2015	-8.96	-3.03
Chemicals	18/09/2015	-3.04	-2.45
	25/10/2016	-2.50	-2.01
Construction	15/02/2016	-4.33	-2.47
	22/04/2016	-4.09	-2.26
	20/06/2016	-5.46	-2.74
Consumer Discretionary	15/02/2016	-4.36	-2.70
Financial Services	23/10/2014	3.14	2.58
	15/02/2016	-4.65	-2.59
	22/04/2016	-5.54	-2.79
	7/10/2016	-5.07	-2.76
	11/10/2016	-4.40	-2.40
Media	22/04/2016	-3.32	-1.96
Software	10/11/2015	2.62	2.04
	15/02/2016	-3.74	-2.54
Technology	11/12/2015	-3.69	-2.24
	17/12/2015	-4.86	-3.03
	15/02/2016	-3.57	-2.06
	22/04/2016	-3.71	-1.97
	15/02/2016	-3.60	-2.25
Transport and Logistics	15/02/2016	-3.60	-2.25
	20/06/2016	-4.28	-2.57

### *Delayed Reactions*

The industries may continue to react to the same piece of information after the event date or their reaction to the event is disseminated a few days after the event date and hence, we address this problem by calculating the cumulative abnormal returns 5 days after the event date. Table 5 shows 14 sectors that experienced delayed reaction to the announcements around Paris Climate Agreement. Our results indicate that most sectors exhibit negative CAR(5). Technology industry, for instance, had a CAR(5) of -2.97% (with a t-stat of -1.97) following the announcement of the EU about its objective of keeping global warming below 2°C on 18 September 2015 (announcement 3).

On the other hand, we find that three sectors including basic resources, food and beverages, transport and logistics experienced positive CAR (5). Furthermore, we observe that insurance, retail and software industries exhibited both negative and positive reactions. For instance, following the opening day for signing the Paris Agreement (announcement 12), software sector had a positive CAR (5) of 3.21% with a t-stat of 2.04 whereas the industry experienced a negative CAR (5) of -3.06% on announcement 17 when EU was celebrating the deposition of instruments of the Paris Climate Agreement.

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**Tab.5** - Delayed Sectoral Reactions following the Announcements around Paris Climate Agreement

Sector	Date	CAR(5) (%)	t-stat
Automobile	18/09/2015	-10.76	-4.79
	20/06/2016	-6.35	-2.27
Banks	20/06/2015	-6.53	-2.46
Basic Resources	15/02/2016	7.93	2.66
Construction	20/06/2016	-6.82	-3.44
Consumer Discretionary	3/06/2015	-2.83	-2.17
Financial Services	30/09/2016	-4.01	-2.18
	4/11/2016	-4.01	-2.08
Food and Beverages	18/09/2015	19.32	3.32
Industrial	7/10/2016	-3.16	-2.67
Insurance	4/03/2016	2.89	2.16
	20/06/2016	-3.33	-2.34
Retail	20/06/2016	-3.12	-2.08
	4/10/2016	3.11	2.21
Software	22/04/2016	3.21	2.04
	7/10/2016	-3.06	-2.04
Technology	18/09/2015	-2.97	-1.97
Transport and Logistics	22/04/2016	3.43	2.16
Utilities	4/11/2016	-8.08	-3.16

## *Risk Analysis*

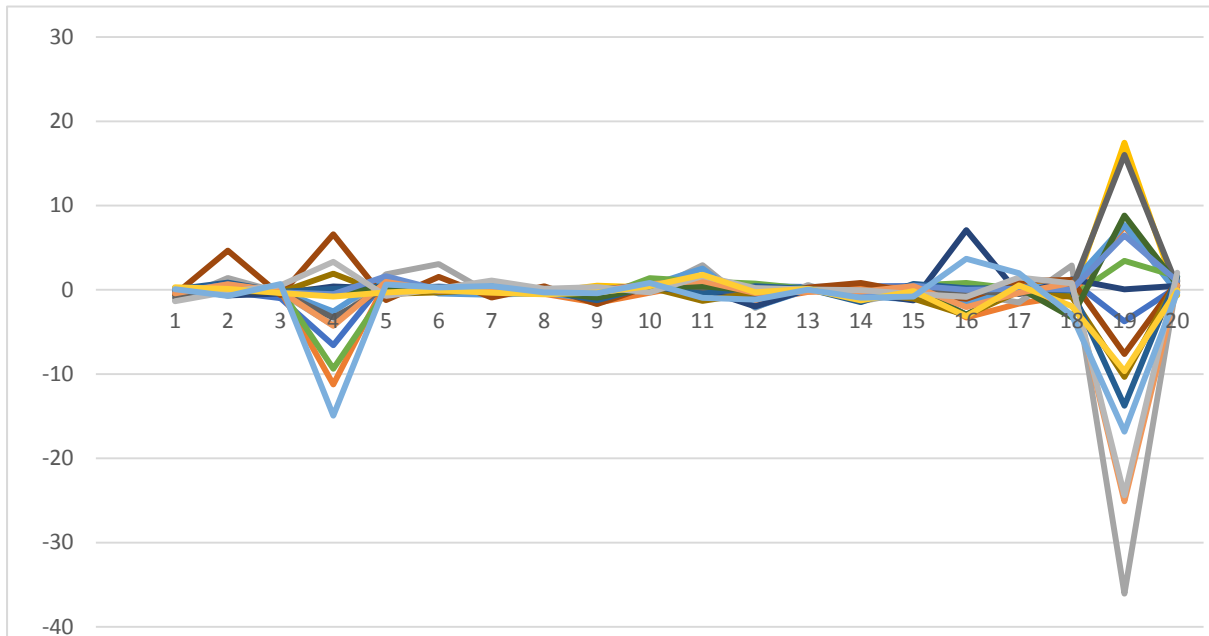
Following the announcements of Paris Climate Agreement, we find three industries including automobile, basic resources and consumer discretionary which experience the changes in aggregate systematic risk (see Table 6). Automobile industry, for instance, exhibited a decrease in aggregate systematic risk (decrease from 0.99 to 0.04) while basic resources and consumer discretionary industries experienced an increase in aggregate systematic risk (increase from 0.8 to 1.18 and from 0.45 to 0.64 respectively).

**Tab.6** - Changes in Aggregate Systematic Risk following Announcements around Paris Climate Agreement

Sector	Intercept	t-stat	Beta	t-stat	Change in Beta	t-stat
Automobile	0	1.27	0.99	77.09	-0.95	-18.68
Basic Resources	0	0.95	0.8	36.08	0.38	2.34
Consumer Discretionary	0	0.62	0.45	41.72	0.19	2.37

In addition, we find evidence of two clear diamond risk structures around the announcement dates (see Figure 1). The first diamond risk structure took place around announcement 3, 4 and 5 when the EU strengthened its contribution toward climate finance and the first day of

COP 21. The second diamond was observed around announcement 18, 19 and 20 when Paris Climate Agreement came into force. Our results confirm the effects of Paris Climate Agreement on the changes in systematic risk whereby several industries experienced an increase in systematic risk while other industries exhibited a decrease in systematic risk.



**Fig.1** - Individual Short-term Sectoral Changes in Systematic Risk following Paris Climate Agreement

## 6 CONCLUSIONS

After the failure to extend Kyoto Protocol, Paris Climate Agreement is the next development of UNFCCC to fight against global warming. The aim of this agreement is to reduce GHG emissions continuously and progressively at the global scale by encouraging the countries to adopt clean technology and make a transition to a low carbon economy. Our study shows that several polluters such as basic resources, chemicals and industrial industries were affected by the announcements around Paris Climate Agreement whereby the shareholders of these sectors exhibited value destruction (at least in the short-term). Therefore, we argue that Paris Climate Agreement is achieving its objectives in the short-term. Furthermore, we find evidence of diamond risk structure due to the uncertainties created by Paris Climate Agreement.

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## The Effects of Information Disclosure Regulation on the Vietnamese Stock Exchange

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### ABSTRACT

*The study investigates the effects of regulation on information disclosure on the Vietnamese stock exchange. Using event study methodology, we examine the reaction of the sectors in Vietnam following the announcements of the regulation. We find evidence showing the market anticipation of the regulation in which most sectors experience negative reactions two and five days before the first announcement on the information disclosure regulation. However, our results indicate that the sectoral reactions are positive on the announcement date and the sectors continue to react in the same direction two and five days after the event day. In addition, we observe that most sectoral reaction is mainly driven by certain firms.*

**Keywords:** *Information Disclosure, Sectoral Reaction, Abnormal Returns, Market Anticipation*

**JEL Classification:** G1, G11, G14

### 1 INTRODUCTION

There has been a shift in research focus recently as researchers are paying more attention to emerging markets in which they examine the effects of regulatory changes on the stock market in terms of risk and return. Most recently, Pham, Ramiah, Moosa and Nguyen (2017), for instance, find evidence showing the mixed effects of regulatory changes in banking regulation on the Vietnamese stock exchange. In addition, several other studies focus on other emerging markets such as China, Asian and Latin American markets (Fu and Heffernan, 2009; Lin and Zhang, 2009; Gan et al., 2014 and Goddard et al., 2012). However, most studies focus on various regulations and the effects of a particular set of regulation at sectoral and firm levels have not been examined closely. Therefore, this study aims to investigate the effects of changes in regulations on information disclosure on the Vietnamese stock exchange.

Following Pham et al. (2017), we examine the sectoral reactions following the announcements around regulations on information disclosure. We employ event study methodology to achieve our objectives and control for firm-specific news as a robustness test. In addition, we analyse the reaction at the firm level in which we identify the reaction of each firm within a sector. Overall, we observe that the Vietnamese stock market only react to the first announcement around the regulation on information disclosure. Nevertheless, our results show that the reaction is concentrated on certain firms.

### 2 LITERATURE REVIEW

The Vietnamese stock market consists of two stock exchanges: Ho Chi Minh Stock Exchange (HOSE) and Ha Noi Stock Exchange (HNX). HOSE was established in 2000 and HNX was

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established in 2005. After two these stock exchanges putting into operation, Ministry of Finance issued its first information disclosure regulation, which was Circular 38/2007/TTBTC Guidance for Information Disclosure on the Stock Exchange, in April 2007. This Circular was revised and updated three times later: Circular 09/2010/TT–BTC in January 2010, Circular 52/2012/TT–BTC in April 2012, and Circular 155/2015/TT–BTC in October 2015. The Circular specifically addresses the issue of externally based financial reporting of listed firms, which marks the beginning of specific disclosure rules and regulations by the Vietnamese authority to improve the level of information transparency of Vietnamese listed firms.

There has been extensive research conducted on the effect of regulatory announcements on financial markets, the majority of which has focused on developed markets (Antoniou and Pescetto, 1997; Berk and Rauch, 2016; Ikhlās, 2014). Although the impact of regulations on stock return is examined by many studies, the results are still mixed. Some evidence shows that regulatory announcements do not lead to changes in stock return. However, other evidence demonstrates that financial markets are sensitive to these announcements (Prasanna, 2011; Ramiah, Martin and Moosa, 2013; Stigler, 1964a, 1964b)

Reviewing relevant literature on the impact of regulatory announcements on equities markets has revealed a gap in Vietnamese research. Recently, Pham et al. (2017) investigate the market's reaction to bank regulatory announcements across financial and non-financial sectors in the Vietnamese equity market. They find evidence for both negative and positive reactions as well as risk shifting behaviour in the form of a diamond risk structure (Pham et al., 2017). However, their paper focuses on bank regulatory announcements while our paper examines changes in information disclosure regulation. Increasing information transparency leads to investors' activities in the stock market (Hoang, 2017). In addition, information disclosure regulation is a form that represents for policy of the government and it cannot fit well with a lot of changes over time. That means at a certain time, this regulation was reformed and the changes in regulation may affect the stock market in several aspects. Therefore, our paper investigates whether the changes in information disclosure regulation influence the Vietnamese equity market.

### 3 METHODOLOGY

We adopt and modify the event methodology developed by Brown and Warner (1985) to examine the impact of the changes in information disclosure regulation. The daily returns from each company within a sector are adjusted using CAPM to calculate their abnormal returns. The sectoral abnormal return is then estimated by averaging the abnormal returns of each company within a sector and the process is repeated for all event dates. According to Pham, Ramiah, Moosa and Nguyen (2017), the sectoral reactions to a regulatory change on the stock market can take place in three forms including positive, negative or mixed. The authors claim that the sectors will react positively if they perceive the news as favourable and vice versa. The mixed reaction exists when the sector reacts positively to one announcement and negatively to other announcements. We employ the standard t test to check if the abnormal returns are statistically significant.

One of the problem with event study methodology is to control for the market anticipation of the events. Thus, we estimate the cumulative abnormal returns (CAR) of two and five days before the event date to examine this effect. Moreover, we calculate the CAR of two and five days after the event date to check the existence of information diffusion whereby the sector

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continues to react to the same information over the next two or five days. The standard t test is used to decide if these results are statistically significant. Another problem of this approach is to capture the true effect of the events on the stock market since it is difficult to separate the effects of the event from other firm-related news. Consequently, we remove all the firms that release news within a window of fifteen days before and after the event dates, and obtain new abnormal returns that act as the robustness test.

Furthermore, the effects of changes in regulation may vary across each firm within a sector as each firm may have different characteristics. Therefore, our study analyses the reaction of each firm within a sector to examine how the reaction of the sectors is driven. The purpose of this exercise is to check whether the reaction is concentrated or dispersed among the firms.

## 4 DATA

We downloaded the return index for each company of 34 sectors in the Vietnamese stock exchange, MSCI Vietnam as a proxy for market return, 3-month deposit rate as risk-free rate for the period between 2006 and 2016 from Datastream. We collected the announcements of the regulation on information disclosure from Ministry of Justice website. The announcements are listed in Table 1.

**Tab.1** - Regulation of Information Disclosure on Vietnamese Stock Exchange from 2005 to 2017

Regulation	Date of issue
Circular 38/2007/TT-BTC	18/04/2007
Circular 09/2010/TT-BTC	15/01/2010
Circular 52/2012/TT-BTC	05/04/2012
Circular 155/2015/TT-BTC	06/10/2015

## 5 FINDINGS

Table 2 indicates 20 sectors that experience statistically significant reactions following the announcements of regulation on information disclosure. We find that most reactions fell on 18 April 2007 when the Ministry of Finance issued Circular 38/2007/TT-BTC which was about the guidance on information disclosure of listed firms (see Table 2). We posit that the market tends to react to the first announcement of the regulation only and any other subsequent amendments of the same regulation would not cause any impact on the market. Our results show that 19 sectors reacted positively to this event. Banking sector, for instance, experienced an abnormal return of 3.72% (with a t-stat of 2.65). However, we find that financial services sector is the only sector that had a negative reaction of -3.95% (with a t-stat of -2.39) following the announcement of this Circular.

When we analyse the sectoral reactions two and five days before the announcement of the Circular 38/2007/TT-BTC on 18 April 2007, we find evidence of market anticipation in which our results show that 15 sectors experienced either a negative CAR(-5) or a negative CAR(-2) or both (see Table 3). Banking sector, for instance, exhibited a negative CAR(-5) of

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-12.55% (with a t-stat of -3.57) and a negative CAR(-2) of -7.48% (with a t-stat of -3.53). The results of the robustness test in Table 4 support this finding. After we removed the firms with firm-specific news, the banking sector had a negative CAR(-5) of -11.97% (with a t-stat of -3.36) and a negative CAR(-2) of -6.53 (with a t-stat of -3.06). We postulate that the Vietnamese stock market could anticipate these regulatory changes and it is reflected in the stock prices.

Furthermore, Table 3 indicates the findings of delayed reaction where the sectors continue to react to the Circular 38/2007/TT-BTC on 18 April 2007 over the next two and five days. Our findings show that fifteen sectors experience either positive CAR2 or CAR5 whereas two sectors exhibit a negative CAR(5). Beverages sector, for example, experienced a negative CAR2 of 7.53% (with a t-stat of 2.60) and a negative CAR5 of 8.76% (with a t-stat of 2.13). The two sectors that exhibited a negative CAR5 are financial services (CAR5 of -13.84% with a t-stat of -3.49) and, electronic and electrical equipment (CAR5 of -15.88% with a t-stat of -3.63).

**Tab.2** - Reactions to the Announcements of Regulation on Information Disclosure (in %)

Sector	18/04/2007		15/01/2010		5/04/2012		6/10/2015	
	AR	t-stat	AR	t-stat	AR	t-stat	AR	t-stat
Banks	3.72	2.65	-0.40	-0.29	0.76	0.54	0.57	0.40
Beverages	8.54	3.76	0.52	0.23	0.89	0.39	-0.27	-0.12
Chemicals	5.47	5.15	1.12	1.06	0.29	0.28	0.53	0.50
Construction and Materials	3.19	2.58	-0.41	-0.33	0.41	0.33	-0.18	-0.15
Electricity	2.92	2.43	-0.79	-0.66	-0.59	-0.49	1.04	1.30
Electronic and Electrical Equipment	3.74	2.47	-1.73	-1.14	-0.52	-0.34	1.10	0.73
Financial Services	-3.95	-2.39	-0.11	-0.07	2.18	1.32	0.98	0.59
Food Producers	4.99	5.05	-0.23	-0.23	0.37	0.37	0.90	0.92
Forestry and Papers	5.19	2.96	-1.78	-1.02	1.24	0.71	-0.73	-0.41
General Industrials	4.73	3.62	-1.78	-1.36	0.14	0.10	0.91	0.70
General Retailers	3.95	2.61	-0.87	-0.58	-1.16	-0.76	-0.49	-0.33
Household Goods and Home Construction	6.07	4.64	-0.75	-0.57	0.39	0.30	-0.15	-0.11
Industrial Metals and Mining	4.53	3.05	0.38	0.25	-0.32	-0.22	-0.74	-0.50
Industrial Transportation	4.66	3.79	-0.20	-0.16	0.32	0.26	1.95	1.59
Media	8.88	4.51	0.81	0.41	1.08	0.55	2.51	1.27
Personal Goods	2.97	2.03	-2.12	-1.45	1.54	1.05	0.37	0.25
Support Services	6.38	4.51	-0.19	-0.13	-0.12	-0.08	0.03	0.02
Technology Hardware and Equipment	4.49	2.66	1.36	0.81	0.70	0.41	0.82	0.49
Tobacco	5.23	2.29	-2.06	-0.90	4.01	1.76	0.33	0.15
Travel and Leisure	4.36	3.30	0.97	0.73	-0.55	-0.42	-0.60	-0.45

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**Tab.3** - Sectoral Reactions to Regulation on Information Disclosure on 18 April 2007 (in %)

Sector	CAR(-5)	t-stat	CAR(-2)	t-stat	AR	t-stat	CAR2	t-stat	CAR5	t-stat
Banks	-12.55	-3.57	-7.48	-3.53	3.72	2.65	-1.39	-0.66	1.17	0.33
Beverages	-13.30	-3.22	-10.56	-3.63	8.54	3.76	7.53	2.60	8.76	2.13
Chemicals	-20.11	-7.58	-6.33	-4.00	5.47	5.15	0.34	0.22	0.25	0.10
Construction and Materials	-8.05	-2.25	-4.75	-2.38	3.19	2.58	5.96	3.00	10.30	2.89
Electricity	-5.19	-4.33	-2.91	-2.42	2.92	2.43	3.08	2.56	10.77	8.97
Electronic and Electrical Equipment	-2.19	-0.53	-0.91	-0.37	3.74	2.47	-4.20	-1.78	-13.84	-3.49
Financial Services	-7.33	-1.67	-2.90	-1.19	-3.95	-2.39	-4.77	-1.97	-15.88	-3.63
Food Producers	-11.41	-4.20	-4.25	-2.71	4.99	5.05	3.44	2.21	9.63	3.55
Forestry and Papers	-5.33	-1.48	7.08	1.49	5.19	2.96	0.48	0.22	3.74	1.04
General Industrials	-10.30	-2.87	-6.32	-3.09	4.73	3.62	4.91	2.40	10.58	2.95
General Retailers	-11.85	-2.84	-6.84	-2.92	3.95	2.61	6.47	2.78	8.34	2.01
Household Goods and Home Construction	-3.31	-1.01	-4.14	-2.13	6.07	4.64	0.49	0.25	5.78	1.76
Industrial Metals and Mining	-10.65	-2.50	-1.80	-0.76	4.53	3.05	6.65	2.83	9.90	2.36
Industrial Transportation	-15.88	-4.54	-6.83	-3.48	4.66	3.79	4.22	2.15	8.82	2.53
Media	-6.88	-1.33	-9.52	-3.18	8.88	4.51	6.36	2.13	17.77	3.46
Nonlife Insurance	-15.72	-3.84	-10.03	-4.04	3.07	1.79	-1.71	-0.69	2.09	0.51
Personal Goods	-2.20	-0.54	0.17	0.07	2.97	2.03	6.64	2.91	13.89	3.40
Support Services	-15.99	-4.11	-8.37	-3.81	6.38	4.51	8.03	3.66	12.47	3.21
Technology Hardware and Equipment	-10.17	-2.35	-6.56	-2.61	4.49	2.66	8.39	3.34	18.76	4.33
Tobacco	-9.26	-2.05	-6.07	-1.97	5.23	2.29	8.36	2.72	16.68	3.72
Travel and Leisure	-6.98	-1.83	-6.34	-3.04	4.36	3.30	4.41	2.11	17.68	4.64

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**Tab.4 - Robustness Test for Reactions on 18 April 2007 (in %)**

Sector	Firm-Specific Removal									
	CAR(-5)	t-stat	CAR(-2)	t-stat	AR	t-stat	CAR2	t-stat	CAR5	t-stat
Banks	-11.97	-3.36	-6.53	-3.06	2.97	2.09	0.30	0.14	-0.54	-0.15
Beverages	-4.20	-1.02	-6.89	-2.37	8.06	3.57	1.03	0.36	7.45	1.81
Chemicals	-20.11	-7.58	-6.33	-4.00	5.47	5.15	0.34	0.22	0.25	0.10
Construction and Materials	-6.34	-1.82	-3.82	-1.91	4.94	3.91	8.82	4.43	13.27	3.83
Electricity	-5.19	-4.33	-2.91	-2.42	2.92	2.43	3.08	2.56	10.77	8.97
Electronic and Electrical Equipment	-9.04	-2.15	-4.20	-1.68	4.01	2.58	-8.18	-3.39	-18.66	-4.58
Financial Services	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Food Producers	-10.94	-4.04	-3.43	-2.19	4.59	4.66	3.25	2.09	9.09	3.36
Forestry and Papers	-8.39	-2.31	10.86	2.14	5.17	2.86	3.16	1.40	6.66	1.83
General Industrials	-12.35	-3.41	-5.99	-2.90	3.06	2.30	5.00	2.42	7.25	2.00
General Retailers	-11.85	-2.84	-6.84	-2.92	3.95	2.61	6.47	2.78	8.34	2.01
Household Goods and Home Construction	-3.31	-1.01	-4.14	-2.13	6.07	4.64	0.49	0.25	5.78	1.76
Industrial Metals and Mining	-10.63	-2.44	-0.10	-0.04	3.88	2.58	4.62	1.93	6.06	1.41
Industrial Transportation	-15.88	-4.54	-6.83	-3.48	4.66	3.79	4.22	2.15	8.82	2.53
Media	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nonlife Insurance	-18.16	-3.90	-15.04	-5.38	8.71	4.48	-3.65	-1.31	6.32	1.36
Personal Goods	-10.47	-2.45	-0.92	-0.39	3.92	2.56	12.43	5.21	23.93	5.60
Support Services	-18.94	-4.94	-9.61	-4.39	5.03	3.53	4.98	2.29	8.90	2.33
Technology Hardware and Equipment	-4.86	-1.06	-3.91	-1.48	4.96	2.82	8.73	3.31	19.47	4.24
Tobacco	-14.04	-3.19	-8.19	-2.72	3.71	1.67	5.78	1.93	11.42	2.61
Travel and Leisure	-6.98	-1.83	-6.34	-3.04	4.36	3.30	4.41	2.11	17.68	4.64

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**Tab.5** - Individual Reaction within each Sector

Sector	Total Firms	Number of	Number of Firms for Negative and Positive Reactions				
			CAR(-5)	CAR(-2)	AR	CAR2	CAR5
Banks	2		2 (-)	2 (-)	2 (+)		
Beverages	2		1 (-)	2 (-)	2 (+)	1 (+)	
Chemicals	1		1 (-)	1 (-)	1 (+)		
Construction and Materials	28		13 (-)	8 (-)	12 (+) 2 (-)	13 (+) 1 (-)	15 (+)
Electricity	2		1 (-)		1 (+)		1 (+)
Electronic and Electrical Equipment	3		1 (-)			1 (-)	1 (-)
Equity Investment Instrument	1						1 (-)
Financial Services	1						1 (-)
Food Producers	11		8 (-)	3 (-)	7 (+)	3 (+)	4 (+)
Forestry and Papers	3		1 (-)		3 (+)		1 (+)
General Industrials	6		2 (-)	3 (-)	2 (+)	2 (+)	2 (+)
General Retailers	2		1 (-)	1 (-)	1 (+)		1 (+)
Household Goods and Home Construction	1				1 (+)		
Industrial Engineering	6		2 (-)	1 (-)	1 (-), 1 (+)	3 (+)	2 (+)
Industrial Metals and Mining	3		2 (-)	1 (-), 1 (+)	3 (+)	2 (+)	2 (+)
Industrial Transportation	5		4 (-)	3 (-)	3 (+)	1 (-)	2 (+), 1 (-)
Leisure Goods	1						
Media	2			2 (-)	2 (+)	1 (+)	1 (+)
Nonlife Insurance	2		2 (-)	1 (-)	1 (+)		
Oil and Gas Producers	3		2 (-)	2 (-)	2 (+)		1 (+)
Personal Goods	2		1 (-)		1 (+)	1 (+)	1 (+)
Pharmaceuticals and Biotechnology	1						
Support Services	7		4 (-)	4 (-)	4 (+)	3 (+)	3 (+) 1 (-)
Technology Hardware and Equipment	2		1 (-)	1 (-)		2 (+)	2 (+)
Tobacco	2		1 (-)	1 (-)	1 (+)	2 (+)	2 (+)
Travel and Leisure	1		1 (-)	1 (-)	1 (+)	1 (+)	1 (+)
<b>Total</b>	<b>100</b>		<b>51 (-)</b>	<b>37 (-), 1 (+)</b>	<b>51 (+), 3 (-)</b>	<b>34 (+), 3 (-)</b>	<b>41 (+), 5 (-)</b>



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Our robustness test supports the findings of electronic and electrical equipment sector but it shows that firm-specific news is the main driver of the negative reactions of beverages and financial services sectors (see Table 4).

Table 5 indicates the result of the individual reactions of each firm within a sector. Our findings suggest that most firms within a sector tend to react in the same direction and the reaction is highly concentrated on certain firms. Food producers sector, for instance, has eleven firms and the sector experienced negative CAR(-2) and CAR(-5), and positive AR, CAR2 and CAR5. We find that eight out of eleven firms had negative CAR(-2) and three out of eleven firms exhibited CAR(-5). In addition, we observe that seven, three and four out of eleven firms exhibited positive AR, CAR2 and CAR5 respectively.

## 6 CONCLUSIONS

The goal of regulatory changes on information disclosure is to ensure listed firms on the Vietnamese stock exchange to disclose all the available information to investors and improve the information transparency but the effects of these changes are unclear. The findings confirm the existence of market reaction to the regulatory changes and interestingly, the reaction is rather unified across the sectors. In general, we observe that the sectors tend to react negatively two and five days before the event date. However, the sectors incline to experience positive AR, CAR2 and CAR5. Thus, we suggest that the Vietnamese stock market could anticipate the changes in regulation and over-react before the announcement date. The market, however, could bounce back to offset the losses after the announcement date.

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## The Effects of 2016 U.S. Presidential Election on the Stock Exchange: Evidence from the U.S. Stock Market

*Huy Nguyen Anh Pham, Tam Nguyen Minh Huynh, Nhi Ngoc Ai Pham, Vikash Ramiah and Imad Moosa*

### ABSTRACT

*The paper investigates the effects of the 2016 U.S. presidential election on U.S. stock market. We examine 47 announcements starting from when President Trump announced that he would run for the Presidential election using event study methodology. Furthermore, we conduct several robustness tests including Corrado ranking, Chesney non-parametric conditional distribution approach, market integration and the removal of firms with firm-specific news. We observe that the U.S. stock market was widely affected by the 2016 U.S. Presidential election whereby life insurance sector was one of the most negatively affected sectors due to President Trump's plan to replace Obamacare. In addition, our results show that the events around the most recent election can lead to diamond risk structures in which the largest diamond risk structure appeared around the event when President Trump secured his Republican presidential nomination.*

**Keywords:** *Presidential Election, Event Study, Abnormal Returns, Diamond Risk Structure*

**JEL Classification:** G1, G14, G19

### 1 INTRODUCTION

The U.S. Presidential election has always drawn massive attention around the world. Whenever a candidate, who typically has political background, announces that he (she) will run for the President, the media will turn their focus onto that candidate immediately. However, when President Trump announced that he would run for the election to become the 45th president of the U.S. in March 2015 that did not only create a shockwave for the political world but also the U.S financial sector.

Although the effects of the U.S presidential election on the financial markets have been extensively documented in the literature, the 2016 election is an entirely new experience to the financial world because of the rise of Trumpism. The speculation about the effect of 2016 U.S. Presidential election varies in which several sources suggest that the stock market will be highly volatile. Several banks predicted that if Donald Trump won the election, the stock market could drop by as much as 6% the day after election (Gandel, 2016)<sup>5</sup>. Furthermore, several reports state that it is a negative sign for emerging markets and multinational companies. On the other hand, others believe that Donald Trump will truly make America great again (Kaletsky, 2016)<sup>6</sup>.

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<sup>5</sup> Accessed the following website on 24/05/2017: <http://fortune.com/2016/11/08/donald-trump-stocks-crash/>.

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This paper focuses on the announcements around Donald Trump's run for the Presidential election and their effects on the U.S. stock market. By taking into account the US presidential 4-year cycle, we examine how the wealth of shareholders and the systematic risk of U.S. sectors have changed during the 2016 Presidential election. Following Ramiah, Pham and Moosa (2016), we use event study methodology to calculate the abnormal returns, ARCH models to estimate the systematic risk and conduct several robustness tests such as Corrado ranking, Chesney non-parametric conditional probability, firm-specific removal and market integration of European and Asian markets to validate the findings. In general, the impacts of the election tend to be different across sectors where the direction of the impact depends on President Trump's views.

The remainder of this paper is organized as follows. Section 2 discusses the literature review. Section 3 provides an overview of the methodology used in the study, Section 4 describes the data, Section 5 discusses the findings and Section 6 concludes the paper.

## 2 LITERATURE REVIEW

In 1970s, researchers found a strong relationship between global economic and presidential election. Generally, the effects are reflected by macroeconomic factors within a country. Alternatively, the impact of the election can be measured by the stock market. According to the strong form of efficient market hypothesis, the stock market will reflect instantly to any available information as it arrives.

Many studies have examined the effects of the Presidential election on the stock market. Kitchin (1923) find that the 40-month cycle appeared in both Great Britain and USA from 1890 to 1922. Furthermore, the author observed that the 4-year cycle had an extremely strong presence in the stock market from 1868 to 1945. Other researchers have identified 6 trading cycles including 28-day cycle (Lunar Cycle); 10.5-month future cycle; January effect; 4-year cycle; 9.2-year cycle and 54-year cycle. The most popular cycle is the 4-year cycle, also known as Kitchin cycle or the Presidential election cycle. This cycle explains the relationship between stock prices and the events around the Presidential election. Every 4 years, the American vote for their President and these events have always had an overwhelming effect on both domestic and world affairs. The stock price is the lead indicator of an economy and hence, it is obviously affected by the Presidential election (Wong and McAleer, 2009). To solve the problem in previous research (e.g. not taking into account the time dependent and conditional heteroscedasticity), Wong and McAleer (2009) use spectral analysis to estimate the period of the cycle and the EGARCH Intervention model to examine the President cycle.

Furthermore, other studies show that stock prices tend to fall during the first half of the presidency, reach the lowest point in the second year, rise again during the second-half of the second year, and reach the peak in the third and fourth year (Allivine and O'Neill, 1980; Gartner and Wellershoff, 1995; Hensel and Ziemba, 1995; Huang, 1985; Booth and Booth, 2003; Foerster and Schmitz, 1997). Wong and McAleer (2009) find that the Democratic and Republican administrations could have an impact on the stock market in which the authors find that DJIA increases (decreases), on average, following the victories of Republican (Democratic) party. Moreover, Li and Born (2006) document that the stock prices and market uncertainty increase before the election when neither of the candidates has a dominant lead by using the poll data of the U.S Presidential election from 1964 to 2000. IN addition, Gemmil (1992) claims that the stock prices tend to increase in the last week before the election.

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On the other hand, the U.S and international stock markets tend to experience a down trend when the results of the poll were delayed (Nippani and Medlin, 2002; Nippani and Arize, 2005; and He et al., 2009). Another study by Katrin Gottschalk et al. (2008) indicates that the market reacts strongly during the election week and when the result of the election is announced. Despite the result of election sometime is predictable, investors are still surprised by the ultimate distribution of votes that lead to market uncertainties.

The above literature shows that scholars have extensively examined the effects of the U.S. Presidential election on the stock markets. However, when the 2016 Presidential election is the most unique election in the history because President Trump won the election and he has never had any experience in the political scene. Consequently, this event could lead to unforeseen effects on the stock market in terms of risk and return. Our paper aims to document these effects of the events around the 2016 U.S. Presidential election.

## 3 METHODOLOGY

Follow Ramiah, Martin and Moosa (2013), and Pham, Ramiah, Moosa and Nguyen (2017), we adjust the daily returns using CAPM to obtain the ex-post-abnormal returns (AR). These abnormal returns are then grouped into a sector to calculate the sectoral average (S) at time  $t$ , ( $AR_{St}$ ). We employ the standard t-test to determine if the result is statistically significant.

Additionally, we capture the over-reaction and under-reaction to the events around the 2016 U.S. Presidential election whereby markets might continue to react to the same event. For this purpose, we calculate the cumulative abnormal returns (CAR) from 2 to 10 trading days after the event date to find out if the market makes a correction if it over-reacts or it continues to deviate from its mean price. We also use t-statistic to check the significance of cumulative abnormal returns.

Following the events around the election, we identify three possible outcomes for AR and CAR. The first outcome emerges when the events have positive impact on the market and the sectors exhibit positive abnormal returns. The second outcome arrives when firms perceive the events as unfavourable for them. In this case, if the economic policies of the winner do not encourage certain sectors, these sectors are expected to exhibit negative AR or CAR. The last outcome takes place when abnormal returns and cumulative abnormal returns are equal to zero that means the events around the election do not have any impact on the sectors.

The event study methodology has been criticized for several reasons such as the non-normality of abnormal returns, the effects of firm-specific news, the impact of stock market integration and spillover effects. AR tend not to have a normal distribution, higher kurtosis and positive skewness that can affect parametric  $t$  statistics. To address these criticisms, we use the Corrado (1989) ranking test and the Chesney et al. (2011) conditional probability test. Moreover, we exclude all firms within a sector if they disclose the information within 15 days before and after the announcement of an event, so that the AR is exclusive to the effect of the 2016 U.S Presidential election. We control for the synchronicity by incorporating the market risk-free premium of two regions including Asia ( $\tilde{r}_{mt}^{Asia} - \tilde{r}_{ft}^{Asia}$ ) and Europe ( $\tilde{r}_{mt}^{Europe} - \tilde{r}_{ft}^{Europe}$ ) to the traditional CAPM.

On 18 March 2015, President Trump announced that he would take part in the White House race to become the 45th US President of the United States. These events about the election are considered as uncertainties to the future of the American economy (e.g. the benefits of the US compared to other countries), and create volatilities of the U.S. stock market (e.g. decline

sharply after public the result of election). To examine the instantaneous change in systematic risk, we adjust the CAPM by introducing interactive variables. A dummy variable (DV), which takes the value of 1 on the event date and zero otherwise, is introduced to capture changes in systematic risk. This DV is multiplied by the market risk premium to create the first interaction variables. Following Ramiah, Martin and Moosa (2013) and Pham, Ramiah, Moosa and Nguyen (2017), the model is:

$$\tilde{r}_{St} - \tilde{r}_{ft} = \beta_S^0 + \beta_S^1[\tilde{r}_{mt} - \tilde{r}_{ft}] + \beta_I^2[\tilde{r}_{mt} - \tilde{r}_{ft}] * DV_t + \beta_S^3 DV_t + \tilde{\varepsilon}_{St} \quad (1)$$

Where  $\tilde{r}_{St}$  is return of sector S at time t,  $\tilde{r}_{ft}$  is risk-free at time t,  $\tilde{r}_{mt}$  is market's return at time t,  $DV_t$  is a dummy variable take the value of 1 on the event date and zero otherwise,  $\tilde{\varepsilon}_{St}$  is the error term,  $\beta_S^0$  is the interception of regression equation [ $E(\beta_S^0) = 0$ ],  $\beta_S^1$  is the sectoral average systematic risk in short – term,  $\beta_S^2$  is the change in the industry's risk,  $\beta_S^3$  measures the change in the interception of equation (1). This equation estimates the aggregate change of the systemic risk in the short – term in the stock market. We perform a series of econometric tests on all regression models. More specifically, we use the GARCH, TARCH, EGARCH and PARCH models to control the ARCH effect.

#### 4 DATA

We downloaded daily data timeseries over the period from January 2010 to December 2016 from Datastream. The series include individual stock prices of the U.S. stock market, stock market indexes (S&P500, Datastream Asia Index and Datastream Europe Index) and the US 3-month Treasury Bill as a proxy for risk-free rate. The firm-specific information is collected from the websites of each company.

From 18 March 2015, when President Trump announced that he would run for the presidency, not only the American presses but the whole world focused on him. Thus, we collect any available activities or events related to President Trump and the election<sup>6</sup>.

#### 5 FINDINGS

Our findings show that presidential election events, especially those related to President Trump, have an impact on stock returns. Another significant observation is that most affected sectors exhibited negative ARs. Tables 1, 2, 3 and 4 indicate statistically significant positive, negative and mixed reaction following the 2016 US Presidential election. Tables 5 and 6 show the results of the robustness tests. Moreover, we observe that the life insurance and industrial engineering sectors were affected the most. In addition, we find that the changes in systematic risk vary across sectors in which systematic risk can increase, decrease or remain unchanged.

We create our hypotheses based on the discussion around the possible outcomes of the 2016 U.S. Presidential election. For instance, according to a LinkedIn<sup>7</sup> discussion, we find that the life insurance sector will experience a difficult time under Trump administration due to possible changes in current policies. We use that argument to construct the hypothesis that President Trump is bad for the life insurance sectors that leads to the negative AR of this

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<sup>6</sup> The event table is available upon request.

<sup>7</sup> Accessed the following website on 23/05/2017: <https://www.linkedin.com/pulse/what-trump-presidency-means-life-insurance-chris-acker-clu-chfc>.

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sector. Through other publications<sup>8910111213</sup>, we have gathered several other ideas as follow (1) it will be more complex to apply for visas to the United States due to stricter immigration policies; (2) oil and gas sector is beneficial if Trump is elected because the sector can access more mines and new areas; (3) the U.S. is predicted to fail to achieve the growth rate between 6% and 7%; (4) if President Trump is committed to pursuing the North American Free Trade Agreement that would put American retailers in a more competitive environment and (5) the telecommunications sector may be threatened by Republican policies because they aim to reduce the power of Internet.

Tables 1, 2, 3 and 4 report AR and CAR (up to 10 trading day) and their associated t-statistics following the events around the election. Table 1 indicates the sectors that experienced positive reactions including chemicals, electronic and electrical equipment, household good and home construction, industrial engineering and leisure goods. The sectors tend to react on the event date and most reactions do not last from 2 to 10 trading day. Electronic and electrical equipment, for instance, experienced an abnormal return of 2.13 % (with a t-stat of 2.59) on 26 January 2012 and continued to react up to 10 trading day with a CAR of 5.32% (with a t-stat of 2.10). Another sector was positively affected is industrial engineering sector in which the sector exhibited an abnormal return of 2.07% (with a t-stat of 2.06) on 6 June 2016 and continued to experience a CAR of 6.67% (with a t-stat of 2.71) in 5 days after the event date.

On the other hand, we discover that 9 sectors experienced negative reaction including banks, fixed line telecommunications, forestry and papers, health care equipment and service, life insurance, oil and gas producers, oil equipment and services, pharmaceuticals and biotechnology, and real estate investment trust (see Table 2). Banks, for instance, experienced an abnormal return of -0.76% (with a t-stat of -3.45) on 18 March 2015 when President Trump announced that he would run for the presidency. The negative reaction from banking sector continued for two days and we observe a CAR2 of -0.75% (with a t-stat of -2.40). Moreover, we find evidencing showing that life insurance sector was negatively affected by the U.S. election. The sector exhibited an abnormal return of -8.25% (with a t-stat of -5.86) on 15 March 2016 and continued its negative reaction after 10 trading day (a CAR10 of -17.52% with a t-stat of -4.20). It is plausible that the negative reaction of life insurance sector was due to President Trump's plan to remove Obamacare.

Table 3 and 4 indicate the statistically significant mixed reaction following the 2016 U.S. Presidential election. We find 15 sectors such as aerospace and defense, alternative energy, automobiles and parts, construction and material, electricity, food and drug retailers, food

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<sup>8</sup> Accessed the following website on 23/05/2017: [https://www.washingtonpost.com/business/mr-business-goes-to-washington-now-what/2016/11/12/8c7f7846-a6e2-11e6-ba59-a7d93165c6d4\\_story.html?utm\\_term=.945ab5e069ca](https://www.washingtonpost.com/business/mr-business-goes-to-washington-now-what/2016/11/12/8c7f7846-a6e2-11e6-ba59-a7d93165c6d4_story.html?utm_term=.945ab5e069ca).

<sup>9</sup> Accessed the following website on 23/05/2017: <http://www.businessinsider.com/how-trump-presidency-will-impact-us-auto-industry-2016-11>.

<sup>10</sup> Accessed the following website on 23/05/2017: <http://www.independent.co.uk/news/world/americas/us-politics/trump-healthcare-cost-year-interview-president-does-not-know-how-it-works-a7851611.html>.

<sup>11</sup> Accessed the following website on 23/05/2017: <http://www.marketwatch.com/story/what-president-elect-trump-means-for-companies-by-sector-2016-11-10>.

<sup>12</sup> Accessed the following website on 23/05/2017: <http://www.thebanker.com/Editor-s-Blog/What-would-a-President-Trump-mean-for-the-US-banking-sector>.

<sup>13</sup> Accessed the following website on 23/05/2017: <https://www.travelshift.com/president-trump-affect-travel-industry/>.

producers, gas, water and multiutilities, general industrials, industrial metals and mining, media, mining, mobile telecommunication, personal goods and real estate investment and services. On 18 March 2015, when President Trump announced that he would run for president on the Republican Party ticket, media sectors were negatively affected and the sector experienced a negative abnormal return of -1.70% with a t-stat of -2.02. On the other hand, when President Trump won at New Hampshire on 09 February 2016, this sector exhibited a positive AR of 1.99% with a t-stat of 2.30. This is an example of a sector which reacted negatively to one announcement and positively to another announcement.

Due to the criticisms of event study methodology, we have conducted several robustness tests to check the results. Table 5 presents the robustness test for sectors, which were negatively affected as shown in Table 2. We discover that (1) banks, life insurance and real estate investment trust sectors were affected the most and the effect could last up to 10 trading day, (2) other sectors such as fixed line telecommunications, forestry and papers, oil and gas producers were not extremely affected and (3) health care equipment and service sector was not affected by the events of the presidential election after controlling for other factors such as firm-specific information. Table 6 shows the robustness tests for positive reaction as shown in Table 1. We observe that (1) chemicals and, electronic and electrical equipment sectors were not affected by the election and (2) household goods and home construction, industrial engineering and leisure goods sectors experience the positive ARs.

We also estimate the change in systematic risk following the events around the election. It is a common practice in finance to measure changes in systematic risk by beta. Following the events related to the 45th Presidential election, we find two sectors that experience aggregate changes in systematic risk (see Table 6). The first sector is alternative energy sector in which the sector experienced an increase in aggregate systematic risk (from 0.38 to 1.16). The second sector is media sector and the sector exhibited a decrease in aggregate systematic risk (from 0.41 to 0.04). The results from other models such as TARCH, EGARCH, PARCH and OLS support our findings (see Table 7). Following Ramiah et al. (2013) and Pham et al. (2017), we find evidence of diamond risk structure. The most notable diamond risk structure took place on 26 May 2016 when Trump secured the Republican presidential nomination (see Figure 1). We find that 16 sectors experienced an increase in short-term systematic risk whereby the systematic risk of alternative energy increased the most while other sectors experienced a decrease in short-term systematic risk following this event.



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**Tab.1** - Statistically Significant Reaction following US Presidential Announcements (Positive Reaction – in percentage)

Sector	Date	AR	t-stat	CAR2	t-stat	CAR5	t-stat	CAR10	t-stat
Chemicals	06/06/2016	1.98	2.39	1.92	1.61	1.40	0.74	1.38	0.50
Electronic and Electrical Equipment	26/01/2012	2.13	2.59	1.97	1.75	2.33	1.36	5.32	2.10
Household Good and Home Construction	28/10/2016	2.90	2.50	1.81	1.18	1.50	0.66	-1.23	-0.40
Industrial Engineering	26/05/2016	2.46	2.47	1.78	1.24	1.96	0.86	4.14	1.29
	06/06/2016	2.07	2.06	2.15	1.48	3.41	1.50	3.96	1.22
	08/11/2016	2.90	2.69	4.52	2.85	6.67	2.71	1.80	0.56
Leisure Goods	29/02/2012	4.12	2.20	2.30	0.93	2.08	0.59	4.76	0.97

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**Tab.2** - Statistically Significant Reaction following US Presidential Announcements (Negative Reaction – in percentage)

Sector	Date	AR	t-stat	CAR2	t-stat	CAR5	t-stat	CAR10	t-stat
Banks	18/03/2015	-0.76	-3.45	-0.75	-2.40	-0.45	-0.92	-0.03	-0.04
Fixed Line Tele.	22/02/2012	-11.28	-2.28	-8.69	-0.97	-5.61	-0.29	-23.41	-0.71
	03/05/2016	-10.55	-2.05	-19.02	-1.92	-40.04	-1.67	-83.44	-1.78
Forestry and Pa.	28/02/2012	-5.90	-2.15	-5.96	-1.65	-5.38	-1.10	-5.40	-0.93
	21/07/2016	-13.75	-4.24	-2.09	-0.61	-1.66	-0.42	-1.44	-0.01
Health Care Equ.	29/02/2012	-1.87	-2.21	-1.82	-1.62	-1.79	-1.03	0.29	0.11
	15/03/2016	-1.50	-2.25	-1.72	-1.83	-2.19	-1.41	-1.60	-0.71
Life Insurance	15/03/2016	-8.25	-5.68	-9.20	-4.46	-8.42	-2.89	-17.52	-4.20
Oil & Gas Pro.	31/01/2012	-2.12	-2.06	-2.35	-1.67	-1.58	-0.75	0.30	0.11
	23/02/2016	-3.01	-2.08	-3.56	-1.68	-0.84	-0.24	13.99	2.93
Oil Equip. & Svs	09/02/2016	-4.63	-2.54	-6.89	-2.47	-4.93	-1.10	1.67	0.28
	08/03/2016	-4.23	-2.23	-4.30	-1.49	-4.03	-0.90	-2.54	-0.42
Pharma & Bio.	15/03/2016	-3.34	-2.76	-4.64	-2.57	-2.82	-0.90	-4.01	-0.88
Real Estate Inv.	01/02/2016	-2.47	-3.76	-2.35	-2.60	-2.95	-1.61	-5.93	-1.26
	09/02/2016	-1.43	-2.33	-1.16	-1.57	-1.78	-0.96	0.10	-0.72

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**Tab.3** - Statistically Significant Reaction following the U.S. Presidential Announcements (Mixed Reaction – in percentage)

Sector	Date	AR	t-stat	CAR2	t-stat	CAR5	t-stat	CAR10	t-stat
Aerospace and Defense	01/02/2016	-4.87	-3.72	-5.94	-3.30	-4.06	-1.39	-5.37	-1.43
	01/04/2016	-3.82	-2.53	4.11	2.02	5.32	1.64	6.85	1.60
	08/04/2016	4.79	3.21	5.45	2.70	1.52	0.47	0.60	0.14
	26/05/2016	3.79	2.54	3.05	1.50	4.56	1.45	4.62	1.08
	22/06/2016	-5.64	-3.74	-4.80	-2.38	-8.44	-2.76	-1.85	-0.46
Alternative Energy	20/03/2012	-4.16	-2.38	-5.60	-2.41	-1.36	-0.37	-1.57	-0.30
	28/07/2016	3.61	2.39	3.30	1.64	5.18	1.78	5.71	1.45
	19/10/2016	4.38	2.92	5.61	2.87	3.02	1.13	2.50	0.69
Automobiles and Parts	15/03/2016	-5.00	-4.11	-4.13	-2.48	-3.97	-1.58	-7.23	-2.05
	10/05/2016	4.99	4.09	3.68	2.27	4.30	1.80	6.15	1.86
Construction and material	28/02/2012	-3.47	-3.56	-3.65	-2.85	0.14	0.08	0.84	0.37
	17/05/2016	2.77	2.45	2.06	1.38	3.63	1.38	4.78	1.58
	22/06/2016	-3.09	-2.64	-2.33	-1.50	-4.28	-1.50	-2.63	-0.85
Electricity	23/01/2012	-1.72	-2.04	-1.31	-1.24	-1.23	-0.93	-3.27	-1.97
	28/02/2012	-2.90	-3.35	-2.69	-2.44	1.17	0.80	-0.57	-0.32
	19/10/2016	5.57	5.05	5.45	3.48	4.77	1.90	8.07	2.28
Food and Drug Retailers	20/03/2012	7.82	4.35	11.46	4.85	5.00	1.64	3.79	1.13
	21/03/2016	-4.30	-3.20	-2.62	-1.46	-3.75	-1.43	3.26	0.97
	01/04/2016	5.98	4.52	5.53	3.11	6.08	2.36	5.89	1.77
	24/05/2016	-5.87	-3.89	-6.07	-2.77	1.29	0.40	1.36	0.38
	26/05/2016	5.02	3.15	7.28	3.24	10.82	3.34	6.02	1.73
	06/06/2016	-4.06	-2.54	-5.89	-2.62	-4.98	-1.60	1.99	0.61
Food producers	26/04/2016	-3.50	-3.29	-3.50	-2.42	-3.33	-1.63	-3.39	-1.18
	14/06/2016	2.90	2.60	0.45	0.31	1.20	0.58	3.38	1.17

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**Tab.4** - Statistically Significant Reaction following US Presidential Announcements (Mixed reaction – in percentage) (cont.)

Sector	Date	AR	t-stat	CAR2	t-stat	CAR5	t-stat	CAR10	t-stat
Gas, Water & Mul.	21/03/2016	-2.62	-2.28	-2.34	-1.67	-1.47	-0.69	-2.67	-0.99
	26/04/2016	4.54	3.66	3.73	2.52	4.59	2.06	4.99	1.73
	10/05/2016	2.56	2.07	0.06	0.04	-3.78	-1.72	-5.91	-2.02
	08/11/2016	-3.52	-2.83	-0.34	-0.23	-1.34	-0.57	1.58	0.51
General Industrials	26/01/2012	4.15	3.46	3.81	2.41	4.17	1.89	0.72	0.27
	10/03/2016	-2.11	-2.18	-0.32	-0.24	-0.21	-0.12	-0.35	-0.14
Ind. Metals & Min.	06/03/2012	-3.04	-2.03	-2.94	-1.51	-2.78	-0.91	-1.88	-0.44
	04/08/2015	2.42	2.04	1.66	1.01	3.73	1.52	3.55	1.05
	06/06/2016	3.63	2.28	2.41	1.10	1.18	0.32	3.65	0.66
Media	18/03/2015	-1.70	-2.02	-0.44	-0.38	-0.61	-0.35	2.08	0.86
	19/10/2016	1.99	2.30	2.79	2.25	-3.72	-1.99	2.41	1.00
Mining	26/01/2012	2.40	2.13	3.68	2.41	5.25	2.41	7.88	2.14
	09/02/2016	-4.06	-2.82	-2.35	-1.20	2.03	-1.20	3.66	0.95
Mobile Telecom	28/02/2012	-9.35	-4.22	-7.22	-2.68	-7.19	-2.11	-7.22	-1.71
	16/06/2015	-3.30	-2.42	-2.80	-1.55	-1.59	-0.58	-2.97	-0.80
	01/04/2016	5.03	3.52	5.72	2.96	5.69	2.04	8.53	2.29
	14/06/2016	3.13	2.18	2.10	1.10	3.75	1.34	2.83	0.77
	08/11/2016	4.16	2.99	4.98	2.68	3.71	1.45	1.11	0.35
Personal Goods	22/02/2012	2.76	2.34	5.02	3.24	3.82	1.66	3.07	0.94
	09/02/2016	2.29	2.36	2.34	1.74	2.57	1.24	4.35	1.54
	01/03/2016	-2.13	-2.20	-1.74	-1.32	-0.48	-0.24	-0.14	-0.05
	03/05/2016	-3.48	-3.29	-4.84	-3.27	-7.50	-3.26	-9.97	-3.14
Real Estate In & Svs	23/01/2012	4.36	2.74	4.86	2.25	3.47	1.14	5.32	1.10
	20/03/2012	-5.44	-3.36	-6.82	-3.15	-7.74	-2.44	-6.77	-2.30
	15/03/2016	-5.02	-2.31	-5.30	-1.78	-7.41	-1.65	-7.23	-1.53

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**Tab.5 - Robustness Tests for Negative Reactions**

Sector	Date	t-Corrado	Chesney		Firm removal		Market Integration	
			P	t-stat	AR	t-stat	AR	t-stat
Banks	18/03/2015	-2.70	2.68	2.51	-0.69	-3.25	-0.64	-0.29
Fixed Line Telecommunications	22/02/2012	-0.72	48.53	0.04	-3.09	-0.83	1.13	0.31
	03/05/2016	-2.29	3.23	2.36	-1.66	-0.62	-0.50	-0.21
Forestry and Papers	28/02/2012	0.19	2.29	2.64	-9.96	-2.30	-6.11	-1.52
	21/07/2016	0.16	19.67	0.93	-33.10	-4.39	-13.05	-2.82
Health Care Equipment and Service	29/02/2012	-1.79	8.88	1.57	-2.30	-1.95	-2.26	-1.72
	15/03/2016	-2.86	42.03	0.21	-0.95	-1.13	-1.18	-0.89
Life Insurance	15/03/2016	-1.58	2.57	2.55	-15.94	-5.66	-8.52	-3.10
Oil and Gas Producers	31/01/2012	-0.23	2.74	2.50	-2.98	-2.48	-2.20	-1.29
	23/02/2016	-1.63	21.97	0.84	-3.14	-2.08	-3.25	-1.20
Oil Equipment and Services	09/02/2016	-2.11	40.99	0.24	-3.01	-1.60	-4.67	-1.42
	08/03/2016	-2.30	15.93	1.11	-2.70	-1.35	-10.98	-3.15
Pharmaceuticals and Biotechnology	15/03/2016	-2.28	22.97	0.80	-1.94	-1.83	-3.26	-1.51
Real Estate Investment Trust	01/02/2016	-0.10	0.96	3.40	-12.06	-7.07	-2.49	-2.11
	09/02/2016	-1.79	45.78	0.11	0.18	0.13	-1.38	-1.21

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**Tab.6 - Robustness Tests for Positive Reactions**

Sector	Date	t-Corrado	Chesney		Firm removal		Market Integration	
			P	t-stat	AR	t-stat	AR	t-stat
Chemicals	06/06/2016	1.52	49.79	0.01	2.69	2.23	2.14	1.43
Electronic and Electrical Equipment	26/01/2012	1.45	35.82	0.38	3.04	2.55	1.61	1.01
Household Good and Home Construction	28/10/2016	0.79	3.24	2.36	-6.80	-2.85	-3.14	-1.51
Industrial Engineering	26/05/2016	-0.90	16.45	1.08	4.88	3.03	2.23	1.38
	06/06/2016	1.38	43.12	0.18	2.52	1.54	2.19	1.20
	08/11/2016	-0.47	3.99	2.19	6.71	3.12	2.90	1.42
Leisure Goods	29/02/2012	-0.75	3.22	2.36	5.57	2.38	5.75	1.99

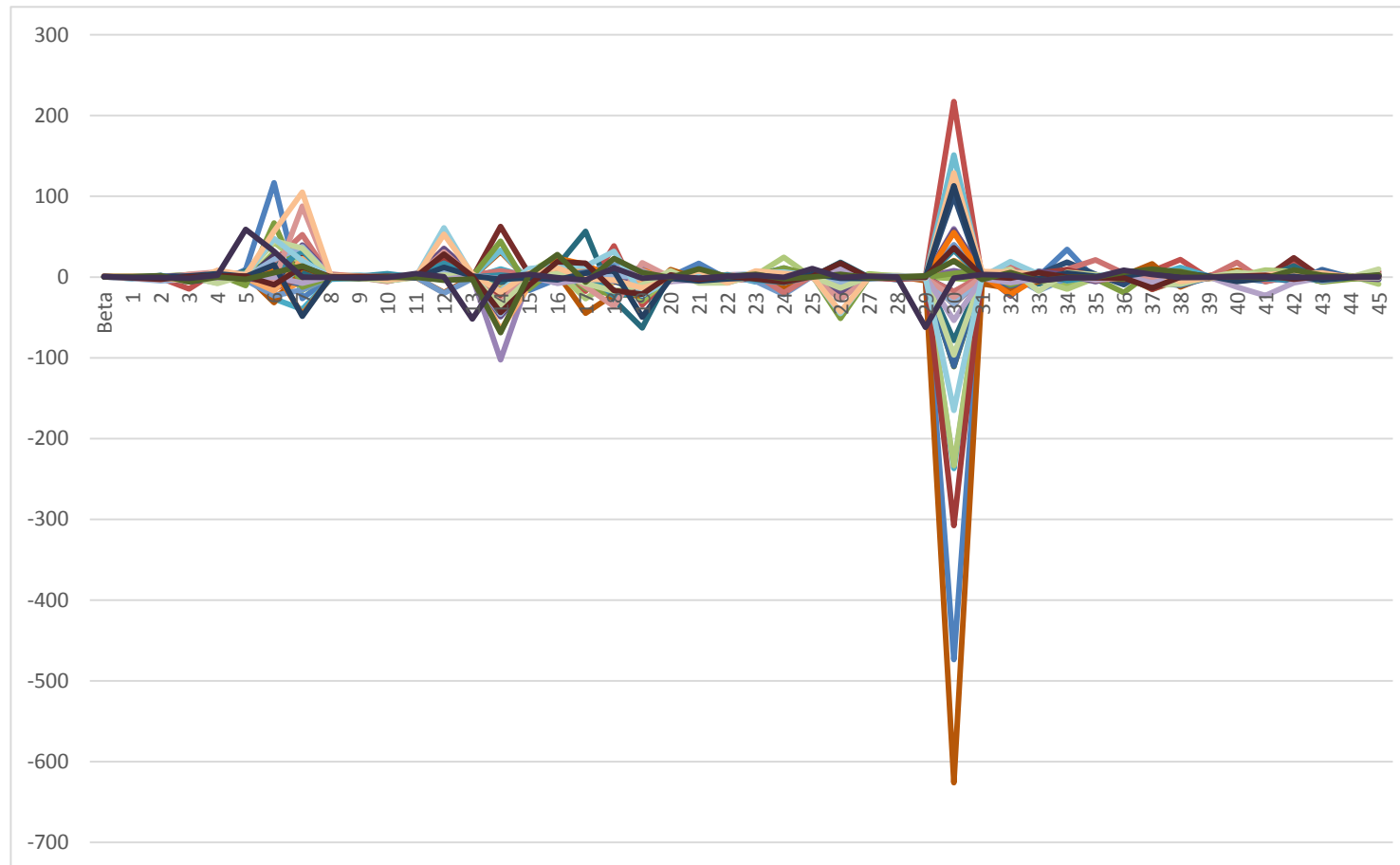
**Tab.7 - Aggregate Change in Systematic Risk following 2016 U.S. Presidential Election**

Sector		Beta	GARCH (1,1)	TARCH	EGARCH	PARCH	OLS
Alternative Energy	Coefficient	0.38	0.78	0.78	0.78	0.78	0.72
	z-stat		3.04	3.04	3.01	3.03	2.41
Media	Coefficient	0.41	-0.37	-0.39	-0.36	-0.35	-0.36
	z-stat		-2.19	-2.23	-2.14	-2.12	-1.98

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**Fig.1** - Individual Changes in Short-term Systematic Risk following the 2016 U.S. Presidential Election

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## 6 CONCLUSION

The 2016 U.S. Presidential election has created uncertainties on the U.S. economy. Most people who are not pro-Trump fear that the U.S. will not perform well under President Trump administration due to his characteristics and unclear policies. Our study shows that the most recent election widely affected the U.S. stock market in various ways. We find the banking sector was negatively affected by the election, as expected, but the effect did not last long. Furthermore, our results show that life insurance sector is the most affected sector and we conclude that this sector is facing a high degree of uncertainty due to President Trump's plan to replace Obamacare. Another important finding in our study is that we observe the diamond risk structure of the 2016 U.S. Presidential election. In general, the impacts of the election tend to be different across sectors where the direction of the impact depends on President Trump's views. One of the limitations of our study is that we are unable to examine a full impact of President Trump on the U.S. economy since President Trump is only eight months into his presidency. Therefore, we leave this problem to future research.

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## Assessment of performance for Technology-Telecommunication companies in Vietnam using Data Envelopment Analysis (DEA)

*Chia-Nan Wang, Anh Luyen Le*

### ABSTRACT

*The main purpose of this paper is to evaluation of performance measure for Technology-Telecommunication companies in Vietnam industry using Data Development Analysis (DEA). To conduct a valid and reliable evaluation process while applying the companies case in Vietnam, we intergrated the slacks-based measure of super efficiency (super-SBM) and Malmquist index to directly handle the slacks, explore best performer, analyzed the intertemporal efficiency change, which is decomposed into “catch-up” and “frontier-shift” effects and find influential factor in efficiency, technical, productivity change of companies from 2012-2015. The results show that the most TTCs have higher efficiency and contribute more effort to improving technical change during 2012-2015. By comparing the efficiency of TTCs, this research provides an approach of decision-making information for manager as well as contributes to orientation for the development of technology and telecommunication.*

**Keywords:** *Data envelopment analysis (DEA), Technology-Telecommunication companies (TTCs), Super-SBM model, Malmquist model.*

**JEL Classification:** O20

### 1. INTRODUCTION

Balancing economic development with sustainable growth has become a critical concern developing economies. To concentrate on promoting supporting industries which can be seen as a key solution towards economic sustainability for the development of the country and thereby improve national welfare. Technology and Telecommunication are supporting industries , having been on an upward climb for recently many years.

Couple with Vietnam’s upward economic trend, the Vietnamese government and businesses are strategizing to upgrade the Information Technology (IT) infrastructure. The strategy is aimed to increase total revenue of the IT sector as a percentage of Vietnam’s GDP. In April 2015, the Prime Minister issued Resolution # 26/NQ-CP, instructing all Ministries and local governments to promote the application and development of IT [1]. In addition, Vietnam has become a member of ASEAN’s Economic Community. To meet the demand market growth, TTC companies need to have a development strategy to position themselves in the competitive arena but not the least opportunity.

The purpose of this research is to evaluate the performance of Technology-Telecommunication companies (TTCs) in Vietnam by integrating the Slacks-Based measure of Super Efficiency (Super-SBM) model and Malmquist productivity index in DEA in order to achieve sustainable competitiveness. It also determining strategies considered as most cost-effective for managing economic.

This research investigation began with technology enterprise and telecommunication enterprises in market Vietnam. However, because of a lack of public data, the study just

employed in 16 TTCs which listed on the stock market. On the other hand, multidisciplinary companies were not included in the analysis in this study.

## 2. LITERATURE REVIEW

### 2.1. About Data envelopment analysis

The DEA was introduced by Charnes and etc [2]. They proposed a data oriented approach for measuring the performance of multiple Decision-Making Units (DMUs), by converting multiple input into multiple output.

Lo and Lu (2009) recently have developed a process, based on DEA to evaluate and rank the relative importance of key performance indicates (KPIs) [3]. The relative importance of each KPI is evaluated by performance loss measure, and each KPI is weight according to the measure.

DEA method is a relatively new “data-oriented” approach used for evaluating the performance of a set of DMUs. DEA can be used in cases that have been resistant to other approaches due to the complex nature of the relations between input/output variables involved. Studies have therefore employed DEA to evaluate performance productivity. Liu (2010) have studied the power-generation efficiency for major thermal power plants in Taiwan during 2004-2006 using the DEA approach. According to the results, all power plants studied achieved acceptable overall operational efficiencies during 2004-2006, and the combined cycle power plants were the most efficient among all plants [4]. Marschall and Flessa [5] applied DEA to assess the efficiency of rural health centers in Burkina Faso. Sun and Stuebs [6] used DEA to measure firm productivity in the U.S. chemical industry. In addition, Lo and Lu [7] approved that the slacks-based measure (SBM) deals directly with input excesses and output shortfalls (slacks). Intertemporal efficiency change which is decomposed into “catch-up” and “frontier-shift” effects, is analysed by means of the SBM-based Malquist index.

### 2.2. Non-Radial Super Efficiency Model (Super-SBM)

This research is based on the super-efficiency model proposed by [8]. One advantage is ranking the performance of efficient decision making units (DMU) and the infeasible problem of the super-efficiency DEA model.

This model was developed on non-radial model called SBM “Slack-based measure of efficiency”, which input and output slacks and return efficiency scores [0, 1]. SBM deals with  $n$  DMUs, each DMU having input/output matrices  $X = (x_{ij}) \in R^{m \times n}$  and  $Y = (Y_{ij}) \in R^{s \times n}$ .  $\lambda$  is a non-negative vector in  $R^n$ . Vector  $S^- \in R^m$  and  $S^+ \in R^s$  are the input excess and output shortfalls, respectively. To estimate the efficiency of  $(x_0; y_0)$ , the SBM program was formulated as follows:

$$\min \rho = \frac{1 - \frac{1}{m} \sum_{i=1}^m S_i^- / x_{i0}}{1 + \frac{1}{s} \sum_{l=1}^s S_l^+ / y_{l0}}$$

$$st. x_0 = X\lambda + S^-, y_0 = Y\lambda - S^+, \lambda \geq 0, S^- \geq 0, S^+ \geq 0$$

Let an optimal solution for SBM be  $(p^*, \lambda^*, S^{-*}, S^{+*})$ . A DMU  $(x_0, y_0)$  is SBM-efficient, if  $p^*=1$ . That mean  $S^{-*} = 0$ , and  $S^{+*} = 0$  (or no input excesses and no output shortfalls). Based on this assumption, Tone has proposed a super-efficiency model for ranking DMUs and it was identified as following program:

$$\min \delta = \frac{\frac{1}{m} \sum_{i=1}^m \bar{x}_i / x_{i0}}{\frac{1}{s} \sum_{r=1}^s \bar{y}_r / y_{r0}}$$

$$st. \bar{x} \geq \sum_{j=1, \neq 0}^n \lambda_j x_j, \bar{y} \leq \sum_{j=1, \neq 0}^n \lambda_j x_j, \bar{x} \geq x_0, \text{ and } \bar{y} \leq y_0, \bar{y} \geq 0, \lambda \geq 0$$

If the denominator is equal to 1, the objective function will become the input-oriented of the super-SBM model and it returns a value for the objective function which is greater or equal to 1.

By the nature of things, inputs should be positive, but outputs may be negative. Nevertheless, many DEA model including SBM model can not handle non-positive output, until a new scheme was introduced in DEA-Solver pro 4.1 Manual.

Suppose that  $y_{r0} \leq 0$ . It has defined  $\bar{y}_r^+$  and  $\bar{y}_{-r}^+$  by

$$y_r^+ = \max_{j=1, \dots, n} \{y_{rj} / y_{rj} > 0\},$$

$$y_r^+ = \min_{j=1, \dots, n} \{y_{rj} / y_{rj} > 0\},$$

In the objective function, if the output  $r$  has no positive elements, then it is defined as  $\bar{y}_r^+ = \bar{y}_{-r}^+ = 1$ . Then term  $\bar{y}_r^+ / y_{r0}$  will be replaced in the following way. (the value  $y_{r0}$  of in the constraints has never changed).

$$\text{If } \bar{y}_r^+ > \bar{y}_{-r}^+ \text{ the term is replaced by: } s_r^+ \left/ \frac{y_{-r}^+ (\bar{y}_r^+ - \bar{y}_{-r}^+)}{\bar{y}_r^+ - y_{r0}} \right. ;$$

$$\text{If } \bar{y}_r^+ = \bar{y}_{-r}^+ \text{ the term is replaced b: } s_r^+ \left/ \frac{(y_{-r}^+)^2}{B(\bar{y}_r^+ - y_{r0})} \right.$$

Where B is a large positive number, (in DEA-Solver B-100)

Furthermore, the denominator is positive and strictly less than  $y_{-r}^+$ . Moreover, it is inverse to the distance  $\bar{y}_r^+ - y_{r0}$ . Hence, this scheme concerns the magnitude of the nonpositive output positively. The score obtained is units invariant, it is independent of the units of measurement used.

### 2.3. Malmquist Productivity Index (MPI)

The Malmquist index (MI) evaluates the efficiency change of a DMU between two time periods. It is defined as the product of “Catch-up” and “Frontier-shift” terms. The catch-up term is related to the degree of efforts that the DMU attained for improving its efficiency,

while the frontier-shift term reflects the change in the efficient frontiers surrounding the DMU between the two time periods 1 and 2.

We denote DMU0 at time period 1 and 2 by  $(x_0^1, y_0^1)$  and  $(x_0^2, y_0^2)$ , respectively. Then, we employ the following notation for the efficiency score of DMU  $(x_0, y_0)^t$  measured by the frontier technology  $t_2$ .  $\delta^{t_2}((x_0, y_0)^t)$  ( $t_1 = 1, 2$  and  $t_2 = 1, 2$ ). Since the “Malmquist index” is calculated as the product of “Catch-up” and “Frontier-shift”, it can be presented as:

Malmquist index = (Catch-up) \* (Frontier-shift)

We now employ the following notation for the efficiency score of the DMU  $(x_0, y_0)^t$  measure by the frontier technology  $t_2$ .

$$\delta^{t_2}((x_0, y_0)^t) \quad (t_1 = 1, 2 \text{ and } t_2 = 1, 2)$$

Using this notation, the frontier-shift effect (F) and the catch-up effect (C) in (F1) can be expressed as:

$$C = \frac{\delta^2((x_0, y_0)^2)}{\delta^1((x_0, y_0)^1)} \quad \text{and} \quad F = \left[ \frac{\delta^1((x_0, y_0)^1)}{\delta^2((x_0, y_0)^1)} \times \frac{\delta^1((x_0, y_0)^2)}{\delta^2((x_0, y_0)^2)} \right]^{1/2}$$

As the product of C and F, we obtain the following formula for the computation of MI

$$MI = \left[ \frac{\delta^1((x_0, y_0)^2)}{\delta^2((x_0, y_0)^1)} \times \frac{\delta^2((x_0, y_0)^2)}{\delta^2((x_0, y_0)^1)} \right]^{1/2}$$

The last expression give an another interpretation of MI, i.e., the geometric means of the two efficiency ratios: the one being the efficiency change measured by the period 1 technology and the other efficiency change measured by the period 2 technology.

As can be from these formulas, the MI consists of four terms:  $\delta^1((x_0, y_0)^1)$ ,  $\delta^2((x_0, y_0)^2)$ ,  $\delta^1((x_0, y_0)^2)$  and  $\delta^2((x_0, y_0)^1)$ . The first two are related with the measurements within the same time period, while the last two are for intertemporal comparison.

- MI > 1, the total factor productivity of the DMU<sub>0</sub> from period 1 to 2;
- MI = 1, indicate respectively the status quo;
- MI < 1, decay in the total factor productivity.

We can develop the output - oriented MI as well by means of the output - oriented radial DEA models. The output - oriented models take all output slacks into account, but no input slacks are taken into account. This is described below within score in output oriented (O-V).

$$\delta^s((x_0, y_0)^t) = \min \theta_{\theta, \lambda}$$

Subject to:  $x_0^t \geq X^s \lambda, \left(\frac{1}{\theta}\right) y_0^t \leq y^s \lambda, L \leq e \lambda \leq U, \lambda \geq 0$

It is called intertemporal score in output orientation (O-V)

### 3. METHODOLOGY AND DATA COLLECTION

- *Data collection:* This study used companies that are related to technology and telecommunication as DMUs that are Vietnam listed companies at stock exchange market as Table I

This study, the companies were selected which demanded includes as DMU providing technology and telecommunication service. In our research, we eliminated some companies such as the incomplete data or multidisciplinary business company.

**Tab.1** - Technology - Telecommunication Companies list

DMUs	Stock name	Full English name of companies
DMU1	ABC	GMG media Group
DMU2	CMG	CMC Technology Group
DMU3	CTIN	Join Stock Company for Telecoms and Informatics
DMU4	GLT	Global Electrical Technology Corp.-GLT Corp.
DMU5	LTC	Low current-Telecom Joint Stock Company
DMU6	CMT	Infonet Joint Stock Company
DMU7	DGW	Digiworld Corporation
DMU8	ELG	Electronic Communications Technology Investment Development Joint Stock Company (Elcom Ltd)
DMU9	FOC	FPT Online Joint Stock Company
DMU10	FOX	FPT Telecom Joint Stock Company
DMU11	FPT	FPT Corporation
DMU12	HIG	HiPT Group Joint Stock Company
DMU13	HPT	HPT Informatics Technology Services Joint Stock Company
DMU14	ITD	Innovative Technology Development and Engineering Ltd.
DMU15	KST	KASATI Joint Stock Company
DMU16	MWG	Mobile World Co.Ltd.

- *Choose input/output variable:* The data sources for this study consist of 16 plants annual reports for period from 2012 to 2015. Information was collected from market observation posting system of Vietnam stock exchange cooperation.

- *Model design:*

Firstly, we use the Super – SBM – O - V model which proposed by Tone (2002) [8] is an appropriate version of DEA for ranking these efficient companies in this study.

Then, we implement the output-oriented Malmquist productivity index to a sample of DMU. This model was chosen to computer in order to evaluate the productivity change of a DMU between two time periods.

Research conclusion show that they can guarantee the viability of the company. Based on the super efficiency scores and MPI index, we find that most TTCs have higher efficiency and contribute more effort to improving technical change.

## 4. RESULTS AND DISCUSSIONS RESEARCH

### 4.1. Pearson Correlation

Correlation test an important step in applying the DEA technique to ensure the relationship between input and output factor is isotonic (i.e, an increase in any input should not result in a decrease in any output) [9]. If the correlation coefficient is positive, these factors are isotopically related and will be put into the DEA model, when the factor demonstrates a weak isotonic relationship, it will be reexamined [7]. The correlation coefficient is always between [-1, +1].

The tables. 2 show the results of correlation coefficients between input and output variables 2012. Those data are proper for DEA assumption and can be used for the analysis for DEA calculations.

**Tab.2** - Correlation of input and output data in 2012

	Tol.as	O.exp	Cogs	N.rev	T.eqt	Net.in
Tol.as	1	0.95518093	0.96313375	0.96432966	0.97056571	0.9390096
O.exp	0.95518093	1	0.93055740	0.94711591	0.98634740	0.99282781
Cogs	0.96313375	0.93055740	1	0.99822982	0.94814367	0.91883690
N.rev	0.96432966	0.94711591	0.99822982	1	0.95802681	0.93714583
T.eqt	0.97056571	0.98634740	0.94814367	0.95802681	1	0.97936440
Net.in	0.93900959	0.99282781	0.91883690	0.93714583	0.97936440	1

*Remark: Total assets (Tol.as), Operating Expense (O.exp), Cost of goods sold (Cogs), Net Revenue (N.rev), Total Equity (T.eqt) and Net Income (Net.in)*

### 4.2. Performance rankings-Super SBM

The Super-SBM oriented (Super-SBM-O-V) model is applied to assess the relative performances and used as a ranking measure of the 16 TTCs in Vietnam. It can be found out from Table 2, Super SBM is highly in the measurement of the efficiency and the rank is clear [10]. The results show that the eleventh (FPT Corporation) DMU11 has best value and the score always larger than 2 from 2012 to 2015, it is also ranked in the second place in 2015. In other words, DMU12 in 2014 over invested in input. Thus, if it wants to improve the efficiency level, it should lower its inputs.

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**Tab.3** - Efficiency rank and score

DMUs	2012		2013		2014		2015	
	Score	Rank	Score	Rank	Score	Rank	Score	Rank
DMU1	2.185801	2	2.217077	2	1.369441	5	1.663374	4
DMU2	0.100741	16	0.2562	15	0.687137	11	0.855383	11
DMU3	0.450408	11	0.566894	12	0.679352	12	0.75491	13
DMU4	1	7	1	7	1	7	1.067994	7
DMU5	1	7	1	7	0.294593	15	1	9
DMU6	0.212235	14	0.451674	13	0.462047	13	0.399822	15
DMU7	0.517456	10	0.715135	10	0.690574	10	1.000883	8
DMU8	1.373305	4	1.234156	6	1.377462	4	1.138086	6
DMU9	1.637496	3	1.336832	4	1.115244	6	2.453098	1
DMU10	1.341003	5	1.736046	3	1.844512	3	1.887847	3
DMU11	3.874397	1	4.14831	1	3.023607	1	2.237058	2
DMU12	0.425568	12	0.10545	16	1.70E-02	16	0.439811	14
DMU13	0.15064	15	0.290744	14	0.304853	14	0.252754	16
DMU14	0.393412	13	0.590856	11	0.745331	9	0.820644	12
DMU15	1	7	1	7	1	7	1	9
DMU16	1.213096	6	1.311464	5	1.998269	2	1.403387	5

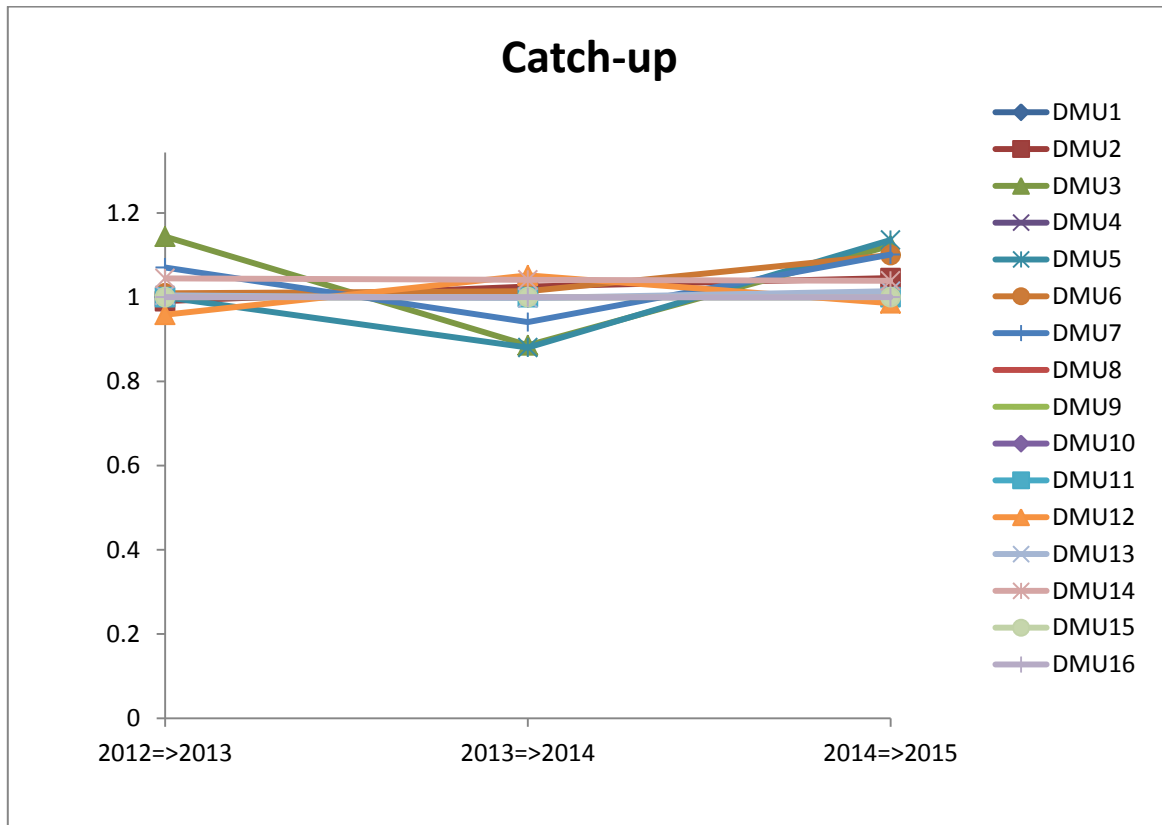
### 4.3. Components of the Malmquist productivity index

The change in efficiency is called “catch-up” effect [11]. The annual efficiency change index for each DMUs in shown in Table 3 and figure 1.

**Tab.4** - Catch-up efficiency change from 2012-2015

Catch-up	2012=>2013	2013=>2014	2014=>2015	Average
DMU1	1	1	1	1
DMU2	0.990477707	1.025140408	1.045237588	1.020285234
DMU3	1.143667971	0.885825076	1.122189625	1.050560891
DMU4	1	1	0.999999788	0.999999929
DMU5	1.000002555	0.88038532	1.135868035	1.005418636
DMU6	1.00923221	1.014365907	1.09998091	1.041193009
DMU7	1.070513428	0.940819106	1.101160795	1.037497776
DMU8	1	1	1	1
DMU9	1	1	1	1
DMU10	1	1	1	1
DMU11	1	1	1	1
DMU12	0.958427352	1.051766639	0.985622374	0.998605455
DMU13	1.004301939	0.997726908	1.014213624	1.005414157
DMU14	1.044768576	1.041151322	1.039119899	1.041679932
DMU15	0.999998841	1.000002321	0.999999327	1.000000163
DMU16	1	1	1	1
Average	1.013836911	0.989823938	1.033961998	1.012540949
Max	1.143667971	1.051766639	1.135868035	1.050560891
Min	0.958427352	0.88038532	0.985622374	0.998605455
SD	0.042012849	0.047892887	0.051088804	0.018889629





**Fig.1** - Catch-up efficiency change from 2012-2015

Table 4 shows the results of efficiency change scores of TTCs as well as their components which belong to partners. At the general trend, the average scores slight movement between 2013, 2014 and 2015. In 2015, DMU5 (Low current-Telecom Joint Stock Company) had the biggest improvement in efficiency change with score is 1.135868035. According average index shows that as a whole, the performance of these companies has been slight movement from 2012 to 2015.

The results of output technical efficiency change present that there are six companies (DMU1, DMU8, DMU9, DMU10, DMU11, DMU16) having no evidence of changes in the input technical efficiency level during the period of 2012-2015.

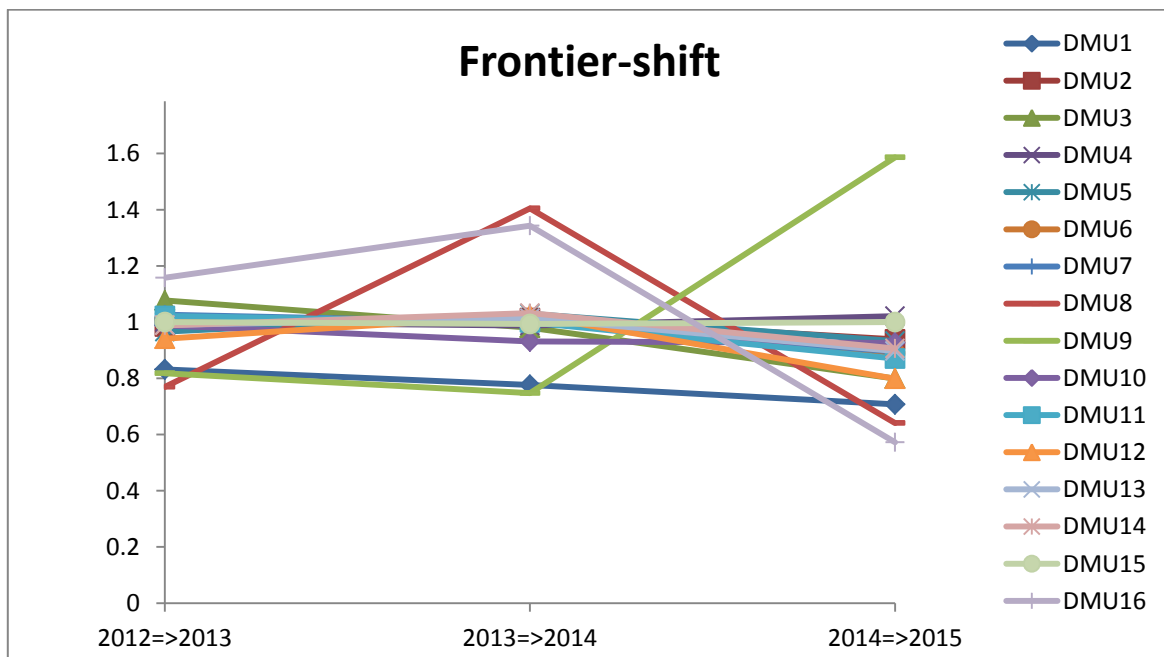
#### 4.4. Components of the Malmquist productivity index

Technical-efficiency or the so-called “innovation” or “frontier-shift” effect measures can be compared across time by means of the Malmquist index. In turn, the Malmquist index can be decomposed into two parts: change in technical efficiency and change in best-practice [11].

**Tab.5** - Technical (frontier) change over the period 2012 - 2015

Frontier	2012=>2013	2013=>2014	2014=>2015	Average
DMU1	0.831858	0.776143	0.707741	0.771914
DMU2	0.984327	1.014177	0.938707	0.97907
DMU3	1.077082	0.98002	0.79888	0.951994
DMU4	1	0.987679	1.021545	1.003075
DMU5	0.966197	1.029745	0.932379	0.976107
DMU6	1.011083	1.01096	0.889578	0.970541
DMU7	1.026438	0.9988	0.89475	0.973329
DMU8	0.769624	1.404707	0.641089	0.938473
DMU9	0.818039	0.747286	1.586083	1.050469
DMU10	0.98809	0.931213	0.925955	0.948419
DMU11	1.022105	0.998953	0.870361	0.963806
DMU12	0.941219	1.024763	0.798462	0.921481
DMU13	0.990191	1.014128	0.897213	0.967178
DMU14	0.988429	1.032027	0.906356	0.975604
DMU15	1.000001	0.993342	1	0.997781
DMU16	1.158154	1.343294	0.572508	1.024652
Average	0.973302	1.017952	0.89885	0.963368
Max	1.158154	1.404707	1.586083	1.050469
Min	0.769624	0.747286	0.572508	0.771914
SD	0.096792	0.163061	0.220836	0.060116

**Fig.2** - Technical (Frontier) change over the period 2012-2015



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The results show that during the period of 2012 to 2015, these are 8 TTCs that having the output technical improvement. There are 8 companies still improve their level of input technical change. Table.5 and Fig.2 shows that DMU9 (FPT Online Joint Stock Company) has the highest average in the technical efficiency in the period 2012-2015. DMU1(VMG Media Group) and DMU10 (FPT Telecom Joint Stock Company) has scores smaller than 1 from 2012-2015. The interpretation of this is that they was not investment in new technologies.

## 4.5. Productivity changes

The Malmquist productivity measures the change of productivity between period t and t+1. In this case, if  $MI > 1$ , the productivity of a specific TTC increases over the previous year that's mean these companies are moving along the best production frontier;  $MI = 1$  and  $MI < 1$  the productivity of specific TTCs decreases over the previous.

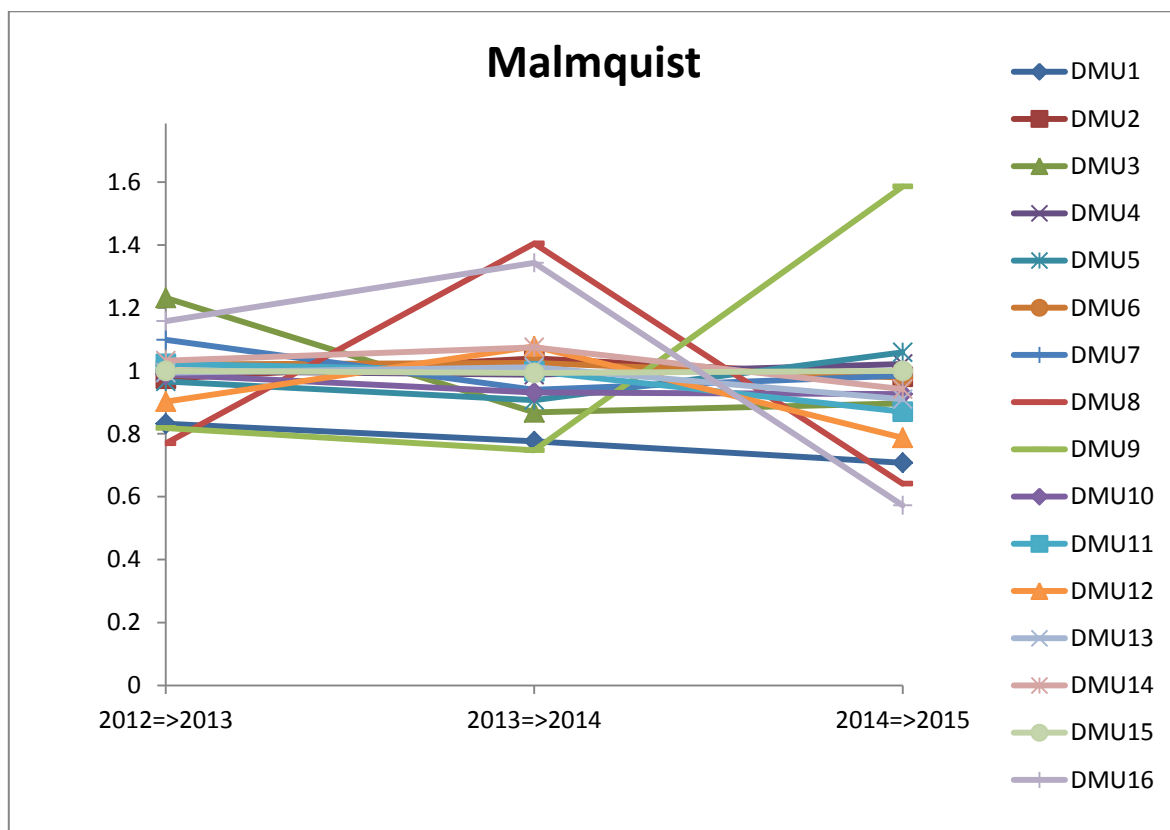
**Tab.6** - Annual productivity change from 2012-2015

Malmquist	2012=>2013	2013=>2014	2014=>2015	Average
DMU1	0.831858	0.776143	0.707741	0.771914
DMU2	0.974954	1.039674	0.981171	0.9986
DMU3	1.231824	0.868126	0.896494	0.998815
DMU4	1	0.987679	1.021545	1.003075
DMU5	0.9662	0.906572	1.059059	0.977277
DMU6	1.020418	1.025483	0.978519	1.00814
DMU7	1.098815	0.93969	0.985263	1.007923
DMU8	0.769624	1.404707	0.641089	0.938473
DMU9	0.818039	0.747286	1.586083	1.050469
DMU10	0.98809	0.931213	0.925955	0.948419
DMU11	1.022105	0.998953	0.870361	0.963806
DMU12	0.90209	1.077811	0.786982	0.922294
DMU13	0.994451	1.011823	0.909966	0.97208
DMU14	1.03268	1.074496	0.941813	1.01633
DMU15	0.999999	0.993344	1	0.997781
DMU16	1.158154	1.343294	0.572508	1.024652
Average	0.988081	1.007893	0.929034	0.975003
Max	1.231824	1.404707	1.586083	1.050469
Min	0.769624	0.747286	0.572508	0.771914
SD	0.1195	0.171905	0.224314	0.063605

Table.6 and Fig.3 shows the results that there are an improvement on the productivity level in 6 TTCs with a MPI values larger than 1 of Malmquist index during 2012 to 2015. In contrast, MPI of the 16 companies, 10 companies had the MPI smaller than 1, and MPI of the other 6 remained was larger than 1, which indicates that productivity loss. The worse productivity in this period comes from the deterioration of input technical efficiency in most cases.

The average years, six of the companies had productivity growth and other ten of the companies had productivity loss. The reduction of the productivity level in this period is mostly from the regression of the input technical efficiency. DMU9 had the highest productivity growth, followed by DMU16. The main source of improvement comes from the development of technical efficiency and technical change.

**Fig.3** - Annual productivity change (MPI) from 2012-2015



## 5. DISCUSSION

The results of correlation coefficient is always between input and output variables in table show strong positive associations and comply with the precondition of the DEA model. Hence, these positive correlations also prove that the selection variable is appropriate to use for the analysis for DEA calculations.

The result study present a situation of 16 TTCs in Vietnam. It can be seen that there is DMU9 (FPT Online Joint Stock Company) that reached their performance goals and their sustainability goals. The operational performance of this company is measured in terms of efficiency among the 16 companies from 2012-2015. The less efficient firms, such as DMU3, DMU6, DMU12, DMU13 (Join Stock Company for Telecoms and Informatics, Infonet Joint

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Stock Company, HiPT Group Joint Stock Company, HTP Informatics Technology Services Joint Stock Company), should carry out efficiency change, technical change as well as reduce wastage in term of time, materials and costs.

In the technological development environment, together with the strong development of start-up companies, Vietnam TTCs need to secure way to stand squarely in the competitive market. The results of paper should be consider by the manager of company, investor or policymakers.

## 6. CONCLUSIONS AND FUTURE

The purpose of this study research is evaluate the performance of TTCs used DEA method and Malmquist productivity index to estimate the efficiency scores of the TTCs in Vietnam. The empirical evidence of this paper provides some suggestion for TTCs to improve more scale efficiencies, technology...

Our limitations in this study, the authors only analyze, evaluate results of the companies based on data in the past. In the future, demand for development economic will remain high, TTCs is playing an increasingly important role with the domestic market, promising companies can reach out to the world if they can improve technical, productivity .... Future research could be added companies in the same industry in ASEAN, Asia to compare the domestic company capacity. Besides, future research should incorporate analysis of the regulations and policies of the state management for technology and telecommunication sector in order to introduce solutions and provide enterprises with a more general perspective for more accurate assessments and decisions.

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# The Relationship between Environmental Performance and Financial Performance: Panel Data Evidence from the U.S. Semiconductor Industry

*Chien-Wen Shen, Phung Phi Thi Tran, Mikhail Kuritsyn*

## ABSTRACT

*This research examines the impact of environmental performance on financial performance using the data of semiconductor manufacturing companies in the United States. As the financial performance, our study considers various indicators such as total assets, return on assets, cash flow, leverage, research and development intensity, sales growth, enterprise value and capital intensity. Moreover, we used environmental performance such as pollution propensity as the dependent variable. Our research results show that there is a relationship between financial performance and environmental performance from a long-term perspective. In addition, by applying panel data regression analysis, we tested whether the individual financial indicator has a significant influence on environmental performance. The results also indicate that companies have a better return on assets generally have better environmental performance.*

**Keywords:** *Environmental Performance, Financial Indicator, Semiconductor Industry*

**JEL Classification:** M21, O14, Q56

## 1 INTRODUCTION

Worldwide semiconductor sales expanded from \$77.3 billion to \$ 305.6 billion during the period from 2003 to 2013, a normal yearly rate of increase of 7.11 percent. According to the WSTS Fall 2014 Semiconductor Industry Forecast, worldwide semiconductor industry sales have a tendency to reach \$345 billion in 2015 and \$355 billion in 2016 (SIA, 2014). The U.S. semiconductor companies lead in global semiconductor market share, accounting for 51 percent of total global semiconductor sales in 2014, far and away the best share of any single nation. The following most astounding countries were Korea and Japan with 17 and 12 percent global market share respectively (Yinug, 2015). Semiconductors were mostly applied in four areas: computers, communication devices, consumer products and other areas from the middle of the 1980s to 2000. With the evolution of Internet in the 1990s, the application of semiconductors had widened. Now its application expanded to wireless networking, cellular phones, personal computing (tablets, notebooks etc.), automotive electronics, digital TVs, RFID devices and almost all electronic products (Insights, 2014). Nowadays semiconductors could be found in nearly every electronic device. According to the Greenpeace research, there are hazardous chemicals found in electronic devices people use every day (Greenpeace, 2005). During the production of semiconductor chips, over two hundred of high purity organic and inorganic compounds, as well as large quantities of ultrapure water, are used (de Luna, Warmadewanthi, & Liu, 2009). Besides, most of the discharged chemicals are incinerated at high temperatures and many of the chemicals are known human carcinogens, which could pose a serious health risk if not treated properly. As

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a result, wastewaters from semiconductor fabrication facility commonly contain a range of harmful contaminants including various solvents, arsenic, antimony, acids, alkalis, salts, fine oxide particles and other purity organic and inorganic compounds (FC, 2013; Taiwan, 2013). With the advancement of the semiconductor industry, the need for controlling pollution and toxic releases of the industry turned out to be more vital. The US Environmental Protection Agency is the authority to control pollution and monitor environmental issues. The US EPA also strictly regulates the semiconductor industry, issuing National Emission Standards for Hazardous Air Pollutants (NESHAP) for Semiconductors Manufacturing industry, which also includes rules and additional amendments to these standards (EPA, 2003).

However, very costly to follow the rules and therefore companies must spend a lot of money on buying machinery and equipment to minimize the number of toxic chemicals released in the semiconductor manufacturing process. On the other hand, a firm that is efficient at pollution control might also be efficient in production. Moreover, a firm that does well financially can afford to spend more of its resources on cleaner technologies. Hence, the first objective of the research is to examine the relationships between financial performance and environmental performance of the U.S. semiconductor companies. Although various authors have investigated the links between financial performance and environmental performance in different industries in different countries, there is a lack of consensus from both the theoretical and empirical reasons. In addition, to the best of our knowledge, there is no research exploring the relationship between financial performance and environmental performance in the semiconductor industry. Hence, this study reports on a new objective data set detailing the environmental performance of U.S. semiconductor industry. The research analyzes semiconductor manufacturing environmental performance considering financial indicators by following the information provided by the U.S. EPA. After collecting of financial and environmental data on 23 companies over 13 year period, we use pollution propensity (PP) to assess companies' financial performance, the higher PP indicates worse environmental performance, and vice versa, lower PP indicates better environmental performance. Furthermore, based on relative environmental performance over time, we divide companies into two categories: progressive group (PRO) and regressive group (RE). The results focus on changing point of view how companies think about the connection between environmental performance and financial performance. We want to motivate more underperformance companies to engage more into environmental activities, obey regulations and policies, and to show what result companies can get if they do so. On the example of more progressive companies with better environmental performance, which in general have better financial performance, better earnings and enterprise value, the study targets not only to stimulate RE companies but to implement the environmental practices as well. This paper offers new evidence on whether or not firms that perform well on financial criteria also perform well environmentally. Secondly, based on the results of the nexus among financial indicators and environment performance, the paper has used a set of panel data to conduct panel data analysis to show which financial indicators of the company play a significant influence on environmental performance. The negative coefficient for financial indicators will be favorable for better environmental performance to support the second hypothesis. The subject of corporate environmental performance, what it means, how to measure it and why it matters, is rapidly gaining prominence among business leaders, academics and investors. A key element in this debate is the question of how individual firm's financial indicators impact its environment performance. A company does that strives to attain good environmental performance gain advantages over competitors, or environmental performance is just an extra cost for these firms. Answers to these questions have important implications for the role that



corporations can be expected to play in promoting pollution reduction efforts and the use of cleaner technologies.

## **2 LITERATURE REVIEW**

There are many researchers discussed the influence of environmental performance on the financial performance of the companies during the past thirty years. However, this issue is still debated. On the other hand, almost companies spent not lots of cost and expenses but human resources as well on their manufacturing for environmentally friendly. In short, companies being effective in pollution management might be also productive in production (pollution means inadequate in production techniques or pollution is equivalent to waste). Further, if a company has budgetary performance is great, it is willing to spend more money on green technologies (Cohen, Fenn, & Konar, 1997). Numerous of scientists holds up the opinion that companies should enhance environmental performance before improving financial performance. The term “it pays to be green” is supported by many researchers. Consequently, superior financial performance is related to the measure of total emission in negative correlation (King & Lenox, 2001). It was likewise exactly demonstrated that organizations picking the path of critical environmental improvement over time, experienced the improvement in their financial performance. By the same token, the empirical proof proved that companies which do not choose the ways of environmental improvement over time have a declination in their financial performance over time. In the extent of the resource-based view of the firm, the research shows that the relationship between environmental performance and financial performance is going on (Clarkson, Li, Richardson, & Vasvari, 2011). Using diverse methodologies, a few specialists inferred that there is no connection amongst pollution and financial indicators, or the relationship is negative. According to Sarkis (2000), the correlation between environmental performance and short-term corporate financial performance is negative. Besides, the cost associated with improvement has an even bigger negative relationship with pollution prevention results (Sarkis & Cordeiro, 2001). For example, in pulp and paper industry, according to Freedman (1991)’s data and methodology, the result cannot completely clarify the link between financial performance and environmental performance. As a result, correlations between these two measures is not significant (Freedman & Jaggi, 1992). There is negative perspective about the causality between organizations’ financial performance and environmental performance. One aspect is that great financial performance makes available resources to make investments to enhance the environmental performance of the organizations. In like manner, good environmental performance will lead to better financial performance since utilization of companies’ resources and commitment of the workforce and other stakeholders is more effectiveness (Scholtens, 2008). Each study has a diverse approach and carefully analyses the estimates to clarify the relationship between environmental and financial performance. Those evaluations include a number of years, industries, the variable used and others. It is necessary that suitable time coverage is very important to set up the positive or negative relationship between environmental and financial performance (Horváthová, 2010). According to Lo, Yeung, and Cheng (2012), adoption of ISO 14000 standards had a significant positive effect on return on assets in the textile industry. Another study of Aragon-Correa, Hurtado-Torres, Sharma, and Garcia-Morales (2008) indicated that even small and medium enterprise can actualize environment actions which will lead to superior financial performance with the regard to resource-based view of the company. The choice to adjust adopt environmental practices is related with certain organizational capabilities of the company. If companies participate in environmental activities, they won’t have an immediate increase in benefits.

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Environmental activities may serve the part of the instrument in lessening the risk of damaging the brand assessments and company reputation in the long run. This result is likely new concept of the impact of environmental activities as resembling an insurance policy (Lin, Yang, & Liou, 2009). Iwata (2010) had results by analyzing the impact of particular environmental issues in Japan manufacturing companies that the reactions of financial performance are different relying upon each environmental issue. Those results are ascribed to modifying stakeholder preferences. The impacts of waste emissions on financial performance, as a rule, are not statistically significant. In simpler terms, reduction of greenhouse gas will make a going up financial performance in the long term; but it does not have a significant effect on other variables such as return on equity, which represents short-term financial performance. The study concludes that the long-term firm performance will affect stakeholders such as investors, stockholders, and financial institutes, while final consumers and trading partners do not take into account organizations' environmental administration in the short term (Iwata & Okada, 2011). As a rule, environmental researchers confront many difficulties leading their explore. First, there is no evidence and generally-accepted definition of environmental performance measurement. Second, Clear principles, regulations, abilities, and authorities do not clear in some countries for collection of environmental quantitative data. Therefore, a huge of data might be missed misleading and biasing any research (Srebotnjak, 2007).

A big question for companies nowadays is what motivations of organizations are for environmental improvement. Motivations that drive companies to change their environmental perspective are numerous. Gonzales-Benito (2004) recognized four types of inspirations such as ethical, productive, commercial and relational. Subsequently, to reach environmental goals, it is necessary to change the following elements of the company. Transformation of the administration framework, which is the system through which organization's goals, is set. Resources are assigned and acquired outcomes which evaluated to addition correct the procedure. Change of the operations framework combines all company's recourses and techniques and produces outputs in the form of market items. Because companies' objective is to channel prepared items towards consumers, the transformation of the business system is like fundamental, (González-Benito, 2005). Many different analysts have additionally proposed conceivable reasons of the environmental changes of an organization. For instance, stakeholders' pressure (Henriques & Sadorsky, 1999), strategic proactivity (Aragon-Correa, 1998), the search of the competitive advantage (Porter & Linde, 1995), and encounters with the last purchaser (Arora & Cason, 1996). A list of determinants or inspirations to start procedures of arbitrary environmental certification has been found by other researchers (Morrow & Rondinelli, 2002). In any case, many of these inspirations cover and are not separate estimations (González-Benito, 2005). Another point of view is that government directions have a negative effect on organizations' competitiveness. In addition, because of lack of resources to comply with environmental regulations in small companies, greater companies have better competitive advantages comparing to small and medium enterprises (Fletcher, 2001). Nonetheless, another exploration demonstrates that policies are probably to have significant effect impact on small and medium enterprises whose core business is assembling. This is the reason that environmental activities are roused by two important factors, business performance and regulations, though regulations deliver a higher degree of environmental action (Williamson, Lynch-Wood, & Ramsay, 2006). There are many semiconductor industry's environmental issues are presented by past researchers. Production of semiconductors requires various procedures and takes a couple of weeks to finish it. The manufacturing process for semiconductors includes three fundamental stages: crystal growing, wafer fabrication, and assembly. During these three phrases and other numerous

steps, to complete the semiconductor huge measure of chemicals is used. The United States Environmental Protection Agency has a definition for those chemicals as Hazardous Air Pollutant (HAP) and incorporates it in its Toxic Release Inventory database. The principle source of pollution for the semiconductor industry is by using of HAP in assembling process of semiconductors (EPA, 2001a). HAP use in the semiconductor industry is reducing because of regulatory, worker safety, and cost pressures and the pattern is destined to proceed. Many HAP materials utilized as a part of semiconductor products have been replaced by HAP-free materials. Tragically, emission points within the semiconductor fabricating process also have been uncontrolled. The semiconductor manufacturing industry has a record of decreasing HAP discharged. Aggregate HAP emissions fell from 2,426 Mg (2,668 tons) in 1987 to 579 Mg (636 tons) in 1994 (EPA, 2001a).

### **3 METHODOLOGY**

#### **3.1 Data**

Collected data of this research focused on the U.S. semiconductor industry which has tremendous growth in the world (CPPI, 2009). In order to find suitable companies in the COMPUSTAT database, we used the North American Industry Classification System (NAICS). It means that for the semiconductor industry, the NAICS code 334413 (Semiconductor and Related Device Manufacturing) was the principle criteria for picking organizations.

In related to financial data, data of research collection including total assets, return on assets, cash flow, leverage, research and development intensity, sales growth, enterprise value, the age of equipment and capital intensity from the COMPUSTAT database. Besides, environmental data from U.S. Environmental Protection Agency Toxic Release Inventory database were identified by U.S. companies during the whole selected study during 13 years. Hence, the companies with missing data were not included in the research. After comparing two databases (COMPUSTAT and EPA TRI) for accessibility of data, total 23 listed and publicly traded companies were chosen. Finally, from 23 companies during a 13-year period, we collected data which creates 299 firm-year observations. Table 1 summarizes the investigated companies according to the NAICS code 334413, where the second column shows their major products including semiconductors, chips and integrated circuit boards for different electronic products and electronic devices.

The research used approach mean the difference between populations to develop hypothesizes. To make it clear, the research decides pollution propensity (PP) as a toxic release in pounds divided by the cost of goods sold in millions in order to assess organizations' environmental performance. We used resources from U.S. Environment Protection Agency's Toxic Release Inventory's database to find out information about toxic releases and to figure as the total of all chemicals discharged to water, air, and land in a certain year. Besides, many past studies included U.S. TRI data in the research as a measure of environmental performance (Cohen et al., 1997; Freedman & Jaggi, 1992; King & Lenox, 2001; Sarkis & Cordeiro, 2001). Because, data for individual plant or factory is collected by Environmental Protection Agency, to whole up releases of all company-owned plants to measure total toxic release for the single organization was important. COPUSTAT database was a source to withdraw the data about COGS.

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**Tab.1** - The list of 23 companies with their major products

Companies name	Major products
Anadigics Inc.	Integrated circuits, chips and components for cellular products, wireless infrastructure, and others.
Analog Devices	Processors, semiconductors, Integrated circuits, chips and components for data converters, power management, and others
Atmel Corp.	Microcontrollers, memory, wireless and RF solutions, automotive products and others.
Celestica Inc.	Integrated circuits, chips and components for aerospace and defense, communication and consumer products, enterprise computing and green technology and others.
Cree Inc.	Chips and components for LED lighting, and other components and modules.
Cypress Semiconductor Corp.	Integrated circuits, chips and components for automotive, consumer electronics, lighting and power control, memory and others.
Diodes Inc.	Diodes, super barrier, rectifiers, bipolar, transistors, protection devices, lighting, and others.
Fairchild Semiconductor Intl.	Automotive products, circuit protection, lighting IC, optoelectronics, power management and others.
Integrated Device Tech Inc.	Semiconductors, Integrated circuits, chips and components for analog and RF, audio products, clocks and timing, data converters, interface and connectivity, memory and logic, power management
Intel Corp	CPU and other computer components.
Intersil Corp -CI A	Semiconductors, Integrated circuits, chips and components for power management, amplifiers and buffers, audio and video, data converters and others.
Linear Technology Corp.	Integrated circuits, chips and components for data conversion, power management, wireless and others.
Maxim Integrated Products	Integrated circuits, chips and components for amplifiers, memory, LED lighting, automotive, optical communication and others.
Memc Electronic Materials Inc.	Solar materials, semiconductors, and others.
Micrel Inc.	Integrated circuits, chips, and components for power management Is LDO Controllers, Lighting & Displays, LED Backlight, power switching, USB Transceivers, system management, temperature sensors and others.
Microchip Technology Inc.	Integrated circuits, chips and components for microcontrollers, automotive, data converters, memory, and others.
Micron Technology Inc.	DRAM modules, NAND flash, SSD, PCM and others
On Semiconductor Corp.	Semiconductors, diodes, transistors, DC controllers and others.
Rf Micro Devices Inc.	Integrated circuits, chips and components for cellular products, amplifiers, wireless and others.
Skyworks Solutions Inc.	Integrated circuits, chips and components for cellular products, amplifiers, wireless and others.
Stmicroelectronics Nv -Add	Integrated circuits, chips and components for cellular products, amplifiers, wireless, automotive, aerospace, and others.
Texas Instruments Inc.	Amplifiers and Linear, audio data converters, logic, power management, processors, microcontrollers and others.
Triquint Semiconductor Inc.	Semiconductors, integrated circuits, chips and components for cellular products, amplifiers, wireless, automotive, aerospace, and others.

### 3.2 Hypothesis

To assess organizations' drivers to execute environment practices, the research needs not only to consider factors to evaluate companies' financial performance and its' administrative capacity but also to be willing to apply environmental practices. The research considers three variables to evaluate companies' financial performance, they are: Return on Assets (*ROA*, the main variable to measure companies' profitability) (Clarkson et al., 2011; Cohen et al., 1997; Freedman & Jaggi, 1992; King & Lenox, 2001; Sarkis & Cordeiro, 2001), Operating Cash Flow (*CF*, evaluates companies' liquidity) (Clarkson et al., 2011; Freedman & Jaggi, 1992), and the ratio of total debt to total (*LEV*, assesses companies' leverage) (Clarkson et al., 2011; King & Lenox, 2001). According to resource-based view, the study dissects firms' environmental changes. As a result, companies with more passionate environmental management will have less contamination and more energetically draw in into environmental practices. It cannot be watched firms' managerial capacity directly. Hence, R&D expenditures (Clarkson et al., 2011; Iwata & Okada, 2011; King & Lenox, 2001), sales growth (Clarkson et al., 2011) and enterprise value (Clarkson et al., 2011) will assume a part of variables for undetectable administrative ability. These three variables are imperative determinants of executives' compensation (Murphy, 1997).

In addition, the research also illustrates another three extra variables to analysis companies' drivers for environmental changes, they are: company size (taking into consideration company's total assets, *TA*) (Clarkson et al., 2011; King & Lenox, 2001), age of equipment (*AGE*) (Clarkson et al., 2011) and capital intensity (*CAPIN*) (Clarkson et al., 2011; King & Lenox, 2001). The variables of this research are summarized as follows:

The study assesses the relative environmental performance of the firms or *PP*, which found as toxic release inventory in pounds isolated by the cost of goods sold, expecting that organizations in the similar industry will have moderately the same environmental performance, affected by the variables mentioned previously. *PP* surveys organization's environmental performance by discovering how many pounds of toxic materials were discharged into the air, water, and land during the manufacturing process, thus lower *PP* value will be more favorable for company's positive environmental performance.

After gathering financial and environmental data, we partitioned companies into two categories based on their relative environmental performance over time. During the grouping technique reserve, we used *PP* or  $1/PP$  for better representation and understanding. Hence, the higher number implied better environmental performance. Beginning from the first year of the study period, companies were adjusted from highest to the lowest depending on their relative environmental performance. In related to the companies at the highest 50%, we give "plus one" score and give "zero" score to the companies at the lowest 50%. This procedure was repeated for every single year of the study period 1999-2011. Because the quantity of company is not even, the middle companies getting whether +1 score or 0 scores based on to which group, company's relative environmental performance was nearer.

The grouping procedure was depended on the total score, which summed up company's scores for every year. It meant that we assigned the companies with a higher total score to progressive group (*PRO*), and the companies with a lower total score to regressive group (*RE*). Table 3 delineates the number of companies in each group, and names of companies in each group are indicated in Table 4. The result of grouping procedure is shown in the two following tables:

**Tab.2** - Definitions of Variables

<b>Variables</b>	<b>Definition</b>
<i>PP</i>	Pollution propensity, defined as toxic release inventory in pounds divided by cost of goods sold
<i>TA</i>	Total assets (\$ USD); taken from COMPUSTAT database
<i>ROA</i>	return on assets; taken from COMPUSTAT database (computed as net income divided by total assets)
<i>CF</i>	Operation cash flow or liquidity, defined as cash flow from operations divided by beginning of periods total assets
<i>LEV</i>	Leverage, defined as total debt divided by total assets
<i>RDIN</i>	Research and development intensity, defined as R&D expenditures divided by beginning of period total assets
<i>GRTH</i>	Sales growth; taken from COMPUSTAT database (computed as changes in sales divided by beginning of period sales);
<i>EV</i>	Enterprise value; taken from COMPUSTAT database
<i>AGE</i>	Age of equipment, defined as net property, plant and equipment divided by gross property, plant, and equipment
<i>CAPIN</i>	Capital intensity, defined as capital expenditures divided by beginning of period TA

**Tab.3** - Classification of companies by PP

<i>Group name</i>	<i>Description</i>	<i>Number of companies</i>
Progressive ( <i>PRO</i> )	Companies ranked in the highest 50% of the 1/PP over the time and got the highest total score	11
Regressive ( <i>RE</i> )	Companies ranked in the lowest 50% of the 1/PP over the time and got the lowest total score	12

**Tab.4** - List of companies by categories

<i>Progressive companies (PRO)</i>	<i>Regressive companies (RE)</i>
Analog Devices	Anadigics Inc
Atmel Corp	Cree Inc
Celestica Inc	Diodes Inc
Cypress Semiconductor Corp	Fairchild Semiconductor Intl
Intel Corp	Integrated Device Tech Inc
Linear Technology Corp	Intersil Corp
Micrel Inc	Maxim Integrated Products
On Semiconductor Corp	Memc Electronic Matrials Inc
Stmicroelectronics	Microchip Technology Inc
Texas Instruments Inc	Micron Technology Inc
Triquint Semiconductor Inc	Rf Micro Devices Inc
	Skyworks Solutions Inc

The aim of this research is to spur more polluting organization to actualize environmentally-friendly policies in U.S. semiconductor manufacturing process and to demonstrate that companies who control their pollution can appreciate the better financial performance. Henceforth, considering recourse-based perspective of the firm and work of previous researchers about relationship between environmental performance and financial performance (Aragon-Correa et al., 2008; Lopez-Gamero et al., 2009; Russo & Fouts, 1997; Salama, 2005; Scholtens, 2008) and in the scope of the research objectives, the first proposed hypothesis to look inside that there is a weighty difference financial data between *PRO* companies and *RE* companies.

$H_1$ : Companies with lower pollution amount generally have better financial performance in the long term.

To analyze the determinants of financial performance, the study needs to propose another hypothesis that explains the third objective of the study - better environmental performance depends on internal factors (Clarkson et al., 2011; Scholtens, 2008). Bearing in mind that organization' financial performance changes, the second hypothesis will be broke down the way organization use their budgets and managerial capability to enhance improve environmental situation of the produced items. Hypothesis two claims that companies should improve their financial indicators and managerial perspective to be able to engage in environmental practices and reduce their pollution. The second hypothesis states:

$H_2$ : Financial indicators have a positive influence on environmental performance.

### 3.3 Method

The study considers two classes, the first class includes progressive companies, whose environmental performance accounts for the top fifty percent of the list, and the second class includes regressive companies, whose environmental performance accounts for the bottom fifty percent of the list. Financial data was divided into two groups for progressive and regressive companies accordingly. After identifying variables, we collected the data. Companies also isolated in two groups by the level of their environmental performance, the research begun to break down the information depended on proposed hypotheses which utilized statistical programming Minitab. We analysis descriptive statistics mostly based on the p-Value analysis, which indicates the level of significance between two groups of samples. Conducting the study, alpha level or  $\alpha$ -level for the P-value was determined as equal to 0.1.

The meaning of panel data, or also called longitudinal data, usually applies to data including time series observations of a number of individual objects. In panel data, multiple objects are seen at two or more time periods. Hence, observations in panel data have at least two dimensions: a cross-sectional dimension and a time series dimension. A cross-sectional dimension is shown by index  $I$  and followed in the contrasts amongst subjects, and a time series dimension is indicated by index  $t$  and echoed in the progressions inside subjects over time. Panel data regression techniques allow analysts to exploit advantage of these two different kinds of information (Hsiao, 2007)

Though it is attainable to use basic multiple regression techniques on panel data, they will not be perfect. The appraisals of coefficients derived from regression might be subject to discards variable bias. This issue emerges when there are some obscure variables that cannot be controlled impacting the dependent variable. Using panel data, it is conceivable to control for some kinds of overlooked variables even without observing them, by observing changes in

the dependent variable over time. This screen for overlooked variables that differ between cases, but they are steady over time. It is also attainable to actualize panel data to control for omitted variables that vary over time but are constant between cases (Wooldridge, 2003). During data gathering, the paper has congregated data on 23 companies over 13 years' period, creating a set of panel data. In this way, the research was able to conduct panel data analysis. Those systems have some advantages over ordinary regression models. First of all, panel data analysis has substantially hunger data set with more variability and less collinearity among the variables than typical of cross-sectional or time-series data. Second, panel data is more enlightening, where the analyst can get more reliable estimates and test more complex behavioral models with less restrictive assumptions. Another advantage of panel data sets is the capacity to control for individual diversity. Not controlling for these unobserved individual specific effects may result in creating bias in the resulting estimates. Panel data sets are better in distinguishing estimate effects that are not detectable in pure cross-sections or pure time-series data. Especially, panel data analysis techniques are better studying complex issues of dynamic behavior (Hsiao, 2003).

Panel data also has its constraint. The case of it would be trouble in design, issues with data collection and data management. Different restrictions include the problem with coverage and availability when available panel data might not cover a period of interest; variation over time may not exist for some essential variables; sequencing in time does not necessarily reflect causation.

In this way, according to the methodology of panel data analysis within the context of  $H_2$  (King & Lenox, 2001), the model to analyze the relationship between environmental performance and financial performance is the following:

$$PP_{it} = \delta_0 + \delta_1 ROA_{it} + \delta_2 CF_{it} + \delta_3 LEV_{it} + \delta_4 RDIN_{it} + \delta_5 GRTH_{it} + \delta_6 EV_{it} + \delta_7 TA_{it} + \delta_8 AGE_{it} + \delta_9 CAPIN_{it} + \varepsilon$$

Since the higher PP means the higher pollution amount, this equation reflects, that the coefficient of  $ROA_{it}$ ,  $CF_{it}$ ,  $RDIN_{it}$ ,  $GRTH_{it}$  and  $EV_{it}$  should be negative, assuming positive effect on  $PP$ , and coefficient of  $LEV_{it}$  should be positive. Hence, an Eviews, statistical software, was used to perform data analysis and test the second hypothesis to implement the methodology of panel data regression.

#### 4 RESULTS AND DISCUSSIONS

In this part, we used methods such as comparison of mean values and standard deviation statistics of  $PRO$  and  $RE$  companies. The results show t-Value and p-Value statistic to indicate the significance of the difference between two groups in general and represent findings of the hypothesis  $H_1$  and  $H_2$ .

Table 5 illustrates that Statistical analysis reveals descriptive statistics for regressive and progressive firms grouped by their  $PP$  values for the variables  $PP$ ,  $TA$ ,  $ROA$ ,  $CF$ , and  $LEV$ . According to hypothesis 1, companies with lower  $PP$  values will have better financial performance. The results appear in the table empirically support  $H_1$ . Total assets measure for  $PRO$  firms is altogether higher than for  $RE$  firms (\$8.842 billion and \$2.242 billion separately), what demonstrated that  $PRO$  companies are bigger in size and have more assets, what supports  $H_1$ . Return on assets for  $PRO$  companies is significantly greater than for  $RE$  companies, where  $ROA$  for  $RE$  companies is negative and equal to -0.05%. There is a positive result in  $PRO$  companies is positive and equal to 5.15%, what also adds to support  $H_1$ . The



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ratio of cash flow to assets for RE firms is significantly lower than for *PRO* firms, approximately 0.03689 and 0.07143, supporting  $H_1$ . *PRO* companies' enterprise value is also significantly larger, compared with *RE* companies (\$20.094 and \$3.321), what indicates that *PRO* companies have much higher market value, what also verifies  $H_1$ . Statistics also suggest that on average *PRO* organizations are more leveraged rather than *RE* organizations, with mean values of 0.175 and 0.1223.

**Tab.5** - Descriptive statistics for groups *PRO* and *RE* companies

<i>PRO</i>	<i>PP</i>	<i>TA</i>	<i>ROA</i>	<i>CF</i>	<i>LEV</i>
<b>Mean</b>	60.4	8842	0.0515	0.07143	0.175
<b>Std. Dev</b>	446.2	14658	0.1359	0.08892	0.2794
<i>RE</i>	<i>PP</i>	<i>TA</i>	<i>ROA</i>	<i>CF</i>	<i>LEV</i>
<b>Mean</b>	308	2242	-0.0005	0.03689	0.1223
<b>Std. Dev</b>	1303	2894	0.2175	0.11245	0.11245
<b>T-value</b>	-2.15	5.08	2.4	2.82	1.94
<b>P-value</b>	0.033	0	0.017	0.005	0.054

In Table 6, statistical analysis analyzed descriptive statistics for regressive and progressive firms grouped by their PP values for the variables *RDIN*, *GRTH*, *EV*, *AGE*, and *CAPIN*. As the table reveals, comparing with *RE* companies, *PRO* companies also spend more money on research and development, which on average accounts for 11.08% of their total assets, while R&D expenditures of *RE* companies only account for 9.6%, affirming  $H_1$ . But on average, *RE* companies have better sales growth minor 14.52%, compared with 8.16% of *PRO* companies. Moreover, *RE* companies also have newer equipment (around 0.07 higher than *PRO* firms) and higher capital intensity measure (0.09607 comparing with 0.07926 of the *PRO* firms).

**Tab.6** - Descriptive statistics for groups *PRO* and *RE* companies

<i>PRO</i>	<i>RDIN</i>	<i>GRTH</i>	<i>EV</i>	<i>AGE</i>	<i>CAPIN</i>
<b>Mean</b>	0.1108	0.0816	20094	0.4067	0.07926
<b>Std. Dev</b>	0.051	0.247	39852	0.1263	0.07231
<i>RE</i>	<i>RDIN</i>	<i>GRTH</i>	<i>EV</i>	<i>AGE</i>	<i>CAPIN</i>
<b>Mean</b>	0.09626	0.1452	3321	0.4712	0.09607
<b>Std. Dev</b>	0.07007	0.2859	3769	0.1784	0.0946
<b>t-Value</b>	1.98	-1.98	4.82	-3.49	-1.67
<b>p-Value</b>	0.048	0.049	0	0.001	0.097

The research needs to conduct panel data analysis to discover observational evidence to support hypothesis 2. The panel data analysis of this research was directed utilizing the statistical software. In the scope of  $H_2$ , the result of the panel data analysis appears in Table 7. According to the hypothesis three, PP was chosen to be a dependent variable during the analysis of panel data. Panel data included samples for 13 years for 23 enterprises resulting in 299 observations, and to be more precise 287 observations because of the missing data. During the analysis linear estimation after one-step, weighting matrix was used with cross-sectional weights.

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Since the study uses *PP*, which is the ratio of toxic releases in pounds to COGS in \$1000USD, to evaluate companies' financial performance. The higher *PP* shows worse environmental performance, and vice versa, lower *PP* illustrates better environmental performance. In this manner, in accordance with the hypotheses 1 and 2 negative coefficients for variables *TA*, *ROA*, *RDIN*, *GRTH*, *EV*, *AGE*, *CF*, and *CAPIN* will be great for better companies' environmental performance to support hypothesis 2. With *PP* as the dependent variable, Table 7 demonstrates the result of panel data regression analysis. The results indicate that in semiconductor industry during 13 years of the study period, with the level of significance equal to 0.0956, independent variable *ROA* is the most significant variable influencing *PP* for 23 companies. With previously mentioned and *ROA* negative coefficient of -64.25712, states that environmental performance is the result of prevalent superior financial resources and progressed managerial abilities of the company.

Nonetheless, the level of significance for other variables is not sufficiently high to claim. Other variables, apart from *ROA*, significantly influence the level of pollution of companies and in that way support hypothesis 2. In any case, the research can consider coefficients of some other variables to contribute to hypothesis 2. For instance, the coefficient for total assets is equal to  $-4.83 \times 10^{10}$ , the coefficient is negative what supports the announcement made in the previous paragraph. Hence, even though the effect of *TA* on *PP* is not significant according to the findings of panel data regression, the result of total assets on companies' pollution measure *PP* is negative, what supports hypothesis 3. Another variable *EV* or enterprise value also supports the statement of the previous paragraph with negative coefficient  $-4.62 \times 10^{10}$ , though it doesn't significantly affect *PP*. Capital intensity *CAPIN* likewise has negative coefficient equivalent to -40.66690, what underpins the statement in the previous paragraph, but doesn't fundamentally influence *PP*.

**Tab.7 - Result of the panel data regression for sampled data.**

Variable	Coefficient	Std. Error	t-Statistic	p-Value
<i>TA</i>	$-4.83 \times 10^{10}$	$4.69 \times 10^{10}$	-1.029697	0.3041
<i>ROA</i>	-64.25712	38.42759	-1.672161	0.0956
<i>RDIN</i>	54.15395	96.99422	0.558321	0.5771
<i>LEV</i>	-23.00593	21.78359	-1.056113	0.2918
<i>GRTH</i>	28.03755	19.80620	1.415595	0.1580
<i>EV</i>	$-4.62 \times 10^{11}$	$1.59 \times 10^{10}$	-0.291486	0.7709
<i>CF</i>	37.20387	66.85103	0.556519	0.5783
<i>CAPIN</i>	-40.66690	59.90692	-0.678835	0.4978
<i>AGE</i>	61.08878	47.54276	1.284923	0.1999
<i>CONSTANT</i>	12.59021	24.75799	0.508531	0.6115

## 5 CONCLUSIONS

This research looks at the effect of environmental performance on financial performance by using 13 years' financial data from approximately 23 listed publicly traded semiconductor manufacturing companies in the United States. Statistical analyses were performed to test the hypothesis explore how underlying firm characteristics affect the relationship between relative environmental performance and financial performance. This recommends that managers ought to give impressive attention to environmental stakeholders (e.g. stakeholder can invest more to reduce pollution). Furthermore, companies looking to project themselves

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as strong, progressive firms possessing both moral respectability and the kind of innovation that will push them financially, have a new weapon: constructing a reputation for leadership in environmental affairs.

As a final exercise, we performed a statistical test to investigate which finance performance indicators have the most critical effect on organizations' pollution measure. Because the results about the positive connections between ROA and environment performances become more generally known, managers may be more likely to pursue environment performances as a feature of their strategy for attaining high ROA. According to our observation, moving aggressively toward environmental improvement will help companies to wind up more entrepreneurial on several of main dimensions that we have noted. Hence, such a trend will benefit firms that have promoted flexibility in their approach to environmental policy and to seek innovative solutions to meet their responsibilities.

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## The Causal Relationship between Money Supply, Inflation and Economic Growth in Vietnam

*Nguyen Trong Tin*

### ABSTRACT

*This study analyzes the causal relationships between money supply, inflation and economic growth in Vietnam in the period of 1999Q2 – 2012Q3. Quarterly macroeconomic data were collected from IFS and GSO. This paper employs the Granger test in the Vector Error Correction Model (VECM) environment to find the Granger causal nexus of three variables for both in short run and long run.*

*There is one cointegration was found from Johansen's test for co-integration. The results show that there is a bidirectional relationship between economic growth and inflation for both in the short run and long run, and there are two unidirectional causalities from money supply to growth and inflation. However, there is no evidence for the effectiveness of monetary policy in the short run.*

**Keywords:** *Johansen cointegration test, Granger causality, VECM, money supply, inflation, economic growth.*

**JEL Classification:** E51, E52, P44

## 1. INTRODUCTION

### 1.1 Problem statement

Economic growth and price stability have been the most important goals of macroeconomics in recent years. However, these goals are not easy to implement in practice. An appropriate increase in money supply can generate growth (Tobin, 1965; Bernanke and Gertler, 1995; Levine, 1997), but an improper expansion in money supply might lead to inflation (Friedman, 1963; Tobin, 1970). Accordingly, high inflation rate would cause many negative impacts on economic growth (Fischer, 1993; Barro, 1995; and De Gregorio, 1996). Nowadays, many economists agree with the view that low inflation is better for the process of economic development. That is why governments often want to keep inflation at low and stable rates, although sometimes there is a trade-off between inflation targets and growth objectives. Therefore, an effective monetary policy founded on deep understanding about dynamic relationship between money supply, inflation and economic growth is one of the fundamental conditions for sustainable growth and macroeconomic stability.

In particular, the relationship between growth and inflation, money supply and economic growth, money supply and inflation have attracted attention and research efforts of economists as well as concerns of policy makers all over the world. However, the problem has not been fully settled and remains the subject of intense controversy. As a result, there exist many mixed, opposing opinions on these issues, both in theoretical and empirical studies. Especially after the global financial crisis, the instability of the world economy has led to the diminishing growth rates and increasing inflation for numerous nations.

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In many countries, the governments accept the high inflation in exchange for high growth rate, especially in developing countries, such as China (Lin and Yunhui, 2005; Xie et al, 2009). In many years, China has achieved high economic growth by easing the monetary policy in which money has been used to finance development projects. Thus, the money supply is also the cause of high inflation in China in recent years. Lin and Yunhui (2005) also proposed that money supply and economic growth boost each other in the long-run, but inflation. Besides, some countries suffer high inflation with very low growth rates. An example is the case of Latin America countries in the period 1970-1980. With their development of financial system in that period, high inflation rates led to negative effects on the economy and then significantly reduced growth rate (De Gregorior and Guidotti, 1995). Moreover, some countries print money to finance the development of infrastructure projects without serious consideration of potential long-term harmful consequences. The results indicate that the relation of money supply, inflation and economic growth is mixed.

Although there have been many research works in theoretical, domain including research on each pair of variables such as money supply and economic growth, money supply and inflation, inflation and economic growth; and also simultaneously all three variables, but all these theories still cannot fully explain the empirical results to the full extent. Overall, this is one of the most dynamic research areas in macroeconomics. The obtained results are different from country to country, from region to region, and from time to time. In such studies, researchers often use VAR model or VECM model to examine the interaction between each macro variables to the other, for both long-run and short-run effect.

It is necessary to study carefully the causal relationship between inflation, money supply and economic growth for the case of Vietnam to solve many important macroeconomic issues such as the stabilization of the macro-economy, the control of inflation or the increase of money supply with sustainable development. In which case, we should increase money to generate economic growth without concern about increasing inflation.

Although the causal relationship between inflation, money supply and economic growth plays a significant role, there is a severe lack of research work on this field for Vietnam's economy. Furthermore, there exist many limitations in previous studies.

The study of Hoang (2010) showed the relationship between monetary policy to price level and output, but the results were still only at low levels. Carmen (2006) studied the volatility of inflation through external factors. Bui (2011) focused on the impact of monetary policy on inflation in Vietnam. In addition, there are few other studies on the relationship between inflation, money supply and growth in Vietnam. However, these studies did not consider all three variables simultaneously, or did not indicate a causal relationship between these variables. Recently, in Vo (2013), the author investigated the causal relationship between money supply, inflation and economic growth in Vietnam. The results showed that the money supply has an impact on growth and inflation in Vietnam. However, it was based on unrestricted VAR model, which only captures the effect of monetary policy on inflation and growth in the short run, without addressing the relationships in the long term. Similar to many previous studies, Vo (2013) used the percentage change of real industrial output as a proxy for growth. Notably, this may be not a good proxy for economic growth, and the results might be biased. Such issues raise the question about the nature of relationship between these three macroeconomic variables.

Moreover, the relationship between money supply, inflation and economic growth is very dynamic and changes over time. Therefore, further study is needed to re-examine this

complex causal relationship. In this research, I attempt to fill the gaps and overcome limitations of previous studies in term of models, approaches and data.

### **1.2 Research objectives**

In general, the objective of this study is to analyze the dynamic relationships between money supply, inflation and growth in Vietnam economy. Specifically, the objectives of this paper are:

To examine the causal relationship between inflation, money supply and economic growth in Vietnam

To propose the implication on monetary policy for the case of Vietnam

### **1.3 Research questions**

This paper will try to answer the following question:

Is there a causal relationship between inflation, money supply and economic growth in Vietnam?

Which monetary policy is suitable for the case of Vietnam?

### **1.4 Scope of the study and methodology**

This paper uses quarterly time series data to examine the nexus between inflation, money supply and economic growth in Vietnam over the period of 1999 to 2012.

Some key modern methods for exploring time series data including Augmented Dickey-Fuller (ADF) test, Phillips and Perron (PP) test, Johansen's cointegration test, Granger causality test, Impulse response functions, Variance decomposition were employed in this research.

## **2. LITERATURE REVIEW**

### **2.1 Theoretical literature**

#### **2.1.1 Theories about the Inflation – Economic growth relationship**

##### ***2.1.1.1 Classical growth theory***

Classical growth theory derives from supply-side theories, which emphasizes the need for incentives to save and invest for economic growth. The idea of this theory is that savings serve as a source of investment and it in turn leads to growth. The link between inflation and economic growth is not clearly explained in this model. However, the relationship between inflation and economic growth is implicitly suggested to be negative, as indicated by the reduction in firms profit levels because they must pay the higher wage costs for the labor.

##### ***2.1.1.2 Keynesian theory***

Traditional Keynesian theory proposes the Aggregate Supply (AS) – Aggregate Demand (AD) model, a general model for linking inflation to growth. A suitable stimulation on the demand side factors can lead to the economic growth.

In general, the Keynesian theory points out the positive link between inflation and growth. That is, when growth increases, it leads to an increase in inflation. However, in the long term, it is difficult to say this relationship is positive or negative. This relationship totally depends



on the characteristics of the economy of each country, where the relationship between aggregate supply and aggregate demand over the long term is determined differently.

### ***2.1.1.3 Neoclassical and Endogenous Growth theories***

Neoclassical and Endogenous Growth theories treat inflation as an exogenous variable, when it explains the effects of inflation on growth through the channel of investment and capital accumulation. When inflation increases, it reduces investment and capital accumulation, and thus leads to the decrease of growth rate.

#### ***2.1.1.4 The Tobin Effect***

The Tobin effect expresses the preference towards the inflation by arguing that it degrades the actual value of money and thus spurs people to invest their money. Those investments in turn help to promote the economic development. In summary, Tobin effect claims that the inflation is positively correlated to the economic growth.

### ***2.1.2 Theories about the Inflation – Money supply relationship***

The monetarism emphasizes the significant role of monetary growth as the primary cause of inflation. In this perspective first put forward by Friedman (1989), the inflation is only viewed as a monetary phenomenon in the sense that the inflation is merely influenced by the monetary growth and hence has no impact on the economic growth. Thus, inflation is the increase in prices of most commodities in the market, wherever and whenever, it is derived from monetary causes. Other causes, such as fiscal policy, also have impacts on inflation through monetary policy, either directly or indirectly as demonstrated subsequently.

When the amount of money in circulation increases, the price level will increase, or to put it another way, money causes inflation. Only when the amount of money in circulation growth exceeds the growth rate of the economy, it then would lead to inflation. On the other hand, we already know that the rising in money supply might have a positive impact on economic growth. In summary, inflation occurs as consequence of the increase in the money supply being relatively higher than the economic growth rate.

### ***2.1.3 Theories about the Money supply – Economic growth relationship***

Money supply has always played an important role in economic growth process (Levine, 1997). Since money affects economic growth through various channels, monetary policy is a useful tool to promote growth, although sometimes it causes some unwanted or unexpected consequences (Mishkin, 1995).

Firstly, in a closed economy, an increase in the money supply will reduce interest rates, which increases investment and accordingly leads to growth (Mishkin, 1995). Over 70 years, interest rate channel has been the key component in transmission mechanism to explain how money imposes effect to the economy.

Secondly, in an open economy, when the money supply expanding makes the interest rate of the domestic currency fall relatively to the world's interest rate, the stream of foreign currency would flow out of the economy. As a result, the domestic currency depreciates and

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this is beneficial for exporters. On top of that, the nation exports more to the world and this is good for its growth (Mishkin, 1996).

Thirdly, money links with economic growth through capital accumulation. Tobin (1965) explained that the wealth of household and individual assumes two forms, capital and money. If the return rate of money is lower than that of the capital when the central bank increases money supply, people will try to switch money to capital to increase the total return. In turn, the increase in capital stock will stimulate economic growth.

Fourthly, money also has an impact on individual consumption through equity price channel. Modigliani (1971) argued that the major financial wealth of individuals is common stock. The money supply increase leads to the increasing of equity price, and then stock price increase leads to improvement of financial wealth of households and individuals. Typically, people consume more when they are wealthier, and that leads to economic growth. In brief, we have:

Money  $\uparrow$   $\rightarrow$  Price of equity  $\uparrow$   $\rightarrow$  financial wealth  $\uparrow$   $\rightarrow$  Consumption  $\uparrow$   $\rightarrow$  Economic growth

Fifthly, money supply affects economic growth through credit channel (Bernanke and Gertler, 1995). When the central bank applies the tight monetary policy and causes the decreases in bank deposit at commercial bank, it affects the borrowers. As a consequence, the bank loan reduces, leading to the decline in investment, and that is bad for growth.

Besides, economic growth also influences money supply through the development of financial system (Kuznet, 1955). With the development process of the economy, we need an appropriate level of money, credit and financial conditions. This facilitates a more robust development of the financial system, especially when the economy approaches the intermediate level stage of growth process. On the other hand, money is the fuel for a functioning financial system because the development of a financial system requires an adequate supply of money. In short, there is a way for the opposite effect, that is, economic growth leads to the increasing in money supply.

## 2.2 Empirical literature

Despite the widely accepted belief among the economists on the adverse effect of very high inflation on economic growth, the empirical studies demonstrate mixed results regarding their relationship. In a typical study, Fischer (1993) and De Gregorio (1996) discovered a negative correlation between the inflation and growth (see also Barro, 1995).

Money plays an important role in the economy. Prahara (2009) found a bidirectional causal relationship between money supply and economic growth in India. Money supply is also an important tool to curb inflation. Feldstein and Stock (1994) stated that the Federal Reserve could probably use M2 as the tool to reduce the long-term inflation rate and the variance of annual GDP growth rate. Ogunmuyiwa and Ekone (2010) used annual time series data from 1980 to 2006 to examine the causal relationship between money supply and economic growth in Nigeria. The Granger causality test was applied in the VAR environment. The results showed that there is a positive link between money supply and economic growth at that time. Furthermore, there are several other empirical studies supporting the view that there is a strong positive relationship between money supply and economic growth including Nouri and Samimi (2011), Owoye and Onafowora (2007), Neusser and Kinglert (1996), King and Levine (1993), Sims (1972).

Although money can affect both inflation and growth, the empirical results show that this relationship is different in each country due to different characteristics of economic activities. In these researches, VAR model or VECM model was used to examine the potential causal relationship of money supply, inflation and output, as well as directions of this relationship.

In Venezuela, Yu Hsing (2004) presented the impulse respond function and variance decomposition in VAR model to analyze the relationship between real GDP and some key selected macroeconomic variables such as money supply (M2), inflation, deficit spending, and exchange rate over the period of 1961-2001. In this study, he found that real GDP responds positively to money supply and negatively to inflation. That means the increasing in the money supply is good for growth, while the inflation brings about negative impacts. However, the relationship between money supply and inflation was not clearly defined, so we do not know whether increasing money supply is good for Venezuela's economy.

Muhd Zulhibri (2007) employed the Johansen cointegration method and Granger-Causality test in VECM environment to re-examine the nexus between money supply, output and price in Malaysia. He used monthly time-series data in the period 1979-2000. The results showed that there was a bidirectional relationship between money (M3) and economic growth. However, there was only one-way causality between money and price which implies money causes inflation or put it another way, inflation in Malaysia is just a monetary phenomenon.

With the same method, Malik and Khawaja (2006) carried out a study to investigate the causal link between money, output and inflation for the case of Pakistan in the period from 1975 – 2003. Likewise, the results also showed that money supply is the main reason of inflation. However, an increasing in the money supply does not necessarily generate growth. The research results hinted that Pakistan should have adopted the tight monetary policy to curb inflation in the country.

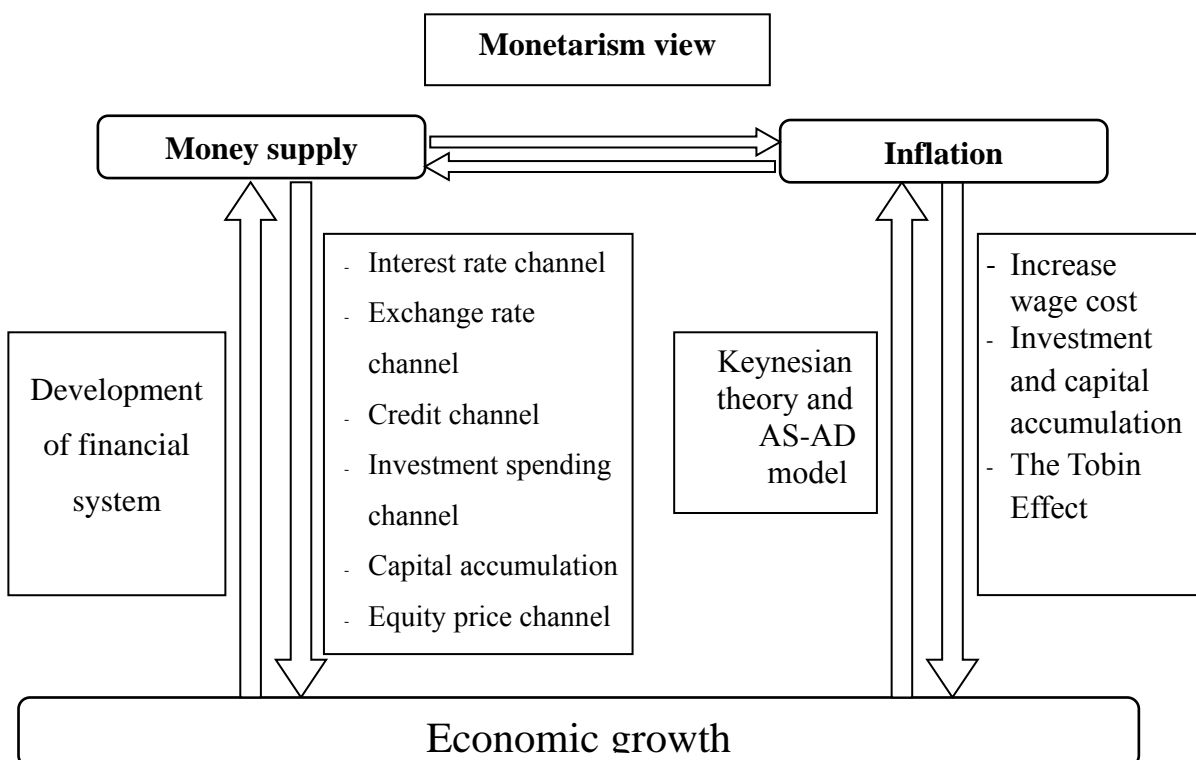


Fig.1 - The conceptual framework of this study

Most recently, Tabi and Ondoa (2011) used the VAR model for the period 1960-2007 to find the inter-relationship between money, inflation and economic growth in Cameroon. Granger causality test were used to analyze the causal relationship between these variables. The result showed that the increasing in money supply leads to the increasing in economic growth, and that growth is the cause of inflation. In addition, Tabi and Ondoa also pointed out that money supply is not necessarily the cause of inflation. Obviously, the interactional relationship between money supply, inflation, and economic growth is quite complicated and varies in each specific case. Thus, there is a need to have an appropriate model for the analysis of each instance.

In this study, based on the characteristic of the time series macro variables in Vietnam, I employed the Granger test in the environment of VAR model or VECM model to analyze the causal relationship between inflation, money supply and economic growth for the case of Vietnam.

### 3. RESEARCH METHODOLOGY

#### 3.1 Analytical framework

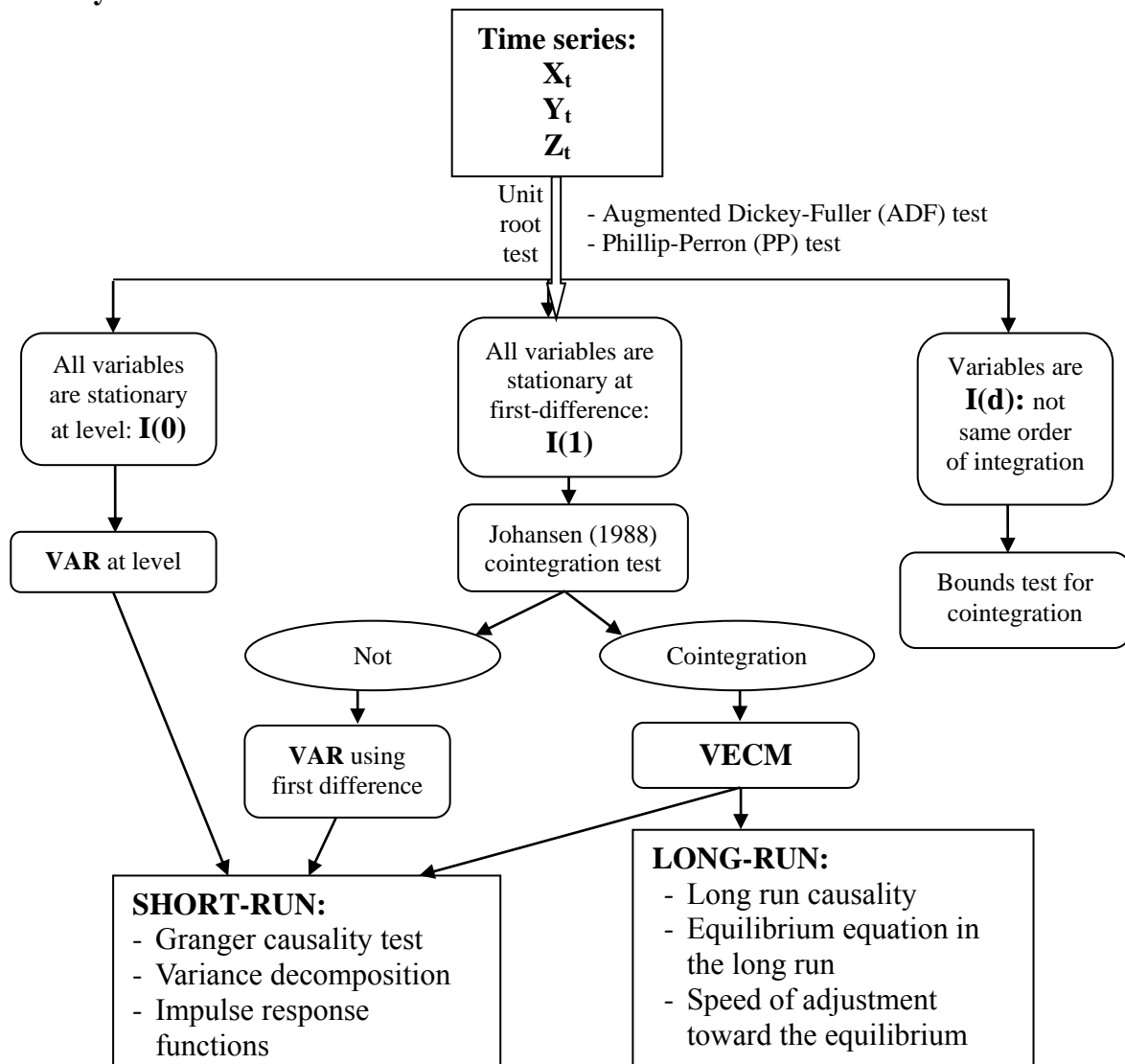


Fig.2 - Analytical framework

### 3.2 Data source

This research exploits the quarterly data set of Vietnam from 1999 Q2 to 2012 Q3. Most of data are taken from International Financial Statistics (IFS) except the quarterly GDP from Vietnam General Statistics Office (GSO).

### 3.3 Model Specification

The major objective of this paper is to find the causal relationships between inflation, money supply and economic growth. Based on the characteristic of the time series data, I employed the Vector Auto-regression (VAR) model at level, or VAR model at first difference, or Vector Error Correction Model (VECM) for the environment to examine the inter-relationship between the three macro-variable. In general, the VAR model is one of the most successful and powerful model to deal with multivariate time series and is represented by the system of equations as following:

$$\left\{ \begin{array}{l} Growth_t = \alpha_{10} + \sum_{i=1}^k \alpha_{1,i} Growth_{t-i} + \sum_{i=1}^k \alpha_{1,k+i} M_{t-i} + \sum_{i=1}^k \alpha_{1,2k+i} P_{t-i} + e_{1,t} \\ M_t = \alpha_{20} + \sum_{i=1}^k \alpha_{2,i} Growth_{t-i} + \sum_{i=1}^k \alpha_{2,k+i} M_{t-i} + \sum_{i=1}^k \alpha_{2,2k+i} P_{t-i} + e_{2,t} \\ P_t = \alpha_{30} + \sum_{i=1}^k \alpha_{3,i} Growth_{t-i} + \sum_{i=1}^k \alpha_{3,k+i} M_{t-i} + \sum_{i=1}^k \alpha_{3,2k+i} P_{t-i} + e_{3,t} \end{array} \right. \quad (3.1)$$

For the case  $Growth_t$ ,  $M_t$ ,  $P_t$  are integration at order one – I(1) but there is no cointegration, unrestricted VAR model is applied to examine the time series as following:

$$\left\{ \begin{array}{l} \Delta Growth_t = \alpha_{10} + \sum_{i=1}^k \alpha_{1,i} \Delta Growth_{t-i} + \sum_{i=1}^k \alpha_{1,k+i} \Delta M_{t-i} + \sum_{i=1}^k \alpha_{1,2k+i} \Delta P_{t-i} + e_{1,t} \\ \Delta M_t = \alpha_{20} + \sum_{i=1}^k \alpha_{2,i} \Delta Growth_{t-i} + \sum_{i=1}^k \alpha_{2,k+i} \Delta M_{t-i} + \sum_{i=1}^k \alpha_{2,2k+i} \Delta P_{t-i} + e_{2,t} \\ \Delta P_t = \alpha_{30} + \sum_{i=1}^k \alpha_{3,i} \Delta Growth_{t-i} + \sum_{i=1}^k \alpha_{3,k+i} \Delta M_{t-i} + \sum_{i=1}^k \alpha_{3,2k+i} \Delta P_{t-i} + e_{3,t} \end{array} \right. \quad (3.3)$$

VECM is used for the case three time series have a common trend, it is unrestricted VAR model with the Error Correction Term (ECT):

$$\left\{ \begin{array}{l} \Delta Growth_t = \alpha_{10} - \pi_1 \cdot ECT_{t-1} + \sum_{i=1}^k \alpha_{1,i} \Delta Growth_{t-i} + \sum_{i=1}^k \alpha_{1,k+i} \Delta M_{t-i} + \sum_{i=1}^k \alpha_{1,2k+i} \Delta P_{t-i} + e_{1,t} \\ \Delta M_t = \alpha_{20} - \pi_2 \cdot ECT_{t-1} + \sum_{i=1}^k \alpha_{2,i} \Delta Growth_{t-i} + \sum_{i=1}^k \alpha_{2,k+i} \Delta M_{t-i} + \sum_{i=1}^k \alpha_{2,2k+i} \Delta P_{t-i} + e_{2,t} \\ \Delta P_t = \alpha_{30} - \pi_3 \cdot ECT_{t-1} + \sum_{i=1}^k \alpha_{3,i} \Delta Growth_{t-i} + \sum_{i=1}^k \alpha_{3,k+i} \Delta M_{t-i} + \sum_{i=1}^k \alpha_{3,2k+i} \Delta P_{t-i} + e_{3,t} \end{array} \right. \quad (3.4)$$

Where:  $\pi$  is the speed of adjustment to the equilibrium

### **3.4 Stationarity and Unit root tests**

In VAR model, the primary condition is that the underlying time series are stationary. Thus, before the time-series were included in the analysis, the stationary condition must be checked. Normally, unit root test is often used as one of the most effective econometric tools for stationary testing. If the time-series have unit root problem, it is non-stationary. Dickey–Fuller (1979) proposed a very useful way to test for unit root, the Augmented Dickey-Fuller (ADF) test.

In empirical studies, researchers often use both the ADF test and the Phillips – Perron (PP) test for better decision making. Because ADF test is based on the assumption that the error terms in equation testing must be uncorrelated and have constant variance. Phillips and Perron (1988) developed a generalization of ADF procedure to fix the serial correlation problem. Eview software has the packages support for both ADF test and PP test. In this paper, I employed both ADF test and PP test for unit root testing.

### **3.5 Johansen’s test for Cointegration**

According to Asterious (2007), if we have more than three variables in the model, then there is a possibility of having more than one cointegration. If it is the case, we can say that the model may contain equilibrium relationships, or three variables have a common trend between them. Johansen (1988) and Johansen and Juselius (1990) proposed two statistic tests to determine the number of cointegration vector in the system which are trace statistic and maximum eigenvalue statistic. This technique requires all time series in the model are integrated at order 1 – I(1). Critical values for both statistics are directly provided in Eview packages which is base on Johansen and Juselius (1990) after conducting the co-integration test

### **3.6 Granger Causality Test**

Granger (1969) proposed a statistical hypothesis test to determine the causality of one time series to another, which is coined Granger causality test. In VAR model, this test can tell us the direction of causality between two time series (see also Asteriou, 2007).

### **3.7 Impulse response functions**

The impulse response function is widely used to uncover the relationship between macroeconomic variables in the short run within VAR environment or VECM environment (Lütkepohl and Reimers, 1992; Koop et al, 1996; Pesaran and Shin, 1998). It captures the response of one dependent variable in the system to shocks from the other explanatory variable.

### **3.8 Variance decomposition**

A variance decomposition or forecast error variance decomposition is used to examine the dynamic behavior in VAR model or VECM model once it has been fitted. In other words, variance decomposition shows us the dynamic properties of the model (Tan and Baharumshah, 1999). It determines how much information each endogenous variable contributes to explaining its own shocks and shocks to other variables in the system.

#### 4. FINDINGS AND DISCUSSION

##### 4.1 Unit root test

The Augmented Dickey-Fuller (ADF) test and Phillip-Perron (PP) test were used in this paper to investigate the stationarity of three time series data. This paper uses MacKinnon (1996) critical value in both ADF and PP unit root tests, which are available in Eview software package. The three possible forms of the time series, which are pure random walk, random walk with intercept, random walk with intercept and time trend were included in the analysis.

**Tab.3** - ADF and PP unit root tests on level time series

Variables	Exogenous	Augmented Dickey- Fuller test		Phillip-Perron test	
		t-Statistic	p-value	Adj.t-statistic	p-value
lnM2	Constant	-1.844046	0.3556	-2.140349	0.2302
	Constant, Linear Trend	-3.499504**	0.0499	-2.791570	0.2068
	None	4.135848	1.0000	8.744237	1.0000
lnCPI	Constant	1.886479	0.9997	2.346532	1.0000
	Constant, Linear Trend	-2.283101	0.4347	-2.385091	0.3829
	None	3.152715	0.9994	4.496176	1.0000
Growth	Constant	-1.931116	0.3158	-96.84012***	0.0001
	Constant, Linear Trend	-2.632441	0.2684	-116.3127***	0.0001
	None	0.811239	0.8842	-18.66612***	0.0000

Note: \*, \*\*, \*\*\* indicate significance at 10%, 5% and 1% levels respectively

Table 4.1 reports the results of unit root test for money supply, consumer price index, and economic growth. This table shows the results for log-levels of these series. CPI is a non-stationary series in two tests. M2 just passes the test in ADF test in the case of constant, linear trend. Growth has mixed results, wherein it is stationary in ADF test but non-stationary in PP test. Given the results, we should conclude that the three time series are non-stationary at level, or CPI, M2 and Growth series contain unit root at level.

Therefore, we should transform these time-series into their first difference for further analysis.

Table 4.2 presents the unit root test for three time series after taking the first difference. From the results in this table, most of the null hypothesis for unit root test is rejected at 1% level. Except for the case of M2, the results are still mixed. However, the results from PP tests strongly supports that M2 is stationary at first difference.

**Tab.4 - ADF and PP unit root tests on first difference series**

Variables	Exogenous	Augmented Dickey-Fuller test		Phillip-Perron test	
		t-Statistic	p-value	Adj.t-statistic	p-value
$\Delta \ln M2$	Constant	-8.110158***	0.0000	-5.387360***	0.0000
	Constant, Linear Trend	-2.349901	0.4000	-5.733734***	0.0000
	None	-1.032966	0.2674	-2.669329***	0.0085
$\Delta \ln CPI$	Constant	-4.160477***	0.0018	-3.400435**	0.0154
	Constant, Linear Trend	-4.416111***	0.0050	-3.337561*	0.0715
	None	-2.613847***	0.0099	-2.643355***	0.0092
$\Delta Growth$	Constant	-298.3320***	0.0001	-125.8995***	0.0001
	Constant, Linear Trend	-295.3045***	0.0001	-127.1349***	0.0001
	None	-298.7618***	0.0000	-126.8851***	0.0000

Note: \*, \*\*, \*\*\* indicate significance at 10%, 5% and 1% levels respectively

On pooling over all evaluation criteria, the results suggest that CPI, M2 and Growth are stationary at first-difference. In other words, these time series are I(1) variables. Because all time series are stationary at first-difference, so we can continue the investigation with Johansen approach to check the existence of cointegration between these time series.

#### 4.2 Estimation of optimal lag for VECM(p) model

Before conducting the cointegration analysis, the optimal lag is selected by many different criteria. Based on the statistical assessment criteria such as LR, FPE, AIC, SC, and HQ criterion, the optimal lag is determined to be four.

Therefore, the standardized model with 4-lag is employed in the analysis of cointegration and causality testing for three macro variables which are CPI, M2 and Growth.

#### 4.3 Johansen cointegration test

Here, from the unit root tests presented above, all three variables are integrated at order one I(1). Generally, CPI, M2 and Growth are non-stationary at level, but they are all stationary at first-difference. Therefore, the cointegration analysis is implemented to find the long run relationship among the variables, with Johansen cointegration test for time series data.

The empirical results of cointegration relationship are reported in Table 4.4. Based on Eigen value and Max-Eigen statistic, there is only one cointegration was found at 5% level of significance. That means there is a long run relationship between inflation, money supply and economic growth.

Thus, these results indicate that we should use the VECM for further analysis with four optimal lags is four and one cointegration. The dynamic interaction between money supply, inflation and economic growth in both short run and long run will be addressed in the next section



**Tab.5** - Johansen's cointegration test with 4 lags

Hypothesized No. of CE(s)	Eigen value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.478003	31.85458	21.13162	0.0011
At most 1	0.226511	12.58532	14.26460	0.0906
At most 2	0.074954	3.817660	3.841466	0.0507

. Max-eigen value test indicates 1 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

#### 4.4 Causality test for the long-run and short-run effect

As the three variables are cointegrated, we can run the VECM model. Table 4.5, table 4.6 and table 4.7 present inflation, money supply and growth in VECM model, respectively.

Long-run equilibrium equation:

$$\ln\text{CPI}_t = -1.458701 + 0.431159*\ln\text{M2}_t + 7.056420*\text{Growth}_t \quad (4.1)$$

The Error Correction Term (ECT) is expressed as follows:

$$\text{ECT}_t = \ln\text{CPI}_t - 0.431159*\ln\text{M2}_t - 7.056420*\text{Growth}_t + 1.458701 \quad (4.2)$$

**Tab.6** - Inflation equation in VECM model

Variables	Coefficient	Standard Error	t-statistics	p-value
ECT <sub>t-1</sub>	-0.069841	0.019720	-3.541622	0.0011
ΔlnCPI <sub>t-1</sub>	0.550027	0.168710	3.260200	0.0025
ΔlnCPI <sub>t-2</sub>	-0.060593	0.198658	-0.305010	0.7622
ΔlnCPI <sub>t-3</sub>	-0.203900	0.192629	-1.058513	0.2971
ΔlnCPI <sub>t-4</sub>	0.050090	0.138155	0.362565	0.7191
ΔlnM2 <sub>t-1</sub>	-0.131542	0.082898	-1.586791	0.1216
ΔlnM2 <sub>t-2</sub>	0.180141	0.093109	1.934745	0.0611
ΔlnM2 <sub>t-3</sub>	-0.027470	0.058716	-0.467842	0.6428
ΔlnM2 <sub>t-4</sub>	0.100593	0.050984	1.973022	0.0564
ΔGrowth <sub>t-1</sub>	-0.643154	0.323018	-1.991080	0.0543
ΔGrowth <sub>t-2</sub>	-0.483212	0.299917	-1.611153	0.1161
ΔGrowth <sub>t-3</sub>	-0.343503	0.285480	-1.203246	0.2370
ΔGrowth <sub>t-4</sub>	-0.275048	0.274741	-1.001118	0.3236
Constant	0.008656	0.008498	1.018625	0.3154
R-squared		0.80697		
Adjusted R-squared		0.735272		

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The coefficient of ECT is the speed of adjustment towards long-run equilibrium. This coefficient must be greater than -1 and less than 0. In this case, the coefficient of ECT in inflation equation is significant at 1% level. Hence, we can say that there is long run causality from money supply and growth to inflation. After each quarter, inflation will move about 7% to the long run equilibrium, which is a fairly slow rate.

**Tab.7 - Money supply equation in VECM model**

Variables	Coefficient	Standard Error	t-statistics	p-value
ECT <sub>t-1</sub>	-0.024474	0.043797	-0.558793	0.5799
ΔlnCPI <sub>t-1</sub>	0.081486	0.374699	0.217472	0.8291
ΔlnCPI <sub>t-2</sub>	-0.682706	0.441214	-1.547337	0.1308
ΔlnCPI <sub>t-3</sub>	0.781259	0.427823	1.826128	0.0764
ΔlnCPI <sub>t-4</sub>	-0.321450	0.306838	-1.047621	0.3020
ΔlnM2 <sub>t-1</sub>	0.759739	0.184114	4.126455	0.0002
ΔlnM2 <sub>t-2</sub>	-0.733170	0.206792	-3.545455	0.0011
ΔlnM2 <sub>t-3</sub>	0.325212	0.130406	2.493844	0.0175
ΔlnM2 <sub>t-4</sub>	-0.055591	0.113235	-0.490933	0.6265
ΔGrowth <sub>t-1</sub>	-0.169388	0.717413	-0.236109	0.8147
ΔGrowth <sub>t-2</sub>	-0.142992	0.666107	-0.214668	0.8313
ΔGrowth <sub>t-3</sub>	-0.138134	0.634043	-0.217862	0.8288
ΔGrowth <sub>t-4</sub>	-0.042562	0.610191	-0.069752	0.9448
Constant	0.045145	0.018873	2.392045	0.0223
R-squared		0.550742		
Adjusted R-squared		0.383874		

For the case of money supply, we found that there is no evidence for long run causality from economic growth and inflation to money supply. This result is quite consistent with the economic situation in Vietnam up to now, when the financial system has not yet developed to the intermediate level.

For the case of economic growth, the coefficient of ECT in growth equation is significant at 5% level, so we can say that there is long run causality from money supply and inflation to economic growth. After each quarter, growth will move about 2.4% to the long run equilibrium, which is a slow rate.

The results show the long-term relationships between money supply, inflation and economic growth. Moreover, although there is a long-term relationship between these variables, the speed of adjustment to equilibrium equation is very low. The following section presents the relationship between the money supply, inflation and growth in the short-term based on Granger causality test.

**Tab.8 - Growth equation in VECM model**

Variables	Coefficient	Standard Error	t-statistics	p-value
$ECT_{t-1}$	-0.024740	0.011752	-2.105076	0.0425
$\Delta \ln CPI_{t-1}$	-0.187057	0.100546	-1.860422	0.0712
$\Delta \ln CPI_{t-2}$	-0.051458	0.118394	-0.434638	0.6665
$\Delta \ln CPI_{t-3}$	-0.130241	0.114801	-1.134498	0.2643
$\Delta \ln CPI_{t-4}$	0.083226	0.082336	1.010803	0.3190
$\Delta \ln M2_{t-1}$	-0.060792	0.049405	-1.230499	0.2267
$\Delta \ln M2_{t-2}$	-0.034805	0.055490	-0.627235	0.5346
$\Delta \ln M2_{t-3}$	-0.003418	0.034993	-0.097667	0.9228
$\Delta \ln M2_{t-4}$	0.022821	0.030385	0.751052	0.4576
$\Delta Growth_{t-1}$	-1.473605	0.192508	-7.654762	0.0000
$\Delta Growth_{t-2}$	-1.449226	0.178741	-8.107965	0.0000
$\Delta Growth_{t-3}$	-1.430917	0.170137	-8.410373	0.0000
$\Delta Growth_{t-4}$	-0.363777	0.163737	-2.221716	0.0329
Constant	0.012176	0.005064	2.404254	0.0216
R-squared		0.999863		
Adjusted R-squared		0.999812		

**Tab.9 - Granger causality test base on VECM**

Dependent variable	Short-run causality (F-test)			Long-run causality (t-test)
	$\Delta \ln CPI$	$\Delta \ln M2$	$\Delta Growth$	$ECT(-1)$
$\Delta \ln CPI$	-	2.034340 (0.1109)	11.32831*** (0.0000)	-3.541622*** (0.0011)
$\Delta \ln M2$	1.054621 (0.3934)	-	1.956079 (0.1229)	-0.558793 (0.5799)
$\Delta Growth$	4.169544*** (0.0073)	1.070810 (0.3856)	-	-2.105076** (0.0425)

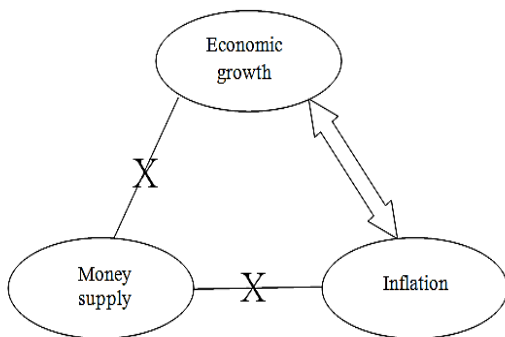
Note: \*, \*\*, \*\*\* indicate significance at 10%, 5% and 1% levels respectively. The p-values are in the parentheses

The results in table 4.8 show that in the short-run, there is only a bidirectional relationship between economic growth and inflation. However, there is no evidence for the relation of money supply to economic growth or inflation in short-run. These results suggest that monetary policy cannot have immediate impact on growth and inflation in the short term, but its influence just occurs in the long term.

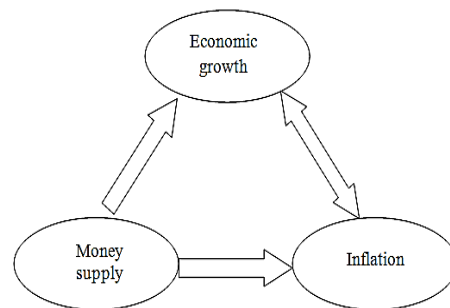
Figure 4.1 and 4.2 illustrate the causal relationship between inflation, money supply and economic growth in the short-run and the long-run.

For Vietnam’s economy in the long run, there is one bidirectional relationship between economic growth and inflation, and a unidirectional causality from money supply to economic growth and inflation.

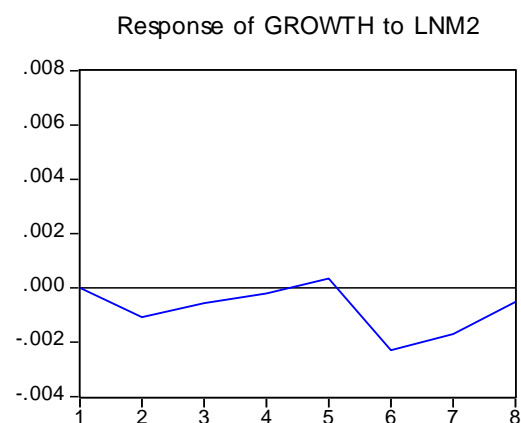
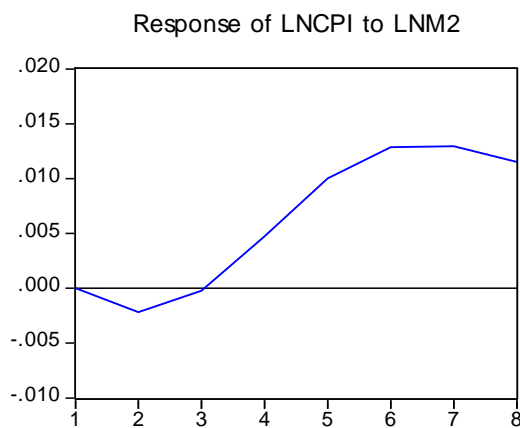
In general, the theories suggest that an increase in the money supply should lead to both inflation and economic growth by many reasons. However, for the case of Vietnam, we can see in Figure 4.3 the impulse response function of inflation and economic growth to money supply. With the positive shock to money supply, it leads to the negative response to economic growth. Besides, inflation responds negatively to the positive shock of money supply in the first three quarter and has a positive response after that. Therefore, a positive shock in money supply might not result in economic growth, but instead put the pressure on inflation.



**Fig.1** - The causal relationship between Inflation, Money supply and Economic Growth in the Short run

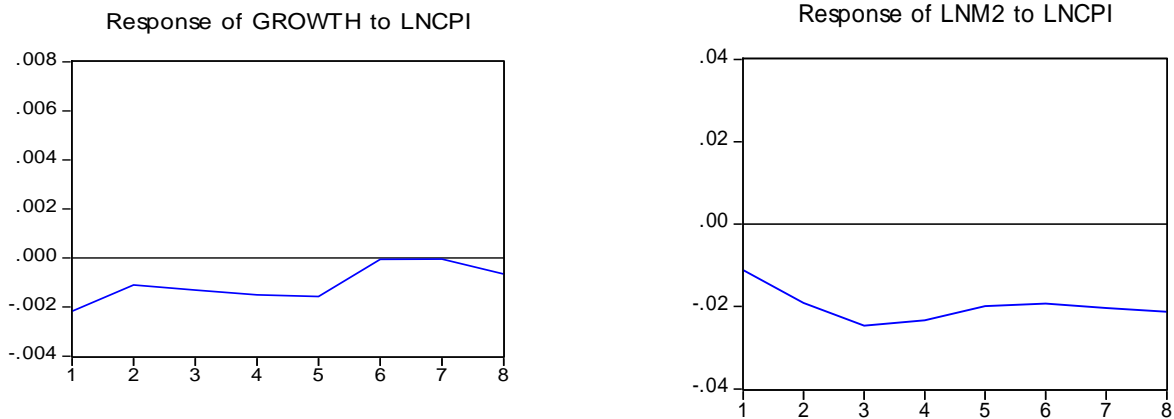


**Fig.2** - The causal relationship between Inflation, Money supply and Economic Growth in the Long run



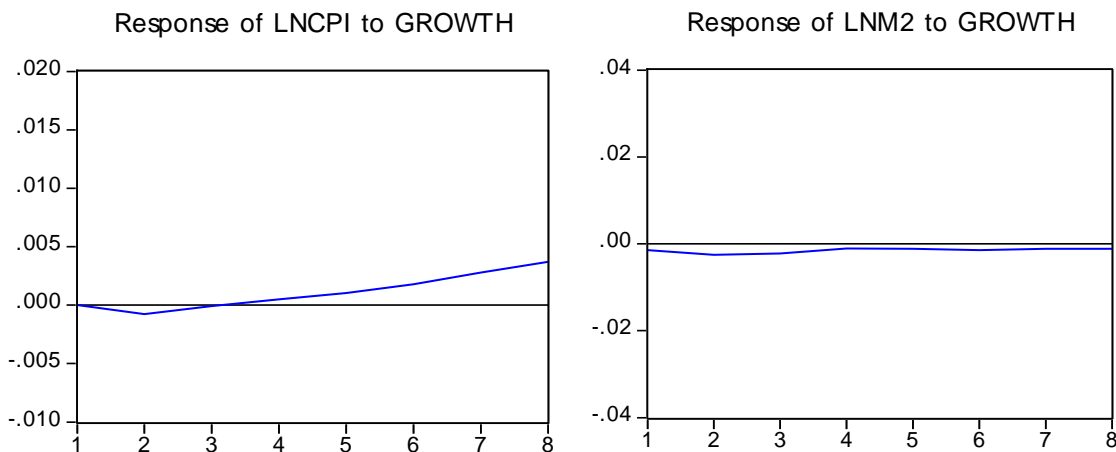
**Fig.3** - Response of inflation and economic growth to money supply

For the response of economic growth and money supply to inflation, Figure 4.4 shows that a positive shock in inflation would cause negative effect on both economic growth and money supply.



**Fig.4 - Response of economic growth and money supply to inflation**

Finally, a positive shock in growth may lead to a negative response in inflation from the first quarter to third quarter, and then a positive response after that. Meanwhile, a shock in growth seems not effect to the money supply.



**Fig.5 - Response of inflation and money supply to economic growth**

Table 4.8 show the contribution of each variable to the change of the others in quarter 8. Money growth accounts for only 9.06% in explaining the change of growth after eight quarter. Meanwhile, money accounts up to 37.27% for explaining the change in inflation.

**Tab.10 - Variance decomposition**

Response variable	Variance decomposition in Quarter 8			
	<i>Growth</i>	<i>LnCPI</i>	<i>LnM2</i>	<i>Total</i>
<i>Growth</i>	79.39%	11.55%	9.06%	100%
<i>LnCPI</i>	1.68%	61.05%	37.27%	100%
<i>LnM2</i>	18.79%	30.24%	69.57%	100%

## 5. CONCLUSIONS AND POLICY IMPLICATIONS

### 5.1 Conclusions

Based on the theories and previous empirical studies, this paper focuses on the causal relationship between money supply, inflation and economic growth in Vietnam in the period from 1999Q2 to 2012Q3. Quarterly macroeconomic data were collected from two reliable sources, IFS and GSO.

In this paper, a number of modern econometric tools are used to analyze time series data. Firstly, unit root test including Augmented Dickey-Fuller test and Phillip-Perron test are applied to determine the stationary characteristic of three time series. Secondly, Johansen cointegration techniques are utilized to find the common trend of inflation, money supply and economic growth in Vietnam. Finally, the short run and long run causality tests in VECM environment are conducted to find the causal relationship between three macro-variables.

*The major findings of the paper are summarized as follows:*

Firstly, the unit root test results supports that all variables included in the analysis are integrated of order one,  $I(1)$ . Secondly, the Johansen cointegration test suggests that there is one cointegration relationship between money supply, inflation and economic growth in Vietnam.

Thirdly, from the Granger causality test in the VECM environment, the results show that there is a bidirectional relationship between economic growth and inflation in the short run, but there is no evidence for causal link running from money to growth or inflation in the short run, and vice versa. This means that monetary policy is not effective in the short term to control inflation and boost growth.

Fourth, the results also discover a bidirectional causality between inflation and economic growth in the long term. Moreover, in the long run, there are two unidirectional causalities, one from money supply to economic growth, and the other from money supply to inflation. As a result, monetary policy only affects inflation and economic growth in the long term.

### 5.2 Policy implications

In Vietnam, inflation and economic growth have a bidirectional causal relationship in both the short run and the long run. It is very difficult to achieve simultaneously both the objectives of high economic growth and low inflation at the same time. There is a trade-off between growth and inflation. Given the fact that inflation always has several negative impacts on the economy and social instability, we should continue to pursue the goal of controlling inflation rather than economic growth.

Monetary policy is not a good tool to curb inflation, because of its slow response to inflation. Monetary policies only have effect in the long term. However, we should not apply loosening monetary policy for economic growth because this will be accompanied by higher inflation in the next few years. Instead, we should adopt tighter monetary policy and find a new source for economic growth other than money in the long run.

Finally, this study could serve as a basis for further studies on monetary policy in Vietnam. The results in this paper also helps to extend the previous studies with the updated data and more advanced approaches.

### 5.3 Limitation and Further studies

Because the limit of time series data in Vietnam, especially the availability of quarterly GDP, data analysis at a deeper level imposes many difficulties and is likely to produce insignificant result due to insufficient time series.

In this paper, the cause of inflation is only considered in the demand side factors. This is a shortcoming in measuring inflation in this paper because inflation causes could come from the supply side factors.

Exogenous variables are not included in the model. Moreover, the money supply and budget deficits have a close relationship. Thus, monetary policy and fiscal policy should be closely coordinated. It is also a potential future research direction by incorporating more variables into the model.

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## **Stability of Business Process – Core Assumption for Implementation of INDUSTRY 4.0 Concept in Industrial Enterprise**

*Felicita Chromjaková*

### **ABSTRACT**

*INDUSTRY 4.0 opens a new possibility of thinking about the settings and right content of business processes. A basic assumption there is the knowledge of business processes, and adequate combination of enterprise organisational and process structures. This involves a requirement on radical change of thinking about the content and settings of core business processes, without which there it is impossible to stabilise business processes and subsequently implement the digital environment content INDUSTRY 4.0, in which part of management functions passes from human to digital technologies. This paper considers to the definition of key parameters for stabilisation of business processes, oriented on the increase of strategic competitiveness of the enterprise.*

**Keywords:** *Industry 4.0, process management, stability*

**JEL Classification:** O60

### **1 INTRODUCTION**

The combination of human and technological factors plays a significant role in the planning process of innovations of selected products and production systems according to the implementation of INDUSTRY 4.0 concept. It depends on the stage of the life cycle, whereby most important is the actual state – or position of technological process and its life cycle stage at the moment (Dorst, 2016). The analysis therefore concentrated on an adequate assessment of the proposed process innovation in relation to the associated costs and potential revenues. An important element of the whole construction process innovation is a clear declaration of the production strategy by the company management (Gerlitz, 2016). It must be absolutely clear, that technological processes are continuing and it is necessary to upgrade their technology and processes that will be phased out. The proposed improvement could be in human-to-human, human-to-system, and system-to-system workflows, and might target regulatory, market, or competitive challenges faced by the businesses. The existing process and the design of new process for various applications should have an important potential of process synchronisation. Definition of INDUSTRY 4.0: Concept of digitized production processes, managed through integrated cyber-physical systems with core orientation on automated e-connection of processes, production technologies and autonomously exchange of information.

The existing knowledge of process and product life cycle is based on a precise knowledge of specific phases phenomena of processes and products. Key parameters that need to be analysed:

### **Technology of production**

Experiences with risk elimination and prediction of risks in realised processes and products

Cooperation with the customer in profiling the product realisation processes and the implementation of the proposed solutions in the life cycle

Many companies are oriented on the 4<sup>th</sup> industrial revolution, they solve daily a lot of new working situation in management and organization of own production processes. The purpose of this paper is to present methodological tool of key process parameters, oriented on the process stabilisation before implementation of Industry 4.0 concept (Gilchrist, 2016). The most important thing in this concept is to manage and lead all employees towards effective and profitable communication with e-technologies used in the company. Productivity, efficiency and profitability of modern production systems depends on the system's ability to solve sophisticated tasks. An important factor is that the staff of specialized enterprise departments in industrial companies design, plan, organize and control the job and work of automated industrial systems. The real output of these automated machines and computer systems, working with the concept of INDUSTRY 4.0, are real processes and products.

## **2 LITERATURE REVIEW**

People management, people leadership in times of 4<sup>th</sup> industrial revolution brings the new way of thinking and processing not only by e-technologies, it also requires other access to the optimal performance management by employees. All industrial companies have a lot of experiences with various models of people management in traditional production processes, but in strong connection with e-technologies we should find new concepts, based on the right compatibility of e-technologies and people. Of particular importance, there is the understanding of new type of process communication: e-technology cooperates with staff, staff should understand in the right way the abilities and potentials of new technology. If flexibility is an important concept in operations management, it should be explored in all types of operation, not just in manufacturing.

There is a claim that the most important demands on managers in sociotechnical organized systems with more or less autonomous work groups are generally that they must have a basic trust in their subordinates and their capacity and development potential, that they must be able to set goals for the activities within the groups and let the group members be responsible for the fulfilment of the production target and thus give up exercising a detailed control over the job procedure, and that they must realize the necessity to provide the group members with all kinds of basic data which are needed for the decision making within the group. At the transition from a traditional to a group-based organization, the manager must display a real commitment as change agent during the whole implementation period (Sigvard Rubenowitz, 1992). Industry 4.0 can progress if there is close exchange between the fields of electronics, electrical engineering, mechanical engineering and IT. With this approach, Germany has special strengths as the "factory outfitter of the world". These strengths are based on the country's good general education system, its established development partnerships between suppliers and users, its market leadership in plant and mechanical engineering, its strong and dynamic SMEs and its position as the leading innovator in automation methods (Heng, 2014). The increasing integration of the Internet of Everything into the industrial value chain has built the foundation for the next industrial revolution called Industry 4.0. Although Industry 4.0 is currently a top priority for many companies, research centres, and universities, a generally accepted understanding of the term does not exist (Hermann, Pentek, Otto, 2016).

Actual production environment in modern industrial enterprises is in today's time strong influenced by the fact that the system oriented process thinking and increasingly digitalisation and automatization of manufacturing environment are critical for future prosperity and competitive ability of internal and external manufacturing and enterprise processes (Gentner, 2016). The importance and requirements of correct functionality of all active process parameters grows every day radically. If we lose sight of the compass connected with implementation of Industry 4.0 concept in the industrial enterprises and do not focus on our company from the value-adding processes point of view, we will get lost (Chromjakova, 2017). At the same moment, we are confronted with the same situation: we have the old non-stable structures, machines, processes, employees. We will know the answer to the important question: "How we can get from the present state of the analogue manufacturing to our vision of digitalized company – a company of Industry 4.0?" Instead of getting fit for the new future, companies are investing in the grandiose and complex IT projects. The degree of waste increases, for the process stabilisation there is necessary their elimination. As long as companies are not strategically adapting their processes to the challenges of the digital world while keeping an eye on the added value, they will inevitably fail in their digitalization projects. The value creation logic follows two core parameters: processes optimization and processes digitalization. In process optimization, our target is to define and stabilize all processes and in process digitalization we are looking for right managed "self-regulating" control mechanism, from the customer through the production process to the supplier. If the digitalized processes are not stabilized, we automate the production of waste. If we are not able to reduce the complexity through the optimal managed process self-regulation, we will not cope with the complexity and in the amount of data that is no longer to be controlled.

### **3 METHODOLOGY**

Important data for the methodology proposal were taken from surveys conducted in selected industrial companies (2015, 2016), oriented on the implementation of Industry 4.0 concept in 3 countries – 300 SMEs. According to results achieved, quantitative and qualitative analyses were realized and they identified core motivation trends for effective e-processes. Presented results show key parameters and orientation strategies for flexible employee's motivation, integrated in process teams in the area of production planning and organization. It is important to use various motivation strategies, dependent on the process – product – personality motivation of employees. This methodology proposal has the limitations in the small amount of companies that have implemented Industry 4.0 concept. If we are interested in the new production management strategies in this environment, we should take positive and negative feedback from existing companies for effective new man-man strategies connected with e-processes. The research and results presented in this article open new ways of managerial strategies for production departments and industrial enterprises in the era of 4th industrial revolution. Many companies focus their attention solely on the implementation of e-technologies and e-processes, while they still pay less attention to an equally important element – human. In practice, this methodology will help to optimize man-man cooperation and teamwork for profitability of complex e-production systems and e-technologies. This paper extends managerial strategy configuration model highlighting new ways of man-man strategies that motivate company employees effective to cooperate with new-implemented e-technologies in accordance with achievement of optimal process performance. In this survey we verified the following hypotheses:

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1. Industrial company has a potential of production planning and an organization department for optimisation and innovation of production system according the INDUSTRY 4.0 concept.

The environment in industrial companies focused on the mass or small serial production has innovation departments only in 65 companies (from total 200 surveyed companies - 32.5%). This finding tells that a systematic process of INDUSTRY 4.0 concept has a good background and has potential as a key component of future firm vision in accordance with the growth of the internal and external customer value added. The result of the survey questionnaire gone by this question the first feedback – potential for process optimisation and performance improvement.

2. Our employees are in the position of active innovators according to the INDUSTRY 4.0 concept.

The survey has brought an interesting finding: employees submit suggestions for improvement, but only a small part of them (8%) is a true innovation. Many people confuse the concept of improvement and innovation. The response gave the signal for the development a better firm motivation system, which can significantly be address to the radical change in the area of process and product innovation technology, which is specific for a given enterprise. This is directly related to the detailed knowledge of the life cycle of the company and its processes in relation to specific products. A smaller part of successfully realised innovative ideas (23%) has contributed to the radical process of cost reduction via digitalization and automatization of realized processes.

3. Our company has a clear concept of core actions for implementation of INDUSTRY 4.0 concept, we monitor the progress of implementation regularly.

The responses show that only 39% of SMEs systematically fosters core actions, connected with 0 of 1 stage of INDUSTRY 4.0 concept implementation, which is a surprising finding, Also, 70% of SMEs will develop good strategy of implementation in next 5 years. These responses only highlight the need for development of application models, enabling the successful implementation of INDUSTRY 4.0 concept.

4. Process stabilisation parameters modelling and simulation are in our processes are focused on the complexly process organisation and management.

The core areas of process stabilisation were in according to this hypothesis were identified as follows:

- product innovations (37%)
- process innovations (34%)
- supporting processes (production planning, quality assurance, logistics, etc.) (17%)
- other – cooperation with suppliers (12%)

Industry 4.0 environment disposes with a high level of e-processes, automation and robotics – we always speak about technologies that operate on the basis of impulses, and the human enters the system. A prerequisite for correctly entering the instructions technological devices is right and effective communication among employees of different departments. These people influence flexible handling in real production daily life and daily situations. That is why we talk about “man – man” system, as an equally important part of complexly production process planning and organization together with the software / information systems support. The main characteristic of the system “man – man” is the ability of a worker to communicate effectively about the desired process inputs and outputs with other worker so

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that this communication will lead to the set of specific actions, which tends to set the production e-processes and e-technologies (in opposite to the machine technologies).

5. Industrial company has identified core INDUSTRY 4.0 tools, which will be successful implemented in next 5 years.

6. In our company we have identified real profits/feedback achieved through the INDUSTRY 4.0 concept.

**Tab.1** - Navigation card - core INDUSTRY 4.0 tools selection for implementation in industrial company (source: author)

Industry 4.0 tool	Implemented	Planned for implementation in next 5 years
Robotics	A – 18% (14 companies)	A – 56% (42 companies)
	B – 52% (14 companies)	B – 67% (18 companies)
Mobil equipment, communication tablets, visualisation tables	A – 16% (12 companies)	A – 36% (27 companies)
	B – 74% (20 companies)	B – 89% (24 companies)
Digital production planning and organisation	A – 9% (7 companies)	A – 24% (18 companies)
	B – 19% (5 companies)	B – 48% (13 companies)
Predictive e-maintenance	A – 9% (7 companies)	A – 24% (18 companies)
	B – 67% (18 companies)	B – 77% (21 companies)
Cloud computing	A – 9% (7 companies)	A – 16% (12 companies)
	B – 7% (2 companies)	B – 19% (5 companies)
e-business, e-communication with supplier or customer	A – 37% (28 companies)	A – 47% (35 companies)
	B – 74% (20 companies)	B – 70% (19 companies)
Industrial 3D-print technology	A – 7% (5 companies)	A – 16% (12 companies)
	B – 7% (2 companies)	B – 11% (3 companies)
Smart logistics	A – 7% (5 companies)	A – 12% (9 companies)
	B – 7% (2 companies)	B -11% (3 companies)
Adaptive automation	A – 4% (3 companies)	A – 11% (9 companies)
	B - 0	B – 3% (1 company)
Industrial Internet of Things	A – 4% (3 companies)	A – 11% (9 companies)
	B - 0	B – 3% (1 company)

Notice: “A” – SMEs (0-250 employees), “B” – (250-more employees)

The verified results showed, that most companies used new Industry 4.0 tools with the goal to improve the effects of traditional industrial engineering methods. From A-category 87% companies (69 companies) it sought to find more intelligent solutions for example in the area of flexible production planning and control, productive maintenance and SMED times reduction by selected workplaces. A few companies had the goal to increase the number of e-processes in the area of production processes connected with selected supporting and administration processes – only 23% (17 A-companies). This fact corresponds with our knowledge from the last 5 years, when the companies did not pay attention to systematic structured changes in value added processes in triangle “technological changes – process changes – social changes”. That was the reason, why we began strong orientation on the

flexible man-man motivation performance management system for successful and effective implementation of key tools in Industry 4.0 concept.

#### **4 DATA**

A basic pillar of a functional production planning process in the philosophy of Industry 4.0 concept is a knowledge of the core parameters of the stabilised processes, by mutual interaction of these it leads to the creation of customer value added in the required time, quantity and quality. Accurate flexibility to respond to the customer needs in real time is directly dependent on current disposable technology equipment, producing the desired output.

It is necessary to set correct core and supporting processes, as well as flexible settings of selected production parameters affecting the productivity and efficiency of production. Industry 4.0 environment dispose with a high level of e-processes, automation and robotics – always we speak about technologies that operate on the basis of impulses, and a human enters the system. A prerequisite for correctly entering the instructions into technological devices is the right and effective communication among employees of different departments. These people influence flexible handling in real production daily life and daily situations.

The basic concept of process stabilisation – inputs identification for process stabilisation in production:

- Knowledge of stable daily structure of production program and available production technologies (elimination of daily changes in production program and higher flexibility during weekly structuring of production program)
- Certainty that the stocks intended for the production process are actually available (material, staff, information, standards, layout, material flow, etc.)
- Setting of “clear” production and supporting processes for selected e-technology with regard to the allocation of responsibilities of specific staff (alternative for each shift individual responsible person with clear own e-code in information system)
- Readiness of real data on daily basis for production planning in information system (a motivated man has all necessary information available in a properly structured information system, he doesn't need to look for all the necessary data manually or with big time waste)
- Adequate working conditions in the workplace for seamless realization of production planning and control (availability of databases, knowledge of performance and technological parameters by e-machines, standards for e-oriented production planning and control, software enabling flexible production planning and control in real time, feedback from unavailable machine capacity in the just-in-time information system)
- Proper allocation of competencies and responsibilities of the staff linked in a process planning and control network
- Possibility (competency) to influence selected parameters of e-technologies according to customer requirements in a real working day (in cooperation with an IT-engineer)
- Real feedback from workplaces about realized production losses in information system (realized production amount, re-work pieces, re-typing times, cycle times, maintenance times, etc.)



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- Competency to stop the production process in case of the system failure and active corrections in process management system as a preventive action
- Possibility of self-realization by planning – realization – control of production system in accordance with balancing of the performance management system and innovations oriented on higher profitability of this performance management system

**Definition:** Process stabilization model build a background for preparation, implementation, testing and improvement of complexly integrated vertical and horizontal enterprises processes, connected with installation of digitized business processes and digital management.

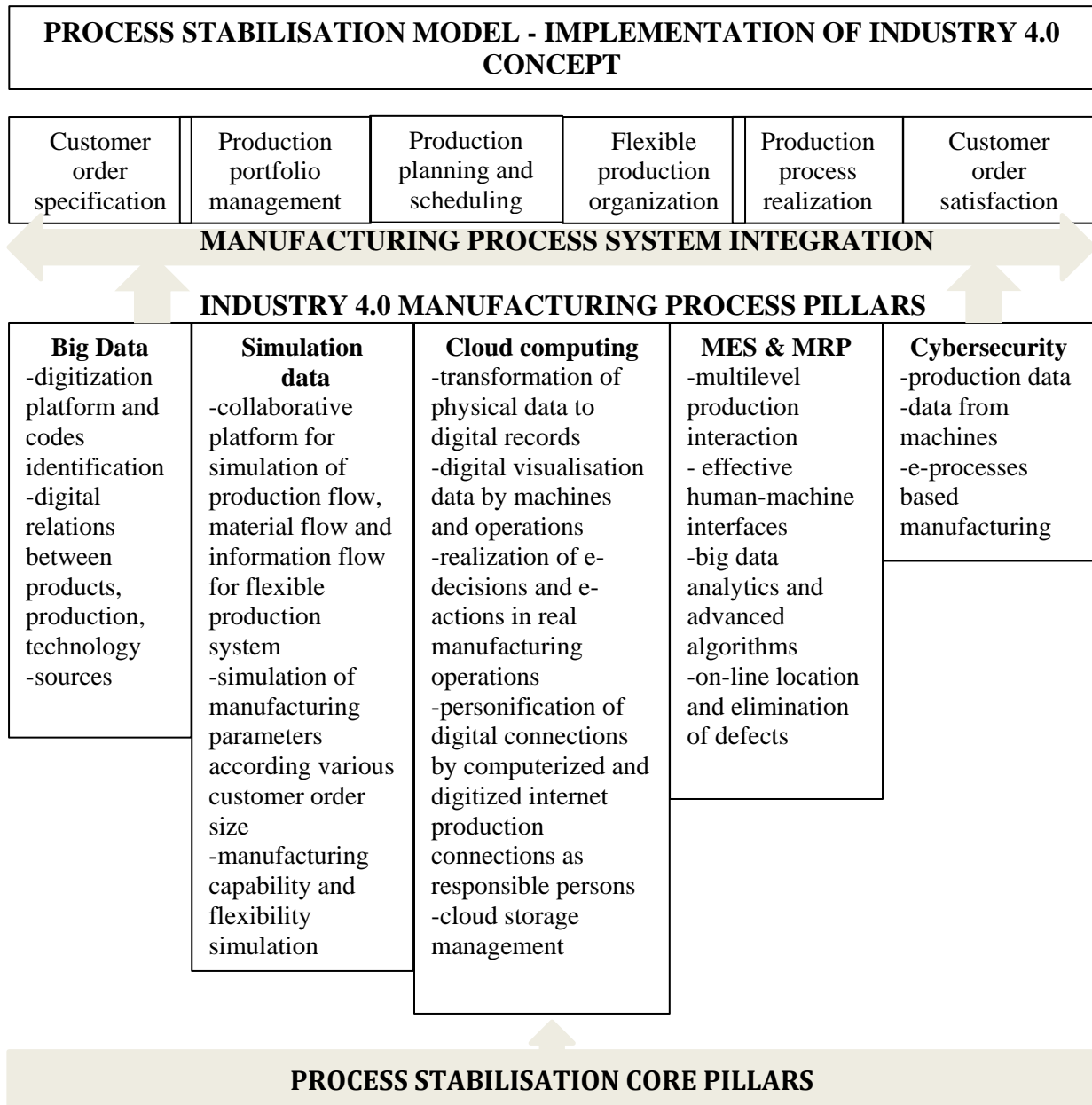
The objective of the process stabilization model is to propose a mechanism by which a clear structure of processes realized by implementation of Industry 4.0 model is made, a strategic aims and objectives are identified, activities are sequenced and prioritized and the resources required are identified. It is designed in according to the right management and coordination of all realized processes from the planning procedures to the realization procedures.

By model development we take into account the following fundamental principles:

- Knowledge of principles of system oriented digitalized model of processes and process elements based on Industry 4.0
- Clear vision in according to the digitized operations, data delivery safety, data complexity, digital standards, norms and certificates
- Standardization of maintenance system for computerized and digitalized processes and operations through MES and MRP
- Skills of the human and his activity in the digitized processes by workplace

From the Industrial Engineering point, there is important to implement the same methods of management and process improvement: methods, which we used for management and process improvement in production processes should be the same for management and implementation of computered or digitized technologies. That means, firstly we should take into account parameters as system oriented thinking, simultaneous process management and organization, process owner, workplace identification and other important facts, that are crucial for the right functionality of proposed technologies or systems integrated into production processes with strong connection on digital technologies. Based on the stability, we have identified important knowledge: each stabilized process or process pillar is confronted in real practice with the phenomena of allowable values for each defined index or relevant process parameter. The process stabilization model can be used as a tool for a new definition of a process or as a preventive tool for process management, in most cases we can use it for daily operative process management, when some unforeseen process conflicts occur.

The structure of process stabilization model:



**Fig.1** - Process stabilization model structure for Industry 4.0 concept implementation in industrial company (source: author)

The results achieved during testing of presented process stabilisation model were important for the balancing of the verified performance criterions and metrics, the testing showed that enterprises should pay more attention to setting of processing parameters of used e-technologies, integrated in Industry 4.0 concept. This fact is crucial in the motivation of man-man system. Second, we declared the right orientation of enterprise management in the product and personality performance management motivation, because these two areas supporting the effective process management and guarantee the satisfaction of each person. Only when we will have right motivated personnel, can we achieve optimal performance with Industry 4.0 concept. Important parts of each model definition are the first diagnosis of the production system, identification of core parameters connected with stabilization,

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standardization of production processes, operations, workplaces, machine technologies, information and material flows, layouts, humans.

Process stabilization model proposal targets are focused on following criteria:

Coordination of production plan in according to the flexible production processes with available production capacities in production and supporting manufacturing processes

On-line task prioritization and optimal sequencing between digitized processes and manufacturing workplaces (“just in sequence optimization”)

Physical objects are referenced, scheduled and managed by an ID

Co-operative production planning in triangle “customer – producer – supplier” realized by web developed interactive digitized environment and data storehouse

Optimization of production planning and scheduling through utilization of big data storehouses and cloud computing technologies in according to the customer order satisfaction in real time

Optimization of supplier connections, transport and logistics costs

Improvement of customer relationships and customer intelligence through the programmed on-line connection before production process

Storage and inventories are regulated by different ID types for each component and by product component number through optimal virtual dynamic behaviour knowledge

Effective data maintenance, data security and responsibility for timeliness of data

Assigned human responsibility for each component integrated in process model in according to the management and organization of each component

Process stabilization model should bring in the practice positive effects in the area of customer order specification, production planning and organization. We can develop our internal calculation model of benefits achieved after implementation of first stages of Industry 4.0 as follows:

### **Industry 4.0 system real availability:**

$$ISA = PD - ST - PSM \quad [\text{minute}]$$

(PD - planned time of availability, ST – service time, PSM – preventive service maintenance)

### **Throughput time of e-process operation**

$$TePO = IITS + DeOP + WTSR + IINO \quad [\text{minute}]$$

(IIS – instruction input time in the system, DeOP – duration of e-operation, WTSR – waiting time on system reaction, IINO – instruction input time for next e-process operation)

### **Average reaction time of the system incident**

$$ARTSI - TSU - ID - IE \quad [\text{minute}]$$

(TUS – Time of system unavailability, ID – incident diagnosis, IE – incident elimination)

### **Index of data completeness availability for process realization in Industry 4.0 system**

$$DCA = SRDO / RDI$$

(SRDO – Number of successful realized digitized operations given into systems as requirements, RDI – Returned no realized digitized operations)

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**Tab.2** - Selected parameters of process stabilisation evaluation (source author)

Identification of all core process components integrated in Industry 4.0 concept
Availability of all required functionalities of computerized and digitized technologies
Number of available services integrated in digitized data and cloud system
Number of intelligent drive units integrated in the Industry 4.0 concept
Defined technical functionality, virtual functionality, communication capability and model process structure
Communication ability verification by each Industry 4.0 system component
Standardization of e-connections, standardization of input and output process parameters
Number of objects managed through digitized technology in one e-chain (ID-chain) and by one ID-administrator
Number of process conflicts in pre-implementation stage of Industry 4.0 concept (technical conflicts, technological conflicts, interface conflicts, data cybersecurity)
Number of total digitized processes in production
Number total digitized machines integrated in Industry 4.0 chain
Defined human responsibility for each process component integrated in the Industry 4.0 chain
Throughput time of production process before Industry 4.0 implementation
Throughput time of production process during Industry 4.0 implementation
Real time of system communication by realization of production process through Industry 4.0 system
React time of delivery of system components availability for realization of production process after input of customer order into system (specification and commitment of customer order)
Operative cost for order processing in digitized environment
Testing and validation of digitized processes according to flexible planning and organization of production process
Ability to re-plan the production process virtually according to given instructions through ID competencies for flexible production organization
Availability of all relevant data and on-line data corrections availability in integrated process components
React time of process defect in system between process component owner (ID) and digitized workplace in production (identified by ID)
Grade of standardization of interfaces and abilities production for digitized regulation of flexible production system
Number of domain borders integrated in digitized environment of the production system
Stability and security of defined standards, technological and technical rules, mutual process e-communication and e-management
Number of digital certificates for authentication of realized operations
Number of identities with login data for maintenance and management of operational Industry 4.0 system
Definition of system responsibilities for human – guarantee of system timeliness and usability
Number of virtual instances of recovery functions and security incidents elimination in Industry 4.0 system

## **5 RESULTS AND DISCUSSIONS**

Industry 4.0 concept enables radical improvement of the productivity and efficiency of complex production value chains and the focus on the creative and strategically oriented business activities. Industry 4.0 concept integrates the three key lines: internet of things, internet of services and internet of people – networks objects, people and systems. Optimal combination of strategic pillars in the industrial company will combine best principles of the smart factory, business and social platforms. This combination guarantee right functionality of production process initialization, planning and scheduling and production process realization with according to the effective and real-time necessary data exchange, safety and reliability. All enterprises will have best competitiveness, couldn't be threatened, they are looking for relevant technologies and lack of data security and standardization. Implementation of proposed process stabilization model assumes the availability of relevant and consistent input data, which are an important condition of the next implementation of all necessary steps in Industry 4.0 concept.

We can see big danger in the possibility of incompatibility between various IT applications used in industrial companies, this can radically influence the horizontal process and vertical process integration as a whole. We can see the newest impulses for elimination of mentioned danger we can see in the higher orientation on the cloud services and standardization of interface connections (maybe without sensitive company data) reflecting occurred interface problems in preparation stage of Industry 4.0 concept implementation. Mutual combination of various managerial conceptions brings a lot of new opportunities for production managers, how to influence effectiveness and efficiency of flexible production flows based on INDUSTRY 4.0 concept. The presented paper is concentrated on the research of actual conditions, active influence on real manufacturing processes and special their process stability as a basic assumption for flexible implementation of INDUSTRY 4.0 in industrial enterprises. In real production process, the horizontal managerial concept is confronted with vertical (digitized) manufacturing concept. We can see positive effects we can see on workers – this concept enables them to organize flexible work in production processes and contributes to higher satisfaction of employees at all enterprises levels through the better work-life balance. Generated potential savings for companies are radical, especially in according to the investment and return of investment in the IT technologies, customer relationships, production process planning and scheduling and flexible production outputs effects.

An important role here is played by the phenomenon of “collaborative factory”, which enables conducting of jobs and process operations in virtual reality with use of mobile workplaces. Each master, supervisor, team leader or shop floor employee can use in their work the assistance of multimodal, user-friendly interfaces through the complexly oriented computerized and digitized technologies, used in Industry 4.0. Presented paper is part of Research Project “Parameters modelling for effective production and administrative processes in industrial companies based on Industry 4.0 concept”.

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## Legal Stability and Economic Factors in the Non-Life Insurance Market: Case of the Selected Emerging ASEAN Countries

*Hui Shan Lee, Shyue Chuan Chong, Bik Kai Sia, Fan Fah Cheng*

### ABSTRACT

*It is well recognised that institution quality constitutes a potentially crucial technique for sustaining a country's financial development, which could apply to insurance market. This study will employ a data spanning a period from 1995 to 2014 in the selected developing countries in ASEAN. The objectives of this paper are to examine the macroeconomics and legal stability impacts to the non-life insurance development. The findings suggest that higher income, higher trading activities, higher stock market trading activities and higher availability of finance credit will enhance the non-life insurance development. Legal stability such as enhancement on the property right and government integrity will improve the non-life insurance development too. Interestingly, when the legal environment in emerging ASEAN countries are more stable, the foreign direct investment and stocks market will become more encouraging and stimulate non-life insurance development. This study could provide a complete picture towards the improvement of non-life insurance development in ASEAN at the same time providing supports to realise Belt and Road Initiative.*

**Keywords:** *Legal stability, property right, government integrity, insurance, ASEAN developing countries*

**JEL Classification:** G22, L1, O16

### 1 INTRODUCTION

In the era of 20<sup>th</sup> century, the rising interest and concern have been focused on the financial economic and legal stability due to the globalisation trend. The globalised economy can stimulate financial service sector and provide a well financial platform in the world. Researchers such as Fang *et al.* (2014), Petkovski *et al.* (2014) and Park *et al.* (2010) recommend that effective legal systems and strong protections enhance financial market expansion through better enforcement mechanisms. An immense deal of attention has been focused to the development of banking industry but a scant attention has been paid to insurance, which is classified as the third keystone of the financial services sector (Kjosevski *et al.*, 2015).

The non-life insurance sector plays important roles in the financial and economic development over the last few decades as financial services provider to consumers. The functions of insurance is to allocate efficient financial resources, produce liquidity, diversify financial losses and facilitate investment in an economy (Lee *et al.* 2017; Shan *et al.*, 2016; Fah *et al.*, 2014; Outreville, 1996). Generally, studies by Lee *et al.* (2013) and Beck *et al.* (2003) have documented that economic, demographic and institutional factors will influence the development of non-life insurance. Institutional factors such as legal stability is vital for a growing and vibrant non-insurance market. Beck *et al.* (2003) argue that the growth of insurance may depend on the soundness of institutional environments. As such, the eminence

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of the legal system and the protection of property rights demonstrate a significant impact on developments in insurance sector. However, deregulation and liberalisation have facilitated globalisation of risks and insurance services (Park *et al.*, 2012; Cummins *et al.*, 2007). This begs the question as to the fussy effects of legal stability on insurance development which is somewhat mixed and requires further investigation.

What are the impacts of the property rights to the insurance sector? From the perspective of insurance, the enforcement of property rights build an economic motivation to obtain and insure property, since government and legal enforcement of property rights help to defend individuals from loss or damage to the asset. There would be higher potential return from insurance if more property rights are maintained well because it is an efficient means of transferring risk (Esho *et al.*, 2014). Another problem is the corruption issue that introduces insecurity and uncertainty that may erode the true purpose of the insurance policies in protecting the policyholders. The lack of government integrity caused by such practices reduces insurance vitality by increasing costs and shifting resources into unproductive lobbying activities. Hence, if the rules of law in a country are not stable, particularly in the emerging countries in ASEAN, it might affect the development of the non-life insurance sector.

Insurance market in Asian region is one the most dynamic in the world and central to some of the most important global trends that would outshine those in the European Union and North America. This is due to the fact that the rising income in Asian over the past few years have created a centre of attention insurance firms to expand their existence in this region (Pinijparakarn, 2016). In building an Asian regional market for trade in financial services and insurance over the last two decades, the various phases of development and openness across the region have raised important questions of prudential stability, consumer protection and regulatory. Furthermore, with the launch of Belt and Road Initiative (B&R) by China, it is forecasted to trigger a new wave of trade liberalisation construction activities. The B&R will connect China with Southeast Asia, Africa and Europe. This will in turn present opportunities to insurers because according to Swiss Re (2016a), the insurance premium potential coming out of those projects is projected to be USD 7 billion. In 2016, trade volumes with Southeast Asian nations accounted for 46.8% of the total trade with B&R countries as a result from the formation of the ASEAN–China Free Trade Area (ACFTA) and the improvement in bilateral relations. With a affiliated rise in demand for trade credit and general cargo coverage, this situation provides an opportunity for insurers, particularly the insurers in ASEAN countries. It also presents great opportunities to the foreign insurers to determine the their best approach to build a long-term presence perhaps in the new ASEAN markets, such as by going into partnership with a host-location entity. Moreover, there is still a lack of study on the non-life insurance development in ASEAN countries in the literature. Hence, this study is an attempt to investigate the factors that influence the non-life insurance in 5 ASEAN countries.

The objectives of these paper are twofolds. First, it will explore the economic factors that influence the development of non-life insurance in the selected developing ASEAN countries. Thus, it is important to study the development of non-life insurance in the emerging ASEAN market. Insurance penetration in the ASEAN countries continues to display enormous variations that can only partially be accredited to economic conditions. Borscheid *et al.*(2015) argue that legal environment will contribute to the change. Moreover, there is rising concern among business participated in B&R projects about the intensity of regulation at both regional and international levels. Thus, in the second objective, it will investigate the roles of institutional from the legal stability perspective in influencing the determinants of the non-life insurance development and its impacts on the growth of non-life insurance.



This research is distinct from existing literature as it investigate the relationship between non-life insurance market and its determinants with country groups rather than for individual countries. This is because, the differences in institutional developments across countries are likely to be correlated with other country characteristics that may influence both institutional development and insurance stability simultaneously. Emerging ASEAN countries are chosen because they will likely have the strongest growth in non-life premiums, expected to be nearly 8% in 2017 and 9% in 2018. A contributing factor will be the investment opportunities presented by China's Belt and Road Initiative, which is expected to generate an increase in demand for commercial insurance (Swiss Re, 2016b). Regulations appear to have vital impacts on insurance development, which could be of interest to policy makers in the insurance industry. Therefore, this paper paints a more complete picture on the factors that influence the non-life insurance development.

The rest of the paper is arranged as follows. In Section 2, relevant literature will be reviewed. Section 3 illustrates the data selection and methodology. Section 4 explains the analysis of the empirical results, and Section 5 concludes the research and discusses policy implications.

## **2 LITERATURE REVIEW**

Generally, insurance is divided into life and non-life. Non-life or also known as general insurance focused on obligatory types of insurance such as motor and fire insurance; non-compulsory coverage such as theft, marine, aviation, travel and bond insurance. On the other hand, life insurance protect the beneficiaries upon a certain accidents such as medical insurance (Kjosevski *et al.*, 2015; Millo *et al.* (2011). According to Borscheid *et al.* (2015), modern insurance is a European discovery and a response to the speedy growth in risk that resulted from the development of trade and the expansions of industrialization. As insurance begins to spread into other cultural realms, it came into antagonism with various institutionally different and homegrown forms of risk management. In the early of twentieth century, insurance is able to gain a decisive foothold to become the most essential trade centers, with the assistance of multinational companies, transfer of people and international agreements. As a consequence of globalisation and its affiliated parties shifts in values, Southeast Asian is among the regions in which insurance is slow to gain acceptance. Lee *et al.* (2016), Trinh *et al.* (2016), Lee *et al.* (2015), Dragos (2014), Petkovski *et al.* (2014) and Njegomir *et al.* (2012) have examined the insurance development in the random cross countries sample, comparison between developed and developing countries and investigation in the European region. Due to the fact that the developing countries in Southeast Asian are among the slow countries to develop insurance service, their contributing influences on insurance and impacts on economics will be different from other regions. In this vein, this article attempt to fill the gap by examining the impacts of economic determinants and legal stability factors on the development of non-life insurance in ASEAN.

The fundamental economic factors that influence the insurance development is income (Liu *et al.*, 2016; Millo, 2016; Sephton *et al.*, 2015; Chang *et al.*, 2012; ). Empirical researches have mainly employed aggregate market and economy level data in examining the effect of income on non-life insurance consumption, due to the difficulty in accessing micro-based income statistics. Studies by Sen *et al.* (2013), Han *et al.* (2010) and Beck *et al.* (2003) postulate that the income is positively related to the insurance development. The higher the level of income, will lead to higher demand in non-life insurance, in order to protect the acquired property. Nevertheless, Lee and Chiu (2012) provide supports that there is a nonlinear relationship between real income and insurance consumption across a wide range

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of countries. The income elasticity of insurance premiums changes over time and across nations, relying on thresholds that characterised as different “regimes”, with dissimilar speeds of change in each regime. As such, the sample of this study falls under the regime of developing countries in ASEAN, the contribution is to provide insight on whether insurance is a normal or inferior product for emerging countries.

Kucera *et al.* (2014) identify that foreign direct investment (FDI) exerts a larger effect in service industry such as finance and insurance than manufacturing industry. Li *et al.* (2003) suggest that increase in foreign trading partners will enhance the product differentiation in insurance services. The increase competition will compel the insurance providers to provide better service, leads to improvement in consumer welfare and indirectly improve the healthy growth of insurance. Nevertheless, Powers *et al.* (2012) suggest that FDI harms the growth of insurance development since damages in multinationals' buildings and products will cause a climb in insurance premiums but compensated at a higher claims. Wilkins (2009) demonstrates that insurance sector gains substantial opportunities and revenues from the operations in foreign locales (Multinational Enterprises, MNEs). Interestingly, it is highlighted that the host country regulations and other government actions could influence the developments of insurance and thus this area of study should not be neglected.

Insurance provide protection in trading activities against the risks involved in international and domestic trade, for example price or currency fluctuations, and nonpayments. More trading in goods and services imply that the country is more open, hence it will accumulate more insurance assets. ASEAN has become an progressively more important trading partner for all other developing country regions. Exporting and importing activities generate additional variable trade costs due freight insurance (Contessi *et al.*, 2012). Furthermore, government in emerging countries may initiate trade finance instrument such as insurance credit subsidies to promote export. Lee *et al.* (2016) and Roe *et al.* (2011) indicate that trade openness and the related and resultant institutions cannot function well under unstable political environments. Thus, the well-functioning of other institutional dimensions, such as the legal rules depend on the soundness of political aspects. Political environments are hence linked directly with insurance activities.

Stock market capitalisation and bank credit will foster economic growth and improve the needs on insurance product. Larger values of these indicators indicate a more market-based financial system (Hou *et al.*, 2017; Law *et al.*, 2014; Sephton *et al.*, 2014; Haiss *et al.* 2008). Furthermore, Bobovnik (2016) and Beck *et al.* (2003) propose that higher bank credit indicates that households are more in debt. They have a higher probability of occurring risky events which affects their expected future wealth. Lee, Lin & Cheng (2016) and Lehmann *et al.* (2010) suggest in that banks have a large incentive to transfer part or all of their risk to the capital markets due to the strong correlation among bank assets that may raise the probability of their insolvency. Thus, insurance is required to mitigate these unexpected risks. As a consequence, the financial nexus within and between the banking and insurance sectors account for financial stability.

From a legal perspective, insurance is a contractual relation between the insurer and the insured (Lee *et al.*, 2015; Chang *et al.*, 2012). Fang *et al.* (2014) and Beck *et al.* (2003) explain that the protection of contractual rights depends on the soundness of the legal rules and jurisdictions. As such, the legal environment is associated with insurance activities. Another legal aspect that may affect insurance is related to the protection of property rights. Insurers need to invest their funds collected from premiums into proper instruments in order to obtain an adequate return that can meet their obligations to the insured in the future. Wen

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and Zhang (1993) show that an individual's long-term investment behaviour is distorted when property rights cannot be assured. The protection of property rights thus has a linkage with insurers' investment behaviors.

The development of a healthy non-life insurance market will be discouraged by political instability. This is due to political instability will influence the economic horizon of potential suppliers and buyers of insurance products. Ward *et al.* (2002) show that political stability postulates a significant impact on insurance demand both in developed and developing economies. They also find that an improvement in the legal system positively impacts the demand for life insurance in developing countries. However, OECD countries already have a sounder legal system, thus the legal effects are not influential in the OECD countries. Thistlethwaite (2017) and Beck *et al.* (2003) find that institutional, quality of the legal system and the protection of property rights has a positive effect on life insurance development. As institutional issues are typically associated to the level of economic development, with the expectation of institutional environments could exert an impact on shaping the insurance growth relationship from which policy implications can be implemented, we extend our paper by exploring both economic and legal institutional effects on the insurance development .

## 3 DATA AND METHODOLOGY

This study will employ a data spanning a period from 1995 to 2014 in the selected developing countries in ASEAN. The countries are Indonesia, Philippines, Thailand, Malaysia and Vietnam. The data are from 1995 onwards because majority of the macroeconomics data prior to 1995 are not accessible, as the importance of transparency of data only highlighted after the ASEAN crisis around 1997. The period is covered until 2014 because most of the recent data are not updated yet. All the macroeconomics data are extracted from the World Bank except for the variables to measure legal stability are extracted from Heritage Foundation.

The macroeconomics variables in this study are non-life insurance penetration, gross domestic product per capita, trade, stock traded, credit finance and inflation. Heritage Foundation provides the indicator for the stability of rule of law by three components namely property rights, juridical effectiveness and government integrity. This study only employ property rights and government integrity to measure legal stability because juridical effectiveness data is only introduced after year 2016. The property rights constituent examines the degree to which a country's legal framework allows individuals to freely accumulate private property, secured by clear laws that are enforced effectively by the government. It provides a quantifiable measure of the degree to which a country's laws protect private property rights and the extent to which those laws are respected. It also assesses the likelihood that private property will be expropriated by the state. The score for this component is derived by averaging scores for the five sub-factors, namely physical property rights, intellectual property rights, strength of investor protection, risk of expropriation and quality of land administration The more effective the legal protection of property, the higher a country's score will be. Correspondingly, the greater the chances of government expropriation of property, the lower a country's score will be. Furthermore, government integrity is to measure the corruption level. Corruption erodes economic freedom by introducing insecurity and uncertainty into economic relations. Of greatest concern is the systemic corruption of government institutions and decision-making by such practices as bribery, extortion, nepotism, cronyism, patronage, embezzlement, and graft.

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**Tab.1** - Descriptions of the Variables

Variable	Measurement /Explanation	Expected Result
NLP	=Non-Life Premiums / Gross Domestic Product (Non-life insurance density) Premium volume is the insurer's direct premiums earned, it is the proxy of the of the insurance development as a result of insurance expenditure by customers.	(Not applicable, is dependent variable)
lnGDPC	=GDP per capita is gross domestic product divided by midyear population Higher income will enhance the consumption on insurance.	+
lnFDI	=Direct investment equity flows in the reporting economy. It is the sum of equity capital, reinvestment of earnings, and other capital Increase in foreign trading partners will enhance the product differentiation in insurance services that increase the growth of insurance.	+
Trade (% of GDP)	=Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product The trading activities will require insurance service to provide risk mitigation.	+
Stock	=Total value of all traded shares in a stock market exchange as a percentage of GDP The stocks traded is commonly treated as financial development, the higher the financial development, it tends to increase the performance of insurance development.	+
CreditFI	= Domestic credit provided by financial sector (% of GDP) The availability of the credit will provide higher budget and provide opportunity to purchase insurance product.	+
INF	=Inflation rate, the annual growth rate of the GDP implicit deflator shows the rate of price change in the economy as a whole The inflation rate affects insurance development because insurance products provide monetary benefits over the long term, but inflation decreases the cash value received in the future.	-
PropRight	=The extent to which a country's legal framework allows individuals to freely accumulate private property, secured by clear laws that are enforced effectively by the government There would be higher potential return from insurance if more property rights are maintained well because it is an efficient means of transferring risk	+
GovInt	= Corruption level (0: high corruption; 100: low corruption) Higher integrity increases insurance vitality by reducing costs when unproductive lobbying activities are minimised	+

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The lack of government integrity caused by such practices reduces economic vitality by increasing costs and shifting resources into unproductive lobbying activities. The score for this component is derived by averaging scores for the six sub-factors namely public trust in politicians, irregular payments and bribes, transparency of government policymaking, absence of corruption, perceptions of corruption and governmental and civil service transparency. The higher the score, indicating little corruption; the lower the score, reflecting very corrupt government.

Following the models by Trinh *et al.* (2016), Petkovski (2014) et al, Njegomir *et al.* (2012) and Millo *et al.* (2010), the panel regression models in this research are:

$$NLP_{it} = \beta_0 + \beta_1 \ln GDP_{it} + \beta_2 \ln FDI_{it} + \beta_3 Trade_{it} + \beta_4 Stock_{it} + \beta_5 CreditFI_{it} + \beta_6 INF_{it} + \beta_7 PropRight_{it} + \beta_8 GovInt + \varepsilon_{it}$$

The explanations of the variables and the expected results are presented in Table 1. Firstly, pooled ordinary linear regression model (Pooled OLS) is exploited to present result based on poolability of the data but disregards the panel structure of the data. The second model to be employed is the random effect model (REM) which handles the constants for each section as random parameters. The third model is fixed effect model (FEM) where the constant is treated as group specific which means the model allows for different constants for each country. The selection between pooled OLS and REM is based on Breusch-Pagan Lagrangian Multiplier (BPLM) Test where the null hypothesis refers to Pooled OLS is preferred versus the alternative hypothesis refers to REM is preferred. The choice between REM and FEM is based on Hausman Test where the null hypothesis refers to REM is preferred than REM (Gujarati *et al.*, 2009). Robustness check will be used to test for heterogeneity and serial correlation.

## 4 RESULTS AND INTERPRETATIONS

Table 2 illustrates the descriptive statistic of the data. The non-life insurance in the selected emerging ASEAN countries are considered as low with the average of 0.86% premium expense for each GDP with the maximum at 2.01% and minimum at 0.29%. The property right are also considered low with the average score of 41.75 and range from 10 to 90. Similarly, government integration score is also considered as low due to its average value of 31.849 and in between the minimum value of 10 and maximum value of 70. This propose that the legal stability in the emerging countries in ASEAN is weak.

Correlation matrix is presented in Table 3 and variance inflation factors (VIF) is displayed in Table 4 to detect the issue of multicollinearity. Since the correlation values among the independent variables are less than 0.8 and Gujarati *et al.* (2009) asserted that coefficient correlation that is more than 0.8 may be subjected to serious multicollinearity problem, thus it suggests that there is no serious multicollinearity problem that gives rise to spurious results. Furthermore, we verify for multicollinearity problem by using (VIFs). As a rule of thumb, a critical threshold of a maximum of 10 is suggested (Gujarati *et al.*, 2009). Refer to Table 4, the VIF for this model is 2.75, hence it does not postulate serious multicollinearity problem.

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**Tab.2 - Descriptive Data**

	Obs	Mean	Std. Dev	Min	Max
NLP (% GDP)	98	0.861186	0.46708	0.290897	2.01
lnGDP	100	8.7937	0.680019	7.31	10.16
lnFDI	100	20.9399	4.928009	0	23.99
Trade (% GDP)	100	115.1595	47.5399	45.51	220.41
Stock (% GDP)	86	26.35631	20.55717	2.63	83.33
CreditFI (%GDP)	100	88.08202	44.83351	20.0722	178.42
INF	99	5.705446	6.660948	-1.71034	58.39
PropRight	100	41.75	21.34818	10	90
GovInt	100	31.849	13.43762	10	70

**Tab.3 - Correlation Matrix among the Variables**

	NLP	lnGDP	lnFDI	Trade	Stock	Credit FI	INF	Prop Right	Gov Int
NLP	1								
lnGDP	0.7495	1							
lnFDI	0.2007	0.2916	1						
Trade	0.8258	0.5824	0.2318	1					
Stock	0.7274	0.7065	0.2609	0.5877	1				
CreditFI	0.8542	0.6314	0.2472	0.7441	0.6631	1			
INF	-0.313	-0.3806	-0.4977	-0.2135	-0.3274	-0.287	1		
PropRight	0.5515	0.1868	0.0474	0.2924	0.3441	0.5364	-0.2083	1	
GovInt	0.8092	0.6273	0.2215	0.7281	0.5109	0.6734	-0.2744	0.5467	1

**Tab.4 - VIF Result**

	VIF	1/VIF
lnGDP	1.39	0.718775
lnFDI	1.49	0.669351
Trade	2.33	0.428683
Stock	2.58	0.388091
CreditFI	3.14	0.3188
INF	3.57	0.279972
PropRight	3.75	0.266905
GovInt	3.76	0.266048
Mean VIF	2.75	

The result in Table 5 represents the outcome based on panel data model as discussed in section 3. From model 1, the variables included are only 6 macroeconomics factors which excludes the impacts of legal stability. Among the six variables, five variables namely GDPC, FDI, Trade, Stock and CreditFI demonstrate significant results. Inflation does not show significant impact on the non-life insurance development. Income of the country which is proxied by GDPC suggests positive relationship with insurance development at 1% significant level. This proposes that when consumers are more wealthy, they will spend more

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on insurance, as they have more assets to protect. Moreover, it also indicates that insurance is a normal good to the consumer in ASEAN, support the findings by Lee and Chiu (2012) where insurance is a normal good instead of inferior good in the developing countries. However, FDI illustrates a negative relationship at 5% significant level with insurance development. The result does not support the recommendation by Li *et al.* (2003) that increase in foreign trading partners will enhance the product differentiation in insurance services. This might be due to the insurance players in developing countries in ASEAN is yet to take the opportunity from foreign trading partners speedily when opportunity arises. The negative result could be due to the damages in multinationals' buildings and products and harm the insurance development, support the findings by Powers *et al.* (2012). The third variable, trade shows positive relationship with non-life insurance development at 1% significant level. It suggests that the developing countries in ASEAN are relying on trade activity that heavily depends on marine and cargo industries, hence the consumption on non-life insurance to safeguard these assets is also high (Kjosevski, 2015). Moreover, this might propose that the current hot topic on investment opportunities presented by China's One Belt One Road program which are very much related to the trade activities, could stimulate more on non-life insurance development in the future. Stock and credit finance are also contributing to the development in non-life insurance. This is because, the more stock trading activities and availability of credit finance, will enhance the finance development in these countries. Banks and other finance institutions will have larger risk in the capital markets, hence insurance is required to diversify these unexpected risks. The findings are consistent with Lee, Lin & Cheng (2016) and Lehmann *et al.* (2010) which recommend that the financial nexus within and between the banking and insurance sectors account for financial stability. Nevertheless, inflation does not show significant negative relationship with non-life insurance development. According to literature, for non-life insurers, unanticipated inflation leads to higher claims costs, hence minimising profitability. To the consumers, rising inflation can have a negative cause on demand on insurance and may lead to policyholders cancelling their policies as well as increasing costs for insurers. The result from this finding is contradict with the past studies, propose that inflation is less important compared to other macroeconomics factors that influence the non-life insurance development.

Legal and political circumstances have an overwhelming positive effect on insurance development in non-developed countries (Chang *et al.*, 2012). Thus, models 2, 3 4 are the models to include the legal stability factors to study their impacts on the non-life insurance development in the ASEAN emerging countries. At the same time, they are also being employed to examine their impacts on other macroeconomics changes towards the non-life insurance development. Model 2 includes both of the property right and government integrity variables. Model 3 is only with property right variable and Model 4 is only with government integrity variable.

In Model 2, property right proposes positive significant relationship with non-life insurance at 1% significance level, government integrity shows 10% significance level. Interestingly, FDI has become less significant compared to Model 1 with the roles of legal stability. This result suggests that when the institutional environment in emerging countries in ASEAN are more stable, their intention to enter these countries will increase. When foreign insurers enter emerging ASEAN market, their' entry and generated more competitive local insurance markets. Additionally, local economies tend to catch the attention of foreign companies in order to generate foreign investments inflows, improve competitiveness of local insurance markets and achieve the greater availability and more affordable insurance coverage (Njegomir *et al.*, 2012).

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In Model 3, when property right factor is introduced in the model, the other macroeconomics variables results remain the same as in model 1 but FDI has completely become insignificant. The discovery explains that when multinational companies' property rights are assured, they believe that purchase of non-life insurance coverage could protect their assets in the subsidiary countries in ASEAN. Thus, the negative relationship between FDI in non-life insurance has become insignificant. This is consistent with the explanation that insurers need to invest their funds collected from premiums into proper instruments in order to obtain an adequate return that can meet their obligations to the insured in the future (Lee, Chang, Arou, 2016).

**Tab.5 - Results of Models**

Models	(1)	(2)	(3)	(4)
lnGDPC	0.189*** (0.0510)	0.212*** (0.0496)	0.253*** (0.0445)	0.127** (0.0482)
lnFDI	-0.00856** (0.00420)	-0.00619* (0.00353)	-0.00581 (0.00357)	-0.00815** (0.00379)
Trade	0.00329*** (0.000594)	0.00311*** (0.000600)	0.00370*** (0.000506)	0.00218*** (0.000594)
Stock	0.00251* (0.00144)	0.00215* (0.00124)	0.00164 (0.00123)	0.00324** (0.00131)
CreditFI	0.00403*** (0.000738)	0.00217*** (0.000709)	0.00203*** (0.000715)	0.00344*** (0.000679)
INF	-0.00341 (0.00327)	-0.000876 (0.00276)	-0.000714 (0.00280)	-0.00254 (0.00296)
PropRight		0.00506*** (0.00133)	0.00638*** (0.00112)	
GovInt		0.00408* (0.00229)		0.00892*** (0.00206)
Constant	-1.394*** (0.432)	-1.831*** (0.430)	-2.179*** (0.389)	-0.989** (0.400)
Observations	84	84	84	84
R-squared	0.869	0.912	0.908	0.895

*Note: Figures in parentheses are standard errors.*

*\*, \*\*, \*\*\* indicate statistical significance at 10%, 5% and 1% respectively*

Government integrity could stimulate stock trading activities and enhance non-life insurance development, which could be observed from Model 4. When government integrity is stronger, the stock activities will have lesser corruption activity and leads to a stronger institution environment. This will improve the finance development in emerging ASEAN



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countries as the financial regulations become solid and stringent. Therefore, it will assist to develop non-life insurance market with healthier progress and make the insurance industry become stronger.

## 5 CONCLUSIONS

Insurance engages the legal transfer risk through a valid contract, thus the importance of the contract is dependent upon legal rules and enforcement, as well as the stability and integrity of the law making process. Therefore, the development of insurance market as one of the financial intermediation, is crucially relying on the quality of the legal system other than the economics environment in a country. Insurance premium growth in the ASEAN will be fuelled by the rising Chinese investments in the B&R, hence, a stronger regulatory environment and improving economic policy frameworks are needed.

Some new developments and more recent researches have emerged on the discussion of institutions. Thus, the objective of this research is to examine both macroeconomic factors and legal stability factors that influence the development of non-life insurance in the selected developing ASEAN countries. This research is distinct from existing literature as it investigate the relationship between non-life insurance market and its determinants with country groups rather than for individual countries in the emerging ASEAN countries. Hence, this research draws a more complete picture on the aspects that influence the non-life insurance development.

The findings suggest that higher income, higher trading activities, higher stock market trading activities and higher availability of finance credit will enhance the non-life insurance development. However, there is negative relationship between foreign direct investment and insurance development. Furthermore, inflation does not show significant impact toward the non-life insurance development in emerging ASEAN countries. Legal stability such as enhancement on the property right and government integrity will improve the non-life insurance development too. Interestingly, when the legal environment in emerging ASEAN countries are more stable, the foreign direct investment and stocks market will become more encouraging and stimulate non-life insurance development.

This study complements earlier studies in several aspects. First, we employ the emerging ASEAN countries as the sample due to many literature are concentrating on the insurance market in the developed regions such as European and American countries. It provides important ideas for the policy makers on what are the crucial factors that influence the development non-life insurance on developing countries. Second, institutional environment issues are more relevant for non-developed countries as enhancing the institutional environments could be path for these economies to attract foreign insurers to enter domestic insurance markets, particularly ASEAN market as it is one the most dynamic in the world and central to the current global trends.

The results are also important to the policy makers because strengthening legal stability will enhance the insurance sector in the globalisation trends. Legal stability is important to shape non-life insurance development in the emerging ASEAN countries. Policy makers should strengthen the level of legal stability in order to ensure an adequate quality of finance rather instead of intensifying the financial sector without considering the institutional quality. With better legal stability, insurance market in ASEAN could grow to a better direction and conforming to international standards. This is to ensure that the insurance market in ASEAN can support globalisation in attracting multinational insurance companies to merge with the

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local insurers, enabling them gradually integrate with globalisation trend and “catch up with” the developed countries. Lastly, this is particularly crucial to attract many investors’ attentions from the B&R which is initiated by the giant market player, China. Therefore, this study will encourage the development of non-life insurance development in ASEAN at the same time providing supports to realise Belt and Road Initiative.

The limitations of this study are lack of long period data to study the long term time series causal effect the relation between variables. Thus, future study could include more countries by extending the region from ASEAN countries to Asia countries in order to capture the dynamic effect between the variables.

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## The Effect of Macroeconomic Factors on CO<sub>2</sub> Emissions in Worldwide Countries

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### ABSTRACT

*This paper focuses on examining the effects of macroeconomic factors, especially FDI, on CO<sub>2</sub> emissions in different income-level areas around the world from 2007-2013. Based on IPAT Model, we use Pooled OLS approach to estimate the dynamic data panel of 113 countries in the world. The results support Halo Hypothesis, indicating that FDI reduces CO<sub>2</sub> emissions in different areas. Finally, we discuss policy implications for promoting FDI as well as environmental issues.*

**Keywords:** *FDI, CO<sub>2</sub> emissions, IPAT model*

**JEL Classification:** E010, E220, Q43

### 1 INTRODUCTION

The 1992 International Environmental Treaty - United Nations Framework Convention on Climate Change (UNFCCC) was formed with the target to stabilize atmospheric greenhouse gas (GHG) in the earth atmosphere to prevent human dangerous interference in the climate system. Kyoto Protocol (1997) established juridical obligations for most of developed countries and transition economics in Central Europe to reduce GHG emissions down to 6-8% averagely compared to the 2008-2012 period. Foreign Direct Investment (FDI) can promote the investment in the energy-efficiency technologies to cut GHG emission. The present research attempts to examine the influence of FDI flow to the global emission change. According to Intergovernmental Panel on Climate Change (IPCC, 2007), CO<sub>2</sub> is the major gas causing greenhouse effect.

The importance of FDI in global scale is more and more increasing, however, there is detailed discussed information on this issue. Indeed, that FDI flows are increasing in developing countries proposes a question whether they lead to environmental consequence (Zeng and Austin, 2012). Therefore, researches on the effect of FDI to CO<sub>2</sub> emission are essential. Although countries within ASEAN (Association of South East Asian Nations) and other developing ones in the world are actively attracting the flow, the prior studies pass over the precise analysis of the correlation between FDI and CO<sub>2</sub> emission, and their causality effect, which leads to the deficiency in the “Pollution haven hypothesis” and the “Halo effect hypothesis” as well. Common standpoints offer that FDI may result in significant CO<sub>2</sub> emission increase with the cases of slack environmental standards in developing countries (Pao and Tsai, 2011). For attracting FDI, these nations implement loose and vague laws on environmental preservation which, in economic theories, was named “Pollution haven hypothesis (or “Haven hypothesis”). Additionally, the Halo effect hypothesis (or Halo hypothesis) supposes foreign corporations bringing along FDI may develop more advanced management system and hi-tech in cutting CO<sub>2</sub> emission from fossil fuels (coal, gasoline, and

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petroleum) burning to improve environmental quality in host countries (Zarsky, 1999), particularly when these FDI flows are targeting towards service industry. Similarly, Zeng and Eastin (2012) remark that, in general, FDI flows impulse under-developed nations to enhance awareness towards environmental issues.

Also, the impact of energy consumption on CO<sub>2</sub> emission is an intense controversy. Some researchers indicate the energy consumption has influence on CO<sub>2</sub> emission (Pao et al., 2011), whereas others argue that energy consumption cannot be responsible for CO<sub>2</sub> exhaust volume (Menyah and Wolde-Refael, 2010). One of the limitations of the previous studies is that they involve only two or three variables, which results in biased variable. Hence, with an aim to avoid biased variable, the authors would like to consider adding relevant variables as the controlled ones. Based on the prior studies (Fang and Miller, 2013; Fang et al., 2012; Zhu et al., 2016), the authors decide to set the economic development, population size, energy consumption, urbanization, industrial and service development as controlled variables.

There are three main reasons for the present research's adoption of Pool OLS panel data fixed effects for CO<sub>2</sub> emission volume. First, the authors use panel data to study the explanatory factors relating to CO<sub>2</sub> emission volume in global scale due to the advantage of provided sufficient data, more tracked transformation and less dependence which improve the effectiveness in result estimation when comparing to concentrating on one particular country (Lean and Smyth, 2010). Additionally, panel data may provide homoscedasticity indicated by intercepts within specific area, unobserved and fixed by time. Moreover, there are various environmental issues having non-barrier features, which requires comprehensive solutions and action plans. Thus, it is significant testing determinants relevant to CO<sub>2</sub> emission volume of nations within the panel data. Second, this approach has capability of demonstrating the entire conditional distribution in term of dependence variables, which help provide an overview of factors relating to pollutant emission. Especially, estimating quantile regression methodology generates solution for each difference. By adopting this methodology, determinants of CO<sub>2</sub> emission volume can be estimated during the process of conditional distribution, particularly for the countries in which CO<sub>2</sub> emission is highest and in those having the lowest. From the perspective of policy planning, this methodology is the advantageous approach in comprehending confident intervals. Contrarily, OLS regression methodology techniques are inappropriate in instituting environmental protection policies for country with high CO<sub>2</sub> emission. Third, the results of quantile regression are stable with the variable observation and are more effective than OLS regression, especially in the case of heteroskedasticity occurs. The stability and effectiveness of quantile regression enable policy planners precisely construct environmental proposals. There is few research applying this methodology to examine the relationship between variables.

Through the references, the authors find that their results do not reach a consensus and vary in each objective country. According to findings of mentioned papers, in certain countries, the existence of Haven hypothesis is affirmed. Others, nonetheless, support Halo hypothesis and Spaghetti hypothesis (which refers the simultaneous occurrence of Haven effect and Halo effect at a particular area). The studies of Baek (2016), Gokmenoglu and Taspinar (2016), which exemplify the Haven hypothesis corroboration, suppose that the larger the FDI flows are, the more CO<sub>2</sub> disposed. While others believe in the converse, which FDI has an enormous contribution to improving environment-friendly technologies leading to exhaust cut-off (Zhang and Zhou, 2016; Zhu et al., 2016). Besides, there are certain studies, with a wider scope and more details, indicate that the occurrence of Haven or Halo effect depends on time, area, development level, and the research subjects' income (Auffhammer et al., 2016).

Thus, the question is whether FDI has influence in CO<sub>2</sub> emission reduces? Attempting to find the answer, the authors decide to conduct an empirical analysis to examine the impact of FDI on CO<sub>2</sub> emission. Based on IPAT model (Commoner et al., 1971; Ehrlich and Holdren, 1972), an expected equation is inferred from a simple CO<sub>2</sub> emission model. Panel data from 113 countries in the period of 2007-2013 is set up as the foundation of the present research. The findings are expected to follow as Haven effect would occur in underdeveloped countries, which causes negative effects on environment (1), Halo effect would be present in developing countries (showing that receiving FDI may enhance awareness towards pollution, which would end up in exhaust offset) (2), the CO<sub>2</sub> emission in developed countries is predicted to correspond with Spaghetti hypothesis. The remainder of this study is organized as followed: IPAT model is profoundly demonstrated in part two, after which data description is conducted. In part four, the results are discussed and finally, the conclusion is highlighted.

## 2 IPAT MODEL

IPAT (or I=PAT) is a noticeable model usually adopted in studies involving to pollutions. The impact of human activity on the environment (I) is illustrated by three main types of cause: population size (P), the level of material affluence of that population (A) (with GDP per capita as the measurement), and current technology (T) (measured by environmental impact on a single economics sector). Kaya model, which provides supports for IPAT model, analyses the global CO<sub>2</sub> emission volume in four multiplicative driving forces: world population, GDP per capita (i.e., GDP/population, global energy intensity of GDP (i.e., energy/GDP), and carbon emission intensity of energy use (CO<sub>2</sub>/energy). Waggoner and Absubel (2002) develop the model of ImPACT with the aim to estimate the total amount of CO<sub>2</sub> emission. Like IPAT and Kaya model, ImPACT model does not originate from theoretical bases due to the inability to test the hypothesis of ad hoc identity.

Examining how P, A, and T affect CO<sub>2</sub> emission, York et al., (2003) reformulate IPAT model into a stochastic impact by regression on population as follows:

$$I_i = aP_i^a A_i^b T_i^c e_i, \text{ or} \quad (1)$$

$$\ln I_i = \ln a + a \ln P_i + b \ln A_i + c \ln T_i + \varepsilon_i$$

Where  $i$  represents countries;  $a$ ,  $b$ ,  $c$ , and  $d$  are parameters requiring estimation;  $e_i$  is error term; and  $\varepsilon_i = \ln e_i$

Next, a simple model of CO<sub>2</sub> emission, which forms an estimating equation similar to (1), is proposed. Hypothesizing a simple Cobb-Douglas production function of CO<sub>2</sub> emission as follows:

$$I_i = a_i E_i^\alpha e^{\varepsilon_i} \quad (2)$$

Where  $I$  = CO<sub>2</sub> emissions;  $a$  = the technological, structural and other effects;  $E$  = energy use;  $e$  = Euler's number, and  $\varepsilon_i$  = the error term.

This equation is augmented by dividing both sides of this production function for CO<sub>2</sub> emissions by population (P) and then introducing real GDP (Y) as follows:

$$\left(\frac{I}{P}\right)_i = a_i \frac{E_i^\alpha}{P_i} e^{\varepsilon_i} = a_i \left(\frac{E}{P}\right)_i^\alpha \left(\frac{1}{P}\right)_i^{(1-\alpha)} e^{\varepsilon_i} = a_i \left(\frac{E}{P}\right)_i^\alpha \left(\frac{Y}{P}\right)_i^\alpha \left(\frac{1}{P}\right)_i^{(1-\alpha)} e^{\varepsilon_i} \quad (3)$$



Taking natural logarithms gives:

$$\ln I_i = \ln a_i + \alpha \ln P_i + \alpha \ln \left( \frac{Y}{P} \right)_i + \alpha \ln \left( \frac{E}{Y} \right)_i + \varepsilon_i \quad (4)$$

Equation (4) matches equation (1), where  $b = c = d = \alpha$ ,  $A_i = (Y/P)_i$  and  $T_i = (E/Y)_i$ . That is, we see that the STIRPAT model is a simple production function (for CO<sub>2</sub> in this case), where we relax the coefficient on population, real GDP per capita, and energy use per real GDP.

### 3 DATA DESCRIPTION

The variables are described in Table 1, the data are all collected from World Development Indicators from the World Bank website. A panel data set of 100 countries in the world covering the period from 2007 to 2013 is applied. With the use of empirical analysis, we examine the impact of FDI on CO<sub>2</sub> emissions. And it is based on IPAT model (Commoner et al, 1971; Ehrlich and Holdren, 1972) to predict the outcome of the CO<sub>2</sub> emissions generated. Therefore, it is more convenient to change slightly the symbols of the elements that correspond to symbols in Table 1 such as: CO<sub>2</sub> emissions = I, the population = P, gross national product (GNP) = energy consumption = T, capital foreign direct investment = FDI, urbanization = U, industrial = IN, service = SV, inflation = IF. At the same time, 100 countries were divided into three main areas: the area of the developed countries (KV1), the area of the developing countries (KV2), and the area of the countries which have not developed yet (KV3).

**Tab.1** - Data sources and variables in the model

Variable name	Description variable	Data sources
DLI <sub>it</sub>	The change in the CO <sub>2</sub> emissions of the country i in year t	World Bank
DLP <sub>it</sub>	The change in the population of the country i in year t	World Bank
DLA <sub>it</sub>	The change in the gross national product of the country i in year t	World Bank
DLT <sub>it</sub>	The change in energy consumption of the country i in year t	World Bank
DLFDI <sub>it</sub>	The change in capital foreign direct investment of the country i in year t	World Bank
DLU <sub>it</sub>	The change in urbanization of the country i in year t	World Bank
DLIN <sub>it</sub>	The change in industry of the countries now i in the year t	World Bank
DLSV <sub>it</sub>	The change in services sector of the country i in year t	World Bank
DLIF <sub>it</sub>	The change in inflation of the country i in year t	World Bank

In order to facilitate the process of regression and the other steps in the research, we will use the data in the logarithm of all variables. First, the data will be converted to logarithmic form with the natural numbers. In addition, research will focus more on finding a causal relationship between the change of variables in each year (Difference level) than the numbers generated annually (Original level). Therefore, the official name of the variables in Table 1 corresponds to symbols after shown by the regression equation: the change of CO<sub>2</sub> emissions = DLI, the change of population = DLP, the changes of gross national product = DLA, changes of energy consumption = DLT, changes of capital foreign direct investment = DLFDI, changes of urbanization = DLU, changes of industrial = DLIN, the change of service = DLSV,

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**Tab.2** - Descriptive Statistics data from 2008 to 2013

The area	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean
	I Tons per person)	P (People)	A (USD/ Person)	T (Kg oil per person)	FDI (USD)	U (%)	IN (%)	SV (%)	IF (%)
<b>The developed countries (KV1)</b>									
2008	10.12088	37863561	34131.157	4390.986	496252484	74.282781	33.119673	64.345187	5.6945246
2009	9.5401194	38081151	30185.614	4205.4122	241333648	74.466	30.712755	66.943234	1.8896933
2010	9.9306927	38283389	31769.991	4379.6453	326809892	74.639125	31.263225	66.38965	2.6406606
2011	9.6783702	38430835	35315.09	4268.4565	412812867	74.808063	31.893341	65.714616	3.5829286
2012	9.5406323	38633340	34508.157	4236.5685	323623153	74.974563	31.317618	66.378556	3.0511237
2013	9.481962	38848074	35225.864	4218.6447	346390607	75.140313	30.698519	66.947539	2.2222307
<b>The developing country (KV2)</b>									
2008	249958.79	78849845	6844.5179	1623.7836	907398451	57.977273	36.062726	52.130865	11.75593
2009	259761.95	79761685	5851.4372	1534.3121	638049761	58.413018	34.286376	54.5475	4.9021607
2010	285083.45	80672967	6650.6101	1579.7298	966352665	58.848727	34.572731	54.154609	5.336463
2011	309729.82	81591542	7770.1511	1658.283	113209309	59.281982	34.769332	53.275418	7.5290598
2012	321251.94	82519606	7909.6852	1713.1472	101854581	59.711145	34.205719	54.323456	6.0819457
2013	323485.47	83452730	8079.4043	1682.8194	112960622	60.1356	33.591189	54.677851	5.2737459
<b>The underdeveloped countries (KV3)</b>									
2008	8527.4675	41798847	1108.4945	401.38623	695450693.	30.071231	23.51366	47.587115	15.445049
2009	9113.3412	42537514	1056.3389	412.00719	636244207.	30.425154	21.764565	49.924467	5.8072141
2010	10306.245	43296610	1223.4744	421.85645	886176756.	30.788385	22.774668	49.516211	6.8281986
2011	10980.69	44079988	1396.1655	421.04806	127227373	31.160462	23.920799	49.021373	10.281574
2012	11344.288	44886135	1376.3603	424.16425	138026010	31.541923	22.167948	48.77831	9.0416824
2013	12026.35	45711808	1412.9088	435.29596	164821903	31.931846	22.70555	48.81592	7.1410898

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Table 2 shows the mean annual divided into three areas, namely: the developed countries of region 1 (KV1), the country is developing of region 2 (KV2), undeveloped countries of region 3 (KV3). Moreover, Table 2 also shows the name and symbols of the variables of the 100 countries with little change (using data Original), referring to the average CO2 emissions = I (Tons per person), the average total population = P (people), the average gross national product (GNP) = A (USD), the average total energy consumption = T (Kg oil per person) the average total want of foreign direct investment FDI = (USD), the average urbanization rate = U (%), the average industry rate = (%), the average rate of service = SV (%), the average rate of inflation = IF (%), from 2008 to 2013. We have:

The average CO2 emissions of three areas are different. There is a reduction in CO2 emissions of developed countries area (KV1), while in regions of developing countries (KV2) and the undeveloped countries (KV3), it tends to rise. In particular, the average CO2 emissions in KV2 countries are higher than other areas, reaching 323,485.47 tons/person (2013). It is obvious since the KV2 countries have rapidly growing average population which crowded about 2 or 3 times as much as the average population of the countries in KV3 and KV1. However, the average population of the countries KV1 and KV3 still tends to go up. The average population of undeveloped countries has increased significantly during 6 years, while it is relatively slow in the developed countries (from 37,863,561 people to 38.4.074 people).

For variables of the average gross national product (GNP) of the areas are increased. But the increase of average GNP of KV1 is inconsistent in years, while KV3 has increased steadily but not much noticeable, just 1412.9 USD (2013). Potential area in production with tendency to develop towards industrialization, KV2 has the extremely high average GNP (8079.4 US dollars). However, the energy consumption of this area is quite low with slow increase. Whilst, the KV3 has the lowest average energy consumption but increasing steadily. Being developed and the leading in technology and industry, the amount of energy consumption in the KV1 is higher than in other areas (42188.64 Kg oil/person) in spite of its downward tendency. Therefore, the level of CO2 emissions increased related to the increase in population, economic activity, and energy consumption.

The change in the average of the total capital foreign direct investment (FDI) in 3 areas has many similarities with the change of the average of total CO2 emissions. FDI has great influence on the CO2 emissions for each region. In 2013, the FDI in developed countries is the largest with 34.6 billion dollars. Following that is the area of the developing countries with more than 10 billion dollars, the region of the undeveloped countries with 1.6 billion. FDI in the developing countries and undeveloped countries are showing significant growth since 2008. However, FDI in the areas of developed countries has the opposite direction. In particular, FDI in KV1 although reduced but still higher than 3 times compared with KV2 and KV3. Proportional to the average of the population, the average rate of Urbanization in the 3 areas tends to increase. But from 2008 to 2013, there is decline in the average rate of industrialization and increase in the average rate of service in all three areas. It also slightly changed the economy, in particular, the decrease of average inflation rate. Because the relationship between carbon emissions, economic growth, FDI and energy consumption which affected by other factors, so appropriately applied a multivariate regression methods. It can be presented in overview descriptive statistics.

#### **4 RESULT ESTIMATION AND DISCUSSION**

The Pooled OLS regression results show the influence of economic factors on CO<sub>2</sub> emissions in countries around the world, such as: Change in CO<sub>2</sub> emissions (DLI), Change in total population Number (DLP); Change in Total Productivity (DLA), Change in Energy Consumption (DLT); Change in Foreign Direct Investment (DLFDI); Urban change (DLU); Industrial change (DLIN); Service (DLSV).

Model 1 is a model that re-articulates the results of the IPAT model (Commoner et al., 1971; Ehrlich and Holdren, 1972). Although the article was born long ago, its results are still true today. In this model, the data is updated to the latest time and the results support IPAT theory, that the impact of the environment is the product of three factors: population, economic development measured It is equal to GDP per capita and existing technology. When other factors remained unchanged, the total population increased to 1 person, the CO<sub>2</sub> emissions decreased to 7.9173. Total national output increased by 1 USD, CO<sub>2</sub> emissions increased to 0.6751. Similarly, the change in energy consumption increases by 1, CO<sub>2</sub> emissions increase 6.1473. The test values are p-value = 0.0000 (DLP) respectively; P-value = 0.0000 (DLA); P-value = 0.0000 (DLT). With a 1% significance level, these test values are statistically significant. The regression coefficient of the change in population size is negative for the effect of the consciousness of human pollution in recent years. At the same time, some recent research results have concluded the same argument. H. Zhu et al. (2016) show that population changes is statistically significant and positive at lower variances; On the other hand, in the midrange variants, the coefficients are not statistically significant and revert to negative and become statistically significant at higher levels. This implies that the greater the population change results in increased CO<sub>2</sub> emissions in low-emission countries, whereas this will be the reverse in high-emission countries. It can also be said that human consciousness of pollution as a commodity can also prove that the correlation between CO<sub>2</sub> and population is contrary (Hotte and Winer, 2012). When the consciousness of pollution is considered as a normal commodity, the higher the income people (people in developed and developing countries) pay more attention to environmental pollution issues. And at the same time contribute to reducing the impact on the environment than people with low income (people in less developed countries). Hence, population growth in high-income areas will have an impact on reducing the damage that people cause to the environment.

Model 2 is the IPAT model associated with the DLFDI variable. This model is the Halo hypothesis test model (Zarsky, 1999) and the Haven hypothesis (Zarsky, 1999; Pao and Tsai, 2011). The results show that FDI will greatly contribute to improving environmentally friendly technologies, reducing harmful emissions, and supporting the Halo hypothesis. However, the FDI variable was not statistically significant even when considered at a 10% significance level, but the parameter showed a negative impact of FDI on the CO<sub>2</sub> level, the remaining variables were statistically significant at the significance level 1%.

Model 3 adds DLU variable. When other factors remained unchanged, urbanization increased by 1%, CO<sub>2</sub> emissions increased by 0.0788%. The test value is p-value = 0.0012 (DLU). According to Martinez & Maruotti (2011) urbanization develops to a certain extent, the impact on the environment is reduced. However, the level of urbanization growth is still low in developed countries. Left, other countries have high urbanization speed. Cities are the places where environmental damage is caused, in particular by increased transport emissions, energy consumption, and other factors, leading to increased pollution. The DLU variable is used to measure its correlation with environmental pollution, in order to draw conclusions about the effect of variables in different economic sectors.

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**Tab.3** - Pool OLS estimation results

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
DLP	-7.9173*** (0.5795)	-8.0045*** (0.5183)	-9.5173*** (0.5077)	-8.6044*** (0.4922)	-9.5207*** (0.5152)	-16.4453*** (0.7436)	0.3792** (0.2027)
DLA	0.6751*** (0.0986)	0.7004*** (0.0898)	0.6687*** (0.0809)	0.6630*** (0.0815)	0.5753*** (0.0796)	1.0344*** (0.1138)	0.0353 (0.0294)
DLT	6.1473*** (0.2057)	6.1133*** (0.1842)	6.1364*** (0.0115)	6.1755*** (0.1579)	6.1894*** (0.1491)	6.0640*** (0.2318)	0.5083*** (0.0478)
DLFDI		-0.0128 (0.0131)	-0.0098 (0.0115)	-0.0177* (0.0108)	-0.0185* (0.0102)	-0.1164*** (0.0198)	-0.0063 (0.0042)
DLU			0.0788*** (0.0242)		0.0926*** (0.0228)	0.1830*** (0.0288)	-0.0069 (0.0129)
DLIN				0.0274*** (0.0041)	0.0279*** (0.0038)	0.0279*** (0.0049)	0.0078*** (0.0012)
DLIF				0.0010 (0.0017)	0.0013 (0.0016)	-0.0071** (0.0023)	0.0015*** (0.0004)
DLSV				0.0152*** (0.0044)	0.0130** (0.0042)	0.0073 (0.0055)	0.0046*** (0.0013)
No. of obs	678	678	666	612	192	330	78
No. of countries	113	113	111	102	32	55	13

*Note: The above coefficients are Correlation coefficients. The above coefficients in brackets are standard error (SE). \*: significant at 1%, \*\*: significant at 5%, \*\*\*: significant at 1%*

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Model 4 incorporates DLIN, DLIF, DLSV and DLU variables. According to Zhu et al. (2016), industrial structure has a positive influence on CO<sub>2</sub> emissions. When other factors remained unchanged, industrialization, inflation, and services increased by 1%, CO<sub>2</sub> emissions increased by 0.0274, 0.0010, 0.0152% respectively. The test values are p-value = 0.0000 (DLIN) respectively; P-value = 0.5539 (DLIF); P-value = 0.0006 (DLSV). DLIN and DLSV are two appropriate variables used for regression analysis of pollution levels in the following models. At the same time, FDI is statistically significant at 10% demonstrating the relevance of model 4 to data sets and the application of regression to individual economic sectors.

Model 5 is a combination of models 3 and 4 for regression testing in countries in developed countries. Similarly, model 6 is used for regression testing in developing countries and model 7 is used for poor countries. In model 5, the regression coefficients indicate that DLP and DLFDI reduce CO<sub>2</sub> emissions while other variables are positive. DLIF is not statistically significant at 10%, DLFDI is statistically significant at 10% and other variables are significant at 1%. Population change in developed countries reduces pollution by increasing awareness of rising levels of pollution, as well as tight environmental laws. FDI has a negative indicator that in developed countries with modern technology and awareness contribute to limiting CO<sub>2</sub> emissions. Research results are similar to models 3 and 4.

In developing countries, the regression coefficients of DLP, DLFDI, DLIF are negative. DLSV is not statistically significant at 10%, but it also demonstrates the impact of services on the environment, as in developing countries the shift to service structure has only begun in comparison with Developed countries. Industrialization and urbanization have also had a major impact on CO<sub>2</sub> emissions, the urbanization boom in developing countries putting pressure on the environment, the rush of major cities to make the environment here. Polluted by vehicles, waste, etc DLFDI has a negative coefficient, again showing that foreign direct investment contributes to reducing pollution in these countries. Direct investment from developed countries will bring positive effects not only to environmentally friendly high technologies but also to raising awareness of green economies in developing countries.

Model 7, regression results in poor countries indicate that DLP has a positive coefficient, explaining that this is income in poor countries, and low awareness of environmental protection. The number increases the amount of CO<sub>2</sub> emissions. The regression coefficient of the DLT variable is much lower than the other two groups, but it still exhibits negative environmental effects. DLU has negative coefficients and is not statistically significant because in urban poor countries there is virtually no urbanization in poor countries without high influence. The impact of industry on CO<sub>2</sub> emissions is also very small in comparison to developed and developing countries, mainly in poor countries that are still focused on agriculture and depend on rich countries. DLFDI has negative coefficients and is smaller than the two groups of developing countries because of their dependence on the capital and technology of rich countries, so investing in poor countries has helped poor countries with machinery and technology. They are environmentally friendly, in addition to helping to make them better aware of the environment. However, in all three models 5,6,7 indicate that foreign direct investment helps reduce the impact on the environment, supporting Halo hypothesis.

## **5 CONCLUSION**

The main objective of this study is to understand the impact of FDI, economic growth, and energy consumption on carbon emissions. With the regression method, the study shows individual heterogeneity and distribution. In addition, to avoid discrepancies and omitting variables, some related control variables are included in the model. Compared to OLS, panel regression models can provide a comprehensive picture of the factors that affect carbon emissions. This paper includes the annual sampling period from 2007 to 2013 in 113 countries around the world. The results show that FDI significantly reduces CO2 emissions.

Experimental results indicate that the effects of different factors on carbon emissions are inconsistent. But overall, FDI has a positive and significant impact on CO2 emissions. The impact of economic growth is negative and significant at the highest level, suggesting that higher economic growth may reduce the expansion of CO2 emissions in countries which have medium and high emissions. Similarly, population size is closely related to CO2 emissions in countries with high and medium emissions, while the relationship is negative in countries with low emissions. Besides, the impact of industrial structure, inflation and services are proportional to the CO2 emissions. In addition, we find that trade openness has a positive impact on carbon emissions. In particular, the effect of trade openness is foreign direct investment (FDI), which is important for the countries.

The findings not only contribute to the existing papers but also useful for policymakers in both developed and developing countries. Our results specified that FDI inflows can reduce CO2 emissions in any group of countries. Policies should be implemented to promote FDI inflows, including how to access into domestic markets and appropriate tax incentives. Policy to attract FDI should also vary to be appropriate for different regions. Finally, the structures of FDI flow distribution need to be further refined. Our results show that the optimal industrial structure is negatively related to CO2 emissions. Therefore, FDI inflows should be directed towards green industries, especially high-tech and technology-intensive industries. There are a number of limitations to our research, such as: providing only a preliminary explanation for the effect of FDI on CO2 emissions. The countries who invest FDI and FDI structure are not considered in our study. The higher technology of FDI from developed countries and the proportion of FDI flowing into different industries have different effects on emissions. Mechanisms for reducing emissions discharged from FDI weren't clarified. Further research will help researchers for better understanding about the relationship between FDI and CO2 emissions in 113 countries.

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## Testing the Causal Relationship between Remittances and Private Investment: A Panel Granger Causality Approach

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### ABSTRACT

*This paper aims to study the role of remittances and private investment with a sample including 30 Asia and the Pacific developing countries. We apply the Granger causality technique to identify the causal relationship between the variables. The database is sourced from World Bank in the period 1985 – 2014. The dependent variable is private investment and the independent variables are the lag of private investment; economic growth rate, the ratio of remittances over GDP; the ratio of Government expenditure over GDP; the trade openness of the economy. The Granger Causality Tests result shows that there is only one-way causality from remittance to private investment existing in research period. Therefore, the study suggests that the government policy should be designed toward promoting private investment for leveling up the rate of economic growth. The study also observes the two-ways causality between government expenditure and private investment as well as trade openness and private investment.*

**Keywords:** *Remittances, Private investment, Asia and the Pacific developing countries, Granger causality, Economic growth.*

**JEL Classification:** E2, F6

### 1 INTRODUCTION

In recent three decades, remittance is one of the most important sources of foreign capital into the economy of developing countries in the world. Especially, remittance inflows play a significant role for the developing countries. The economic power of remittances, as an origin of capital and support for the nations of migrants' source, is impacting on millions of families around the world. It dramatically affects the economic activities of the nations of origin and the nations of destination as well. In addition, remittances also create a financial connection more and more closely among countries, regions, and continents over the world.

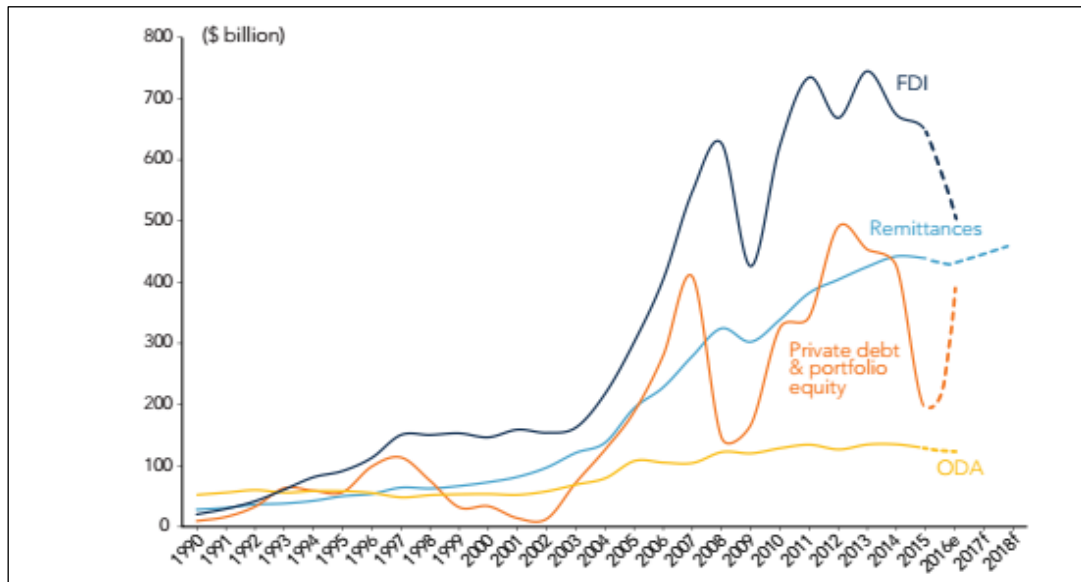
Following to the statistics from World Bank, Global remittances were calculated to be approximately USD 583 billion in 2014, and the developing countries received over USD 436 billion in particular (accounting for 74.7 percent). In addition, the remittance inflow to the developing world is forecasted to exceed USD 516 billion by 2016 with an annual growth rate by 8.4 percent in the period 2014-2016. It was noteworthy that Asia and the Pacific region has been the region with the world's largest remittance inflows within 10 years. Remittance inflows in the Asia-Pacific region have increased 14 times, from USD 14.2 billion in 1990 up to USD 198.2 billion in 2010. In 2013, remittances via official channels were around USD 235 billion in Asia and the Pacific, accounting for 45 percent of the total amount of remittances in the world. In Asia and the Pacific, there are 18 countries with the ratio of remittances over GDP was greater than 1 percent in 2013. Especially there are 9

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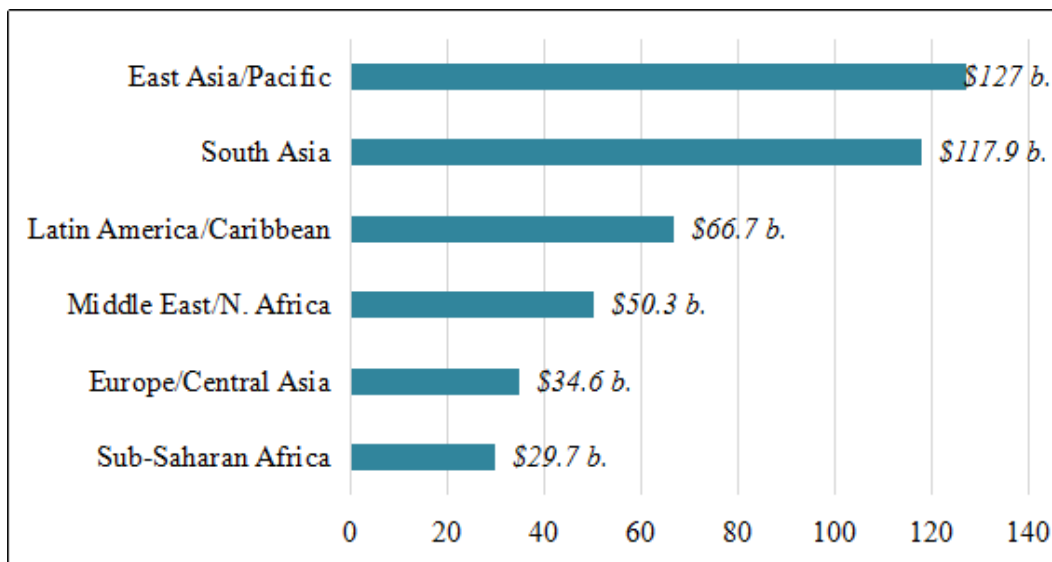
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countries with the ratio of remittance inflows to GDP more than 10 percent such as Tajikistan 47.5 percent, Kyrgyz Republic 30.7 percent or Nepal 28.7 percent. Since 1995, remittances have become the second largest foreign capital source (after foreign direct investment) into the Asia-Pacific region. In 2012, the remittance inflows in this region increased up to USD 236.6 billion in comparison with foreign direct investment (USD 557.1 billion) and official development assistance (USD 33.9 billion).



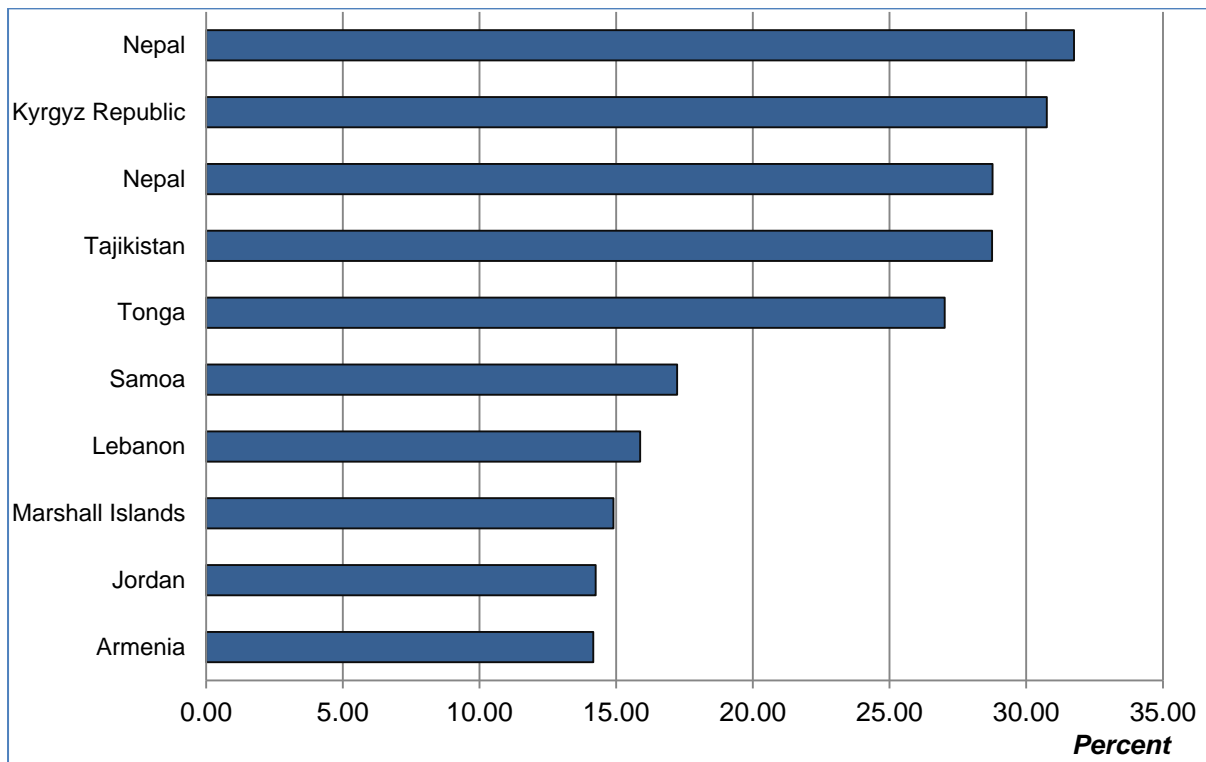
**Fig.1** - FDI, ODA and Remittance flows in developing countries

Source: World Development Indicators (World Bank, 2017)



**Fig.2** - Remittances to developing world, 2014 (Unit. Billions).

Source: World Development Indicators (World Bank, 2017)



**Fig.3** - Top recipients of remittances over GDP in Asia and the Pacific, 2015

Source: *World Development Indicators* (World Bank, 2017)

There have been many studies on the positive role of remittances in an economy, but only a few results focused on the relationship between remittances and private investment in the recipient countries. Remarkably, there are few studies on the effects of remittances on private investment at the macro-level, but many experimental results at the micro-level including Massey and Parrado (1998) studied in Mexico, Adams and Cuecuecha (2010, 2013) experimented in Guatemala and Ghana, Mallick (2012) studied in India, or Salas (2014) implemented in Peru. Following the literature there has been no experimental evidence for the impact of remittances on private investment in the Asia-Pacific region.

The findings of this paper contribute to the theoretical background of remittances in the two following ways. Firstly, empirical evidence clarifies the relationship between remittances and private investment and proves the direct impact of remittances on the economic growth in the recipient countries. Secondly, previous studies only used data at the micro-level, whereas this research employed data at the macro-level via using a sample of 32 developing countries in Asia and the Pacific region. The structure of this paper includes five sections. Section 2 presents an overview of the literature and empirical investigations. Section 3 shows the econometric technique and the research model. The data is introduced in Section 4. Section 5 reports the results of Granger causality test. Finally, Section 6 presents conclusions and some policy implications.

## **2 LITERATURE REVIEW**

Remittance inflows can be defined as current transfers sent by non-resident workers from the overseas to recipient countries (Chowdhury, 2011). Azeez and Begum (2012) considered remittances as the transfer of cash and monetary items by immigrants to their households in their home country. It has many benefits from remittances like income distribution and advancement in the standard of living, especially for untalented poor emigrants. Remittance plays a noteworthy part in improving the wage level of the family of the emigrants. Therefore, remittance is a large capital inflow from outside nations into the economy of the recipient countries, in which vast majority of the remittances are transferred to the household division. As of late, many studies have demonstrated that remittances advance economic growth (Giuliano & Ruiz-Arranz, 2009) and help to lessen poverty (Acosta et al., 2008; Gupta et al., 2009; Imai et al., 2014).

Bjuggren, Dzansi and Shukur (2010) claimed that workers' remittances are an essential venture source especially for developing nations. They found that remittances raise investment. Aggarwal, Demirguc-Kunt and Martinez-Peria (2006) claimed that remittance plays a vital role in financial sector development and found a significant positive impact of remittances on financial development in developing countries. Acosta, Baerg and Mandelman (2009) claimed that remittances are very important for developing countries. They expect that if the financial system is developed, remittance will be high and may be effectively used for investment. Besides, remittances were found to contribute to the expansion of the financial sector in many countries (Chowdhury, 2011; Aggarwal et al., 2011; Cooray, 2012; Beine et al., 2012) or increase the competitiveness of an economy (Bayangos & Jansen, 2011). However, remittances were also found to have negative impacts on the economy of the recipient countries such as social inequality (Acosta et al., 2008), corruption (Berdiev et al., 2013) or inflation (Narayan et al, 2011).

On the other hand, the relationship between remittances and private investment is still an infrequent topic in the literature review, and the studies are mostly based on micro-level data in some US-Latin or Africa countries. Moreover, these studies showed inconsistent or even contradictory results. According to Massey and Parrado (1998), remittances from U.S accounted for 21 percent in start-up capital of The New Business Formation in Mexico. In addition, Conway and Cohen (1998) found that remittances promote and support manufacturing companies in the Santa Anan community in Mexico. Therefore, both of the above mentioned studies proved the impact of remittance on promoting private investment in the recipient countries.

Migrants send money to their home nations which depends on the altruistic motive. Family ties in the form of mutual caring are imperative inspirations of remitting funds from oversea (Chami et al., 2005). Remittance support of the migrant's family members left behind is particularly an essential well-spring of financial support for many households in the developing world. It specifically applies significant effect on the standard of living of the households accepting them as it is spent on education, wellbeing and other family utilization (for daily expenses) and thus is partly invested in human capital. On the contrary, while investing remittances on the genuine part or capital segment, they might have the profit intention, which depends on the self-interest hypothesis of remittances. When remittances are utilized for consumption, besides straightforwardly enhancing the quality of life and generating human capital in the receiving nation, it also creates an indirect influence on the local economies by generating employment chances and impacting private utilization. Also, remittances can have direct and indirect impact on investment via consumption as well.

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Adams and Cuecuecha (2010) used household survey data in Guatemala in the period from July to December 2000 to investigate the impact of remittances on households' marginal consumption by the application of the Working-Lesser model and the Two-Stage Selection Model. The research results concluded that households receiving remittances increase investment in education and housing. Adams and Cuecuecha (2013) experimented with household survey data in Ghana from September 2005 to September 2006 and found that remittances increase household investment in not only housing and education but also health care. Consequently, the results of this experimental study supported the theoretical framework of the impact of remittances on investment in human and physical capital in the recipient countries. Baldé (2011) investigated the impact of remittances on savings and investment using a sample of 37 and 34 Sub-Saharan Africa (SSA) countries over the period 1980–2004. The results found that remittance inflows have a positive and significant impact on investment in SSA region. The study also indicated that the amount and ratio of remittances are lower than foreign aid, but remittances have more positive impact on investment.

The inward remittances have favorable effect on savings and investment (Ratha, 2003). Lucas and Stark (1985) cite many contextual analyses, which demonstrate the proof that remittances have quicken investment in Morocco, Pakistan and India. Glytsos (2002) modeled the direct and indirect impacts of remittances on wages and henceforth on investment in seven Mediterranean nations and found that investment increases with remittances in six out of seven nations. Moreover, an investigation directed by León-Ledesma and Piracha (2004) supports the proof that remittances have a positive effect on productivity and employment through quickening of level of investment in 11 transition economies of Eastern Europe during 1990–1999. An investigation by Roberts et al. (2004) on remittances in context of Armenia proposes that the propensity to spare out of remittance wage is high (very nearly 40%) and is strikingly consistent over the investigation. In this way, there is solid proof in help of remittances empowering to accomplish higher rate of economic growth through boosting the rate of investment through its multiplier impacts and bringing income levels in the economy beyond the remittances receiving households. Therefore, it can be presumed that remittances can impact on investment through its development motivations.

On the contrary, Mallick (2012) conducted research on the relationship between remittance inflows and private investment in India from 1966 to 2005. The results proved that remittances have a negative impact (or detrimental effect) on private investment in India in the study period. On the basis of the research findings, it is suggested that the Indian government should have appropriate policies regarding remittance inflows to the private sector for promoting the economic growth rate. Continuously, Ahamada and Coulibaly (2013) applied the panel Granger causality testing approach to investigate the causal relationship between remittance inflows and economic growth over the period 1980-2007 in the case of 20 countries in the Sub-Saharan African region. However, the research findings showed that there is no relationship between remittance inflows and economic growth because remittances did not increase physical capital investment in these countries.

More recently, Salas (2014) used the human capital theory and Random – Effects Probit Model for analyzing the role of remittances toward household's decision on investment in children education in Peru from 2007 to 2010. The results found that remittances have a positive effect on human capital investment in the research period. Similarly, Bedi and Sparrow (2009) examined the influence of remittance on human capital investment in Ecuador from 2005 to 2006 and their research findings concluded that remittances play a role as an investment resource for human capital. Davis and Lopez-Carr (2014) applied the

modern economics of labor migration framework to examine the relationship between migration, remittances and smallholder decision-making in land use and livelihood change for the case of four countries in Central America, including Costa Rica (2002), El Salvador (2007), Guatemala (2004) and Nicaragua (2002). The results presented that remittances lead to a growth in private investment in agriculture in these countries.

### 3 METHODOLOGY

The Granger causality technique is a testing methodology to settling on the choice whether one-time series is helpful in forecasting another. Granger-causality can be effectively clarified. More or less, assume that we have two variables X and Y. Expecting the Granger-causality the variable Y Granger- causes X when the past values of Y provide data that can be utilized in prediction of X values and beyond the extent of the data. Although Granger causality testing standards were explored by Granger (1969), supposed to be inappropriate for panel data. However, our article applies the Granger causality test developed by Hurlin and Venet (2001) and Hansen and Rand (2006) which is suitable for panel data. This method assumed that the autoregressive coefficients and the slope coefficients are constant in a panel data VAR model. There have been a number of studies applying the approach of Hurlin and Venet (2001) in performing Granger causality tests for the panel data as Erdil and Yetkiner (2009) and Tongur and Elveren (2014).

According to the approach of Hurlin and Venet (2001) which consider the variable  $x_{i,t}$  is causal to the variable  $y_{i,t}$ , VAR model is used to describe the data table and estimating the equation (2):

$$y_{i,t} = \sum_{k=1}^q \eta^k y_{i,t-k} + \sum_{k=1}^q \gamma_i^k x_{i,t-k} + v_{i,t} \quad (1)$$

Where, t denotes periods, N is cross section units and  $i \in [1, N]$ .  $x_{i,t}$  and  $y_{i,t}$  are covariance stationary variables.  $\eta^k$  and  $\gamma_i^k$  are assumed to be constant over time. By application of the methodology developed by Hurlin and Venet (2001), we use the Granger causality tests to examine the causal relation between private investment and the explanatory variables. Two-time stationary VAR models are written as follows:

$$\Delta y_{i,t} = \sum_{k=1}^p \eta^k \Delta y_{i,t-k} + \sum_{k=1}^p \gamma_i^k \Delta x_{i,t-k} + v_{i,t} \quad 2)$$

$$\Delta x_{i,t} = \sum_{k=1}^p \eta^k \Delta x_{i,t-k} + \sum_{k=1}^p \gamma_i^k \Delta y_{i,t-k} + v_{i,t} \quad (3)$$

The optimal lag of VAR model is selected based on the recommendations of some indexes, including the Akaike Information Criteria (AIC), Schwarz Criterion (SC), Hannan-Quinn Information Criterion (HQ), Final prediction error (FPE) Likelihood ratio and (LR). According to the econometric model in the previous studies by Baldé (2011) and Adam (2009), the econometric model for analysis the impact of remittances on private investment in Asia and the Pacific developing countries in this research is constructed as follows:

$$PINV_{i,t} = \beta_0 + \beta_1 PINV_{i,t-1} + \beta_2 GDPG_{i,t} + \beta_3 REM_{i,t} + \beta_4 GE_{i,t} + \beta_5 OPENNESS_{i,t} + \varepsilon_i \quad (4)$$

Where,  $PINV_{i,t}$  denotes private investment variable referring to the Gross fixed capital formation over GDP;  $PINV_{i,t-1}$  is the lag of private investment;  $GDPG_{i,t}$  represents the economic growth rate,  $REM_{i,t}$  denotes the ratio of remittances over GDP;  $GE_{i,t}$  is the ratio of Government expenditure over GDP;  $OPENNESS_{i,t}$  measures the trade openness of the economy (calculated by the sum of exports and imports over GDP) and  $\varepsilon$  is the error term. Continuously,  $t$  denotes periods, and  $N$  is cross-sectional units with  $i \in [1, N]$ .

#### 4 DATA DESCRIPTION

This paper employed a dataset including 30 Asian and the Pacific developing countries. Secondary data of 29 years from 1985 – 2014 of variables under study i.e. Private investment, Remittances, GDP, Government Expenditure, Openness are collected from the data bank maintained by the World Bank and analyzed using E-view software. List of countries used in study sample including Armenia, Azerbaijan, Bangladesh, Bhutan, Cambodia, China, Fiji, Georgia, Hong Kong, India, Indonesia, Iran, Kazakhstan, Kiribati, Korea. Rep, Kyrgyz Republic, Lao, Macao, Malaysia, Maldives, Mongolia, Nepal, Pakistan, Papua New Guinea, Philippines, Samoa, Solomon Islands, Sri Lanka, Tajikistan, Thailand, Turkey and Vietnam. *Table 1* shows the description of the variables in this research.

**Tab.1** - Descriptive statistics

Statistics	Mean	Median	Maximum	Minimum	Std.dev	Observations
PINV	26.48	24.47	93.13	5.18	9.95	656
REM	4.14	1.57	49.29	0.03	6.58	656
GDPG	5.45	5.61	34.5	-20.09	4.91	656
GE	0.12	0.11	0.39	0.03	0.04	656
OPENNESS	0.83	0.69	4.58	0.11	0.62	656

*Notes:  $PINV_{i,t}$  is the private investment over GDP;  $REM_{i,t}$  is the remittances over GDP;  $GDPG_{i,t}$  is the economic growth rate;  $GE_{i,t}$  is the Government expenditure over GDP;  $OPENNESS_{i,t}$  is the trade openness of the economy.*

*Source: Calculate from the research data.*

#### 5 PANEL CAUSALITY TEST RESULTS

In this part of our paper, the panel Granger causality test was used to analysis the existence of the causal relationships between some explanatory variables and private investment in Asian and the Pacific developing countries. This paper uses three methods of panel unit root test, including LLC (Levin et al., 2002), IPS (Im et al., 2003) and Breitung (Breitung, 2000). The result of unit root tests showed some variables in the equation (1) are non-stationary at the level. However, all the inspection for first difference of these variables stopped with all testing at the statistical significance level of 1%. Therefore, we continued to use the first difference of these variables for Granger causality test in the next step.

The results from *Table 4* indicate the existence of only one-way Granger causality from remittance to private investment in Asian and the Pacific developing countries. It shows that remittance inflows increase private investment and this effect is statistically significant at the 1% level. It is found that there exists two-ways Granger causality between economic growth



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rate and private investment in the case of Asia and the Pacific developing countries at the significance level of 1%. Accordingly, these results, the Granger test statistic indicates that there is a two-ways causal relationship between government expenditure and private investment. The statistical significance is 1% from private investment to government expenditure but it only is 10% from government expenditure to private investment. Finally, the two-ways causality exists between trade openness and private investment with 10% statistical significance, however, this causal relationship seems quite weak.

**Tab.2 - Result of panel unit root tests at level**

	INV	GDPG	REM	GE	OPENNESS
LLC	2.23138**	-5.12438***	0.06375	-2.53861***	-1.32370*
IPS	1.74283**	-6.68916***	0.68085	-3.96315***	1.93544
Breitung	-1.96612**	-9.05637***	-0.45429	-0.70561	5.07985

Notes: \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

Source: Calculate from the research data.

**Tab.3 - Result of panel unit root tests at first difference**

	$\Delta$ INV	$\Delta$ GDPG	$\Delta$ REM	$\Delta$ GE	$\Delta$ OPENNESS
LLC	-18.5621***	-4.14250***	-12.6246***	-21.2825***	-8.74867***
IPS	-13.4183***	-18.1481***	-4.98369***	-16.0387***	-13.1924***
Breitung	-14.0737***	-14.6488***	-8.26342***	-21.2825***	-2.83548***

Notes: \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

Source: Calculate from the research data.

The result of Granger causality tests between private investment and the explanatory variables are presented in *Table 4* below.

**Tab.4 - Results of panel Granger causality tests**

<i>Rem and Private Investment</i>		
Lag = 3	REM → INV 4.87446***	INV → REM 0.94020
<i>Economic growth rate and Private Investment</i>		
Lag = 1	GDPG → INV 8.72260***	INV → GDPG 12.1678***
<i>Government expenditure and Private Investment</i>		
Lag = 5	GE → INV 1.96866*	INV → GE 2.20475***
<i>Trade openness and Private Investment</i>		
Lag = 6	OPENNESS → INV 2.93394*	INV → OPENNESS 1.92418*

Notes: \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

Source: Calculate from the research data.

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## 6 CONCLUSIONS

This study inspected causality relations of remittances on macroeconomic activities (private investment) in 30 Asia-Pacific developing countries from 1985 to 2014 by making utilization of Granger causality testing system for board informational sets. We have discovered overall confirmation for a multiplicity of causality relations among the variables considered. Otherwise, a noteworthy segment of remittances would bring about an expansion in private investment in these nations. The outcomes complement and contribute to the literature on the influence of remittances in the economy. Thus, the administration should take appropriate measure for occupying the remittances to more productive parts, so that it will increase investment and employment and ultimately boosting up the genuine development rate of the economy. The research findings also provide useful information about the impact of remittances on private investment; thenceforth, the policy-makers in these countries can enhance the effectiveness of planning and operating policies for promoting private investment due to the upward trend in remittance inflows in Asia and the Pacific region.

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## Consumption Economies of Scale, Household Headship and Poverty: Evidence from Sri Lanka

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### ABSTRACT

*The idea that female and female-headed households disproportionately represent the poor, and that they experience a higher incidence of poverty than male and male-headed households, has been discussed widely in the literature on gender and poverty, particularly in the context of developing countries. Nevertheless, important questions remain unexplored. For example, how does the gender of the headship affect household ability to reap the benefits of consumption economies of scale (CSE)? And how do these differences in CSE, based on the gender of the household head, change the poverty status in male-headed and female-headed households? This study, using Household Income and Expenditure survey 2009/10 data for Sri Lanka, attempts to uncover the differences in CSE associated with the gender of household headship. We use an Engel equivalence scale approach for this purpose. This analysis sheds new light on the existing debate on poverty and household headship in a different lens. Our results indicate that female-headed households enjoy greater CSE than their male-headed counterparts. However, we find that the poverty rate among the female-headed households are higher than that of their male-headed counterparts, even after CSE are allowed for.*

**Keywords:** *Female headship, equivalence scales, consumption economies of scale, poverty rates*

**JEL Classification:** D10, D12

### 1 INTRODUCTION

Female-headed households have received much attention in the literature on poverty and headship, as they are believed to be highly disadvantaged compared to male-headed households. There has been an increasing trend in the prevalence of households headed by females around the world. This is due to various socio-demographic reasons such as gender-selective migration, gender differences in life expectancy, and conflicts and wars (Visaria 1980, Chant and Campling 1997). An important implication of these changing patterns in household headship is that they are also associated with changes in household size and composition. For example, research suggests that female-headed households appear to be smaller than male-headed households and that female household headship is associated with higher dependency ratio (i.e., the presence of a greater number of dependents – both young and old – with fewer adult earners) (Chant and Campling 1997, Silva 2003, Chant 2004). These changes have brought about some serious consequences relating to the welfare of these female-headed households.

As far back as 1895, scholars such as Ernst Engel realised that one cannot simply compare incomes across households if their size and composition are different. This is because larger households tend to be better off than smaller households, if the economies of scale in

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consumption (CSE) associated with large families are taken into consideration when assessing poverty (Engel 1857). CSE are defined as the reduction in the cost per-person to maintain the same material welfare as the household size increases, enabling larger households to attain a relatively higher per-capita standard of living than that of smaller households (Lanjouw and Ravallion 1995). These CSE may generate from the sharing of household goods, bulk purchases and increasing returns to scale in home production (Nelson 1988).

Therefore, if the gender of the head of the household associated with specific household size and compositional differences, we believe that the magnitude of CSE realised by a particular household is also likely to be influenced by these compositional and size differences based on the gender of the household head. Traditional approaches to poverty measurements that employ a per-capita method do not provide avenues to incorporate the effects of the differences in household size associated with the gender of household headship when estimating poverty measures and comparing poverty levels across male- and female-headed households. The failure to consider the differences in CSE in large and small households often results in an underestimation of the incidence of poverty among the female-headed households, which are typically smaller than those of their male-headed counterparts (Bongaarts 2001). An identification of the variation of CSE based on the gender of the household, therefore, enhances the precise identification of the poor and the most vulnerable groups in a country by enabling a more accurate comparison of poverty across households with different sizes and compositions, emerging from the differences in the gender of the household headship.

Gender of the household headship may, on the other hand, play a significant role in determining the level of CSE, particularly those of food (FCSE) for a given household size. This phenomenon may be associated with gender roles in performing household tasks. Women have been traditionally playing an important role in household food supply compared to men. In conventional societies, adult women appear to impart traditional knowledge and customs about the management of household food supply to younger females than to younger males. Such knowledge may act as an expedient to better manage household food supply and thereby reap higher FCSE in female-headed households, particularly in the absence of a male breadwinner to support the household. These higher FCSE that are likely to be observed in female-headed households may make them better off than their male-headed counterparts, in some aspects.

The most common way to control for the influence of CSE on the measurement and comparison of household poverty is by using equivalence scales. Among various approaches to estimate equivalence scales, the Engel (1857) method, which is based on the idea that two households with identical foodshares are equally well off, has been widely used in the literature. This study uses an adaptation of the Engel (1857) approach to construct equivalence scales to investigate the CSE.

For the empirical analysis, we have chosen Sri Lanka as a case study for two reasons. Firstly, there is a high incidence of female-headed households in Sri Lanka. About one in four households in the country is headed by females, leading Sri Lanka to be the country with the highest proportion of female-headed households in South Asia (De Silva 2005). The political unrest in the south of the country in the early 1980s, and the 30 years long civil war originating in the north and east have resulted in a significant number of households emerging as female-headed households due to widowhood. The international out-migration of the male-head for economic reasons has also partly contributed to an increased proportion

of female-headed households in Sri Lanka (Ruwanpura and Humphries 2004). Secondly, the highest percentage of female-headed households (27 per cent) is seen in the urban sector, where the traditional social networking system is less likely to be present. This situation, coupled with lower income levels, may make urban-living female-headed households more vulnerable than their rural-living counterparts that may receive traditional knowledge on food supply management from their adult relatives. These two conditions may have a significant impact on the overall measures of FCSE adjusted poverty among the male- and female-headed households.

This paper represents an exploratory study undertaken with two objectives: 1) to examine how the gender of the head of the household affects FCSE, in particular, whether female-headed households enjoy greater FCSE; and 2) to explore how these differences in FCSE, based on the gender of the household head, impact on household poverty status. The empirical investigation of this study uses self-reported headship, and hence consists of both *de jure* and *de facto* female-headed households. The remainder of the paper is organised as follows. Section 2 presents a concise literature review on the link between household headship, poverty and CSE. Section 3 discusses the methodology adopted in this study, while Section 4 describes the data used when applying this methodology. Section 5 presents the empirical results and a discussion of their implications, while Section 6 provides some concluding remarks.

## **2 LITERATURE REVIEW**

In the literature on poverty and headship, female-headed households have been regarded to be highly disadvantaged compared to male-headed households. The loss of the male breadwinner, for whatever reason, such as death and divorce of the male breadwinner, forces females to be the head of the household, bearing the dual responsibility of performing household work and childcare demands, and serving as the economic provider of the household. Female household heads, particularly those who are living in rural areas, appear to be in a disadvantageous position in performing these tasks relative to their male counterparts because of lower earnings, limited access to remunerative jobs, and less access to resources such as land, credits, and technology (Buvinić and Gupta 1997). These deprivations adversely affect not only the female head of the household but are also transferred to the next generation through their dependent children.<sup>14</sup>

A considerable number of studies, both in the context of developed and developing countries, have investigated whether households headed by females are poorer than those headed by males. Buvinić and Gupta (1997), for example, reviewed 61 studies, covering countries in Africa, Asia, and Latin America and the Caribbean, on the association between female headship and poverty. They showed that 38 of the 61 studies, based on a variety of poverty measurements (such as total or per-capita household income and expenditure, income per-equivalent adult, and access to services and ownership of land assets) underpin the argument that female-headed households are overrepresented among the poor. On the other hand, Quisumbing et al. (2001) conclude that out of 10 developing countries, only 2 countries (Ghana and Bangladesh) show that female-headed households tend to be poorer than male-headed households.<sup>15</sup> Furthermore, Lampietti and Stalker (2000), reviewed 58 World Bank

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<sup>14</sup> For a detailed discussion on the underlying factors why more females and female-headed households suffer from poverty than male-headed households, refer Chant (2003, 2004, 2011); Buvinić and Gupta (1997).



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Poverty Assessments that were carried out since 1998 and concluded that 43 per cent of female-headed households are poorer than male-headed.

As identified in the literature, the measurement and comparison of welfare and poverty among the households headed by females and males poses an important conceptual challenge that require serious consideration. This challenge is associated with the differences in household size and composition based on the gender of the head of the household. Several studies confirm that the average size of female-headed households is substantially smaller than that of male-headed (Bongaarts 2001, Krishnan and Horrell 2007). This is because female heads rarely live with a spouse while a majority of male heads live with their wives. Female-headed households appear to have household compositions that are substantially different from male-headed ones have. For example, female-headed households tend to have a higher child dependency ratio than male-headed have. That is, they tend to have a higher ratio of non-workers to workers (Kossoudji and Mueller 1983, Buvinić and Gupta 1997, Quisumbing et al. 2001). Female-headed households with extended families or maternal parents tend to show a higher elderly dependency ratio (Chant 2011).

Household size and composition play a vital role in measuring and comparing poverty across households (Lanjouw and Ravallion 1995, Deaton and Paxson 1998). Traditional poverty measures based on per-capita terms do not make allowances for these household size and compositional differences. For example, large households enjoy higher CSE through sharing of household goods, taking advantages of bulk purchases, and increasing returns to scale in home production. Under the traditional approach, the poverty levels in smaller households such as female-headed households might be underestimated (Quisumbing et al. 2001). On the other hand, the per-capita based methods may overestimate poverty in female-headed households with more children whose consumption needs are less than adults. This is because per-capita approaches assign an equal allocation of resources for adults and children, although the latter have lesser needs, particularly food, than those of adults. The literature shows that female-headed households reflect a higher incidence of poverty when the necessary adjustments are made to allow for the impact of possible CSE. For example, Drèze and Srinivasan (1997) and Van de Walle (2013) showed that although no significant differences in poverty status among the male-headed and female-headed were found under per-capita poverty measures, the incidence of poverty among female-headed households disproportionately increased once the possibilities for CSE were allowed for. This was found to be especially true in the case of single widows and widows living with children, who were more inclined to live in small households. All of these studies investigate the aggregate effects of CSE in the measurement of poverty.

However, an interesting aspect to consider here is that how these CSE differs across gender of the household headship at a given household size. That is, for example, whether two-adult female-headed households experience higher CSE than two-adult male-headed household or *vice versa*. This is important because at a given household size, food consumption behaviours may be different depending on the gender of the head of the household. Such an investigation of CSE in relation to the gender of the head of the household has been received a minimal attention in the literature and therefore, no direct evidence available in the existing literature. However, some evidence on the possible reason for female's to achieve higher FCSE can be drawn from the literature on gender roles in performing household tasks and gender roles in enhancing food security.

Traditionally, women have been responsible in household activities; mainly in performing household food supply related tasks than men (Greenstein 2000). In particular, women have

been playing a vital role in food processing, preparation and storing and also passing on this knowledge to the next generation, especially to daughters (Van der Lippe and Siegers 1994). These traditional knowledge include preserving vegetables, fruits and milk, in times of abundance, for the use during scarce time through various indigenous food preservation methods such as drying or fermentation. The use of wild food such as fruits, nuts and leaves to support household food supply is also common in traditional societies. Such food provides economical and nutritious food for the family throughout the year; hence appears to play a major role in food security, particularly in rural societies (Ibnouf 2012, Kalansooriya and Chandrakumara 2014). Studies have also found that poorer rural female-headed households provide more nutritional food for their children than those headed by men (Kennedy and Peters, 1992). One possible reason for this may be that due to traditional gender norms, women may have inherited more knowledge on indigenous food processing and preserving methods and thereby may better manage household food supply than men do. Furthermore, rural women may demonstrate greater indigenous knowledge about food processing and preserving than the urban women due to the close social networking system on these practices in the rural areas. This implies that women, particularly those who are in the rural areas are more likely to utilise available resources more wisely and thereby improve the nutritional status of the family members (Kennedy and Peters, 1992; Kalansooriya and Chandrakumara, 2014). This, in turn, is expected to deliver greater FCSE among these female-headed households. On the other hand, women, particularly those in urban areas, with poor social networking system on traditional practices, and men, in general, who lack such knowledge about traditional food management skills may not be able to reap such benefits. The following section presents the empirical methodology adopted to investigate whether female-headed households, particularly those who are located in rural areas, enjoy higher FCSE and to investigate the overall effect of such FCSE, based on the gender of the head of the household, on poverty measures.

### 3 METHODOLOGY

#### 3.1 Estimating Engel curves and equivalence scales

As noted in above, this study uses Engel equivalence scales approach to analyse the differences in CSE based on the gender of the household headship. This section provides a brief description of the estimation procedure of Engel equivalence scales.<sup>15</sup> The estimation of Engel equivalence scales involves two steps. The first step involves estimation of the Engel curves. As this study focuses on FCSE, the Engel curve for food, taking the expenditure share on food and beverages as the dependent variable, is estimated. The specification of the Engel curve, with two demographic characteristics (adults and children), to estimate income-dependent equivalence scales, is as follows:

$$(1) \quad w_f = \beta_0 + \beta_1 \ln \frac{x}{n} + \beta_2 \left( \ln \frac{x}{n} \right)^2 + \gamma_1 n_a + \gamma_2 n_c + \gamma_3 n_a n_c$$

where  $w_f$  refers to expenditure share on food,  $n$  to household size,  $n_a$  to number of adults and  $n_c$  to number of children in the household. The variable  $x$  is the household expenditure,  $\ln \frac{x}{n}$  is the logarithm of per-capita expenditure (PCE) and  $\left( \ln \frac{x}{n} \right)^2$  is the square of the logarithm of PCE. Following Deaton and Muellbauer (1986) we use a simple logarithmic

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<sup>15</sup> For a detailed description on the estimation of Engel equivalence scales using Sri Lankan data refer Jayasinghe et al. (2016)

transformation of per-capita income (PCI) for two reasons. Firstly, the problem of heteroskedasticity commonly encountered with cross-sectional data can be reduced via such a transformation. Secondly, this form of transformation reduces non-linearity in the data. In this study, we use PCE as a proxy for PCI due to the enhanced reliability of expenditure data.<sup>16</sup> Here, in this case, another variable has been added to the model (i.e.  $n_a n_c$ ), which is an interaction term of  $n_a$  and  $n_c$ , that estimates the joint effect of adults and children on foodshare. This is because in households which have both adults and children, their joint effect on the expenditure share on food may be different to the individual effect of adults and children on the expenditure share on food. Accordingly,  $\beta_0, \beta_1, \beta_2, \gamma_1, \gamma_2$  and  $\gamma_3$  are the parameters to be estimated.

In the second step, the estimated coefficients of the quadratic Engel curves are used to construct income-dependent equivalence scales. Following Deaton (1981) and Lelli (2005), an analytical solution can be derived using a basic mathematical approach to solve quadratic equations, as follows. A two-adult and no-children household, (2,0) is taken as the reference household, hence  $n^r = 2$ .

Consider the budget share on food in household  $h$  is

$$(2) \quad w_f^h = \beta_0 + \beta_1 \ln\left(\frac{x^h}{n^h}\right) + \beta_2 \left(\ln\frac{x^h}{n^h}\right)^2 + \gamma_1 n_a + \gamma_2 n_c + \gamma_3 n_a n_c$$

and the budget share on food in the reference household  $r$  is

$$(3) \quad w_f^r = \beta_0 + \beta_1 \ln\left(\frac{x^r}{n^r}\right) + \beta_2 \left(\ln\frac{x^r}{n^r}\right)^2 + 2\gamma_1$$

Based on the Engel assumption that  $w^h = w^r$ , equation (2) and (3) can be used to derive a quadratic equation as follows:

$$(4) \quad x^h = n^h \exp\left(\frac{-\beta_1 \pm \sqrt{\beta_1^2 - 4\beta_2 C}}{2\beta_2}\right)$$

where  $C = \gamma_1 n_a + \gamma_2 n_c + \gamma_3 n_a n_c - \beta_2 \left(\ln\frac{x^r}{2}\right)^2 - \beta_1 \ln\left(\frac{x^r}{2}\right) - 2\gamma_1$

Equation (4) gives two roots for  $x^h$  for any given  $n^h, n_a^h$  and  $n_c^h$ . From the two possible solutions for  $x^h$ , the larger value of  $x^h$  corresponds to the relevant part (or downward sloping side) of the Engel curve. An equivalence scale is the ratio between  $x^h$  and  $x^r$ , such that dividing  $x^h$  by the initially selected  $x^r$  yields the equivalence scale. Note that this ratio between  $x^h$  and  $x^r$  depends not only on  $n^h, n_a^h$  and  $n_c^h$ , but also on the income of the reference household,  $x^r$ .<sup>17</sup> This is a natural result of the quadratic specification, with its implication that the costs imposed by household size are not proportionately the same at all levels of incomes.

We estimate the Engel curve specification in equation (1) for female-headed and male-headed households separately, at the national level, with the view of testing for the differences in food consumption scale economies associated with the gender of the household head. We

<sup>16</sup> As noted by Summers (1959), the Engel curve, when modelled on household expenditure, may suffer from endogeneity. To allow for possible effects of endogeneity, following Banks et al. (1997) we used log per-capita income and its square as instrumental variables for log of per-capita expenditure and its square during the actual estimation.

<sup>17</sup> During the actual estimation, household expenditure of top (richest) and bottom (poorest) expenditure deciles and mean expenditure were considered as  $x^r$  to estimate income-dependent equivalence scales.

also perform bootstrapping with 1000 replicates to estimate standard errors associated with our equivalence scales. In this study, we consider that all of the adults in the households have identical tastes, irrespective of their gender and age.

### 3.2 Estimation of the Percentage of Households Below Poverty Line

The poverty comparisons between male and female headed households are often made based on PCE, ignoring the effects of CSE on poverty measures. Therefore, a valid comparison, to highlight effects of CSE on poverty measures would be, between poverty rates under the per-capita expenditure (PCE) and those under expenditure per adult equivalent (EPEA), which is based on self-estimated equivalence scales. For this analysis, the percentage of households whose PCE and EPEA falls below the official poverty line is obtained. The official poverty line in Sri Lanka for the period of 2009/10 is Rs.3,028 real total expenditure per person (Department of Census and Statistics 2011b).<sup>18</sup> While the PCE is obtained by dividing total household expenditure by household size, the EPEA is obtained by dividing the total household expenditure by the respective equivalence scales for male- and female-headed households, estimated at the mean expenditure. The equivalence scales used in this exercise are estimated using the equation

$$(5) \quad x^h = n^h \exp\left(\frac{-\beta_1 \pm \sqrt{\beta_1^2 - 4\beta_2 C}}{2\beta_2}\right)$$

where  $C = \gamma_1 n_a + \gamma_2 n_c + \gamma_3 n_a n_c - \beta_2 \left(\ln \frac{x^r}{1}\right)^2 - \beta_1 \ln\left(\frac{x^r}{1}\right) - \gamma_1$

This is a slightly modified version of equation (4) presented above, where the two-adult household was the reference household. In this case, however, the one-adult household is taken as the reference household, instead of the two-adult household, and hence  $n^r = 1$ . This way, the equivalence scale in the one-adult household takes the value 1, which allows determination of the additional cost associated with changing household sizes.

## 4 DATA

The analysis in this study is based on the 2009/10 Household Income and Expenditure Survey (HIES) conducted by the Department of Census and Statistics (DCS) in Sri Lanka. The HIES provides data on both food and beverage, and non-food expenditures of households. Expenditure on food and beverages (hereafter referred to as expenditure on food) covers 18 sub-categories.<sup>19</sup> The imputed value of home production for own consumption and freely received food items is also added to expenditure on food where applicable. Expenditure on non-food items covers 10 additional sub-categories<sup>20</sup>. The total expenditure in this study consists of both food and non-food expenditure, excluding the expenditure of alcohol.

<sup>18</sup> The annual average exchange rate of the US\$ was 113 SLR (Central Bank of Sri Lanka 2013).

<sup>19</sup> These categories comprise cereal, prepared food, pulses, vegetables, yams, meat, fish, dried fish, eggs, coconuts, condiments, other foods, milk & milk products, fats & oils, sugar, fruits, confectionery and non-alcoholic beverages (Department of Census and Statistics 2011a).

<sup>20</sup> These categories comprise housing & household services, fuel & lighting, personal care, health care, transport, communication, recreation, education, clothing & footwear and other ad hoc expenditure. Certain non-food expenditure items include some imputed expenditure elements (e.g. the rental value of owner-occupied housing and the value of free housing, particularly in the estate sector) (Department of Census and Statistics 2011a).

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Additionally, we have adjusted for possible district level price variability of food expenditures using a spatial price index (SPI) for 2009/10 calculated by the DCS<sup>21</sup>, and therefore, the dependence of equivalence scales on prices will henceforth be dropped (Department of Census and Statistics 2011b).

**Tab.1** - Summary statistics for households with male and female

	Male headed	Female headed
<b>Panel A: demographic characteristics</b>		
<b>Number of observations</b>	14,402	4,417
<b>Age of head</b>	49.51	53.76
<b>Household size</b>	4.41	3.99
<b>Dependency ratio*</b>	0.38	0.43
<b>Share of 65+ in the households</b>	0.11	0.21
<b>Share of 0-17 in the households</b>	0.26	0.22
<b>Panel B: household consumption</b>		
<b>Food expenditure share</b>	0.54	0.54
<b>Total household expenditure</b>	28,150	24,956
<b>Per-capita total expenditure</b>	6,953	7,064
<b>Monthly Per adult equivalent total expenditure</b>	9,324	9,578

*Note: The dependency ratio is the ratio between dependents (children aged 0-17, and the elderly aged 65+) and the number of people of working age (aged 18-64).*

*Household expenditure data is given in Sri Lankan Rupees.*

*Source: Author's calculations based on Department of Census and Statistics (2011a)*

Table 1 provides summary statistics for households with male and female heads, at the national level and at the sectoral level. Panel A presents demographic characteristics of the households while, Panel B provides statistics on household consumption. At the national level, about 23 per cent of the households are female-headed, while the highest percentage of female heads (27 per cent) live in the urban sector. Female heads in our dataset are on average older than male heads. The size of female-headed households is smaller than that of male-headed with relatively higher dependency ratio. In this study, we define the dependency ratio as the ratio of dependents (children aged 0-17, and the elderly aged 65+) to the number of people of working age (between 18-64). It appears to have higher old-age dependents in female-headed households compared to those of their male counterparts. Panel B of Table 1 show the food expenditure shares of female-headed households are slightly higher than those of their male counterparts, at the sectoral level, while the shares are identical at the national level. In terms of per-capita and per adult equivalent total expenditure, there are no notable and systematic differences based on the gender of the household head. Nevertheless, the total household expenditure in female-headed households are consistently smaller than those of male-headed households.

<sup>21</sup> Ideally, non-food expenditures also should be adjusted for district level price differences. However, due to unavailability of district or sector specific price indexes for non-food expenditures, we use the national average price for non-food items in this study.

## 5 RESULTS AND DISCUSSIONS

### 5.1 Food consumption economies of scale

Table 2 presents the parameter estimates of the Engel curve for food, for male and female-headed households, at the national. The R-squared values of 50 and 46 per cent indicate that the estimated food Engel curves fit reasonably well to our cross-sectional Sri Lankan data. According to Engel's law, which suggests that the expenditure share on food declines with household income, we expected the  $\beta_1$  and  $\beta_2$  coefficients, in our regression estimates, to be negative. However, the  $\beta_1$  coefficients the estimated models are positive and are accompanied by negative  $\beta_2$  coefficient. This indicates that the foodshare increases with PCI at a decreasing rate. The negative and significant coefficients relating to the number of adults ( $\gamma_1$ ) and number of children ( $\gamma_2$ ) implies that when the household size increases by one adult (or child), the foodshare declines. This inverse relationship is in accordance with our expectations as this implies that due to food consumption scale economies, an additional adult (or child) adds less than double to food expenditure. Due to higher food needs of adults than those of children, the decline in foodshare at the presence of an additional adult is smaller than that of an additional child. The consistently smaller  $\gamma_1$  coefficient than that of  $\gamma_2$  reflects these differences in consumption needs of the adults and children. The interaction term between the number of adults and the number of children ( $\gamma_3$ ) denotes a negative joint impact on the food expenditure share. This observation is also in line with our expectations, due to food consumption scale economies.

Panel A and B of Table 3 reports the marginal equivalence scales for male and female-headed households at the national level. The equivalence scales measure the cost of an additional household member (in this study, an adult), taking the possibility to share goods within the household into consideration, the higher equivalence scales the lower the economies of scale in consumption. The marginal equivalence scale refers to the change in the cost of remaining at the same standard of living, measured in terms of food consumption, when household size increases by one adult. In the household size column, the left hand side and right hand side figures indicate the number of adults and children, respectively. In Panel A, the marginal equivalence scale of 0.30 for 2,0-3,0 household type in 1<sup>st</sup> income quartile implies when household size increases from 2,0-3,0, the 3,0 household requires 30 per cent additional income to remain in the same standard of living they enjoyed when they had only two adults (2,0) in the household.

The estimated marginal equivalence scales show that those for female-headed households are consistently smaller than those of the male-headed households. These results indicate that the cost of an additional adult, in terms of expenditure on food, in female-headed household is smaller than that of their male-headed counterparts, suggesting that, at a given household size, female-headed households achieve greater FCSE. This observation is in line with the existing literature, as discussed in Section 2, that female household heads possess better household food management skills received via learning-by doing through their mothers.

**Tab.2** - Regression estimates for Engel curves for food by gender of the head of the household

	<b>Male-headed</b>	<b>Female-headed</b>
$(\beta_0)$ Constant	0.499 (0.004)	0.591 (0.035)
$(\beta_1)$ $\ln \frac{x}{n}$	0.247 (0.000)	0.214 (0.001)
$(\beta_2)$ $(\ln \frac{x}{n})^2$	-0.026 (0.000)	-0.024 (0.000)
$(\gamma_1)$ $n_a$	-0.0314 (0.000)	-0.035 (0.000)
$(\gamma_2)$ $n_c$	-0.037 (0.000)	-0.043 (0.000)
$(\gamma_3)$ $n_a n_c$	0.007 (0.000)	0.008 (0.000)
<b>Number of observations</b>	14,402	4,417
<b>Root MSE</b>	0.118	0.124
<b>R-squared</b>	0.499	0.460

*Note: Dependent variable is the expenditure share on food for male- and female-headed households, respectively. p-values are given in parenthesis.*

*Source: Author's compilation based on Department of Census and Statistics (2011a)*

A range of factors could explain the differences in equivalence scales and the resulting FCSE in male-headed and female-headed households. These factors are linked with gender of the household headship-based differences in household characteristics and food consumption behaviours. One possible reason for higher FCSE enjoyed by female-headed households is the lower income levels associated with such households compared to male-headed households. This observation is in line with the literature that reveal that lower household income is associated with higher consumption economies of scale (Jayasinghe et al. 2016).

Another important reason for higher FCSE among female-headed households, as observed in this study, may be linked to gender-based social and cultural norms that are embedded in traditional societies. In many societies women play an important role in household food supply as food producers, processors, preparers, and food providers for the family (Kennedy and Peters 1992, Greenstein 2000, Quisumbing et al. 2001, Ibnouf 2012). The cultural setting in Sri Lanka has also been constructed in such a way that women play the key role in domestic food supply. As such, they have been traditionally responsible in ensuring the availability and access to food, and the utilisation of available food wisely. Usually, mothers impart this traditional knowledge about effective management of food supply on to their daughters. While farming and food production have been the main responsibility of men, with some assistance provided by women, the availability of food for the consumption of family members has been mainly regarded as women's work. A study conducted in Sri Lanka by Kalansooriya and Chandrakumara (2014) revealed that the majority of the women in the sample used some kind of food preserving method to ensure the availability of food during scarce times. Women usually stockpile additional food during the peak availability season and when they are cheaper, and preserve them in the form of drying vegetables, yams, and fish, and preparing pickles and chutney for later use. Adult females in the family have traditionally passed on such knowledge to young female members. Results of that study also

showed that about 84 per cent of the female household heads in the sample, in rural areas, paid greater attention to preparing every meal at home for their family members to avoid the consumption of food prepared outside. Such practices among the female household heads, particularly in the face of lower income levels and fewer or no support from a male partner, may contribute towards the higher FCSE in households headed by females.

**Tab.3** - Marginal equivalence scales for food

<b>Marginal Equivalence Scales for Food</b>			
<b>Household size</b>	<b>Panel A: male-headed Households</b>		
	1st quartile	Sample mean	3rd quartile
	Rs.16, 120	Rs.28, 150	Rs.34, 651
<b>1,0-2,0</b>	0.43 (0.005)	0.43 (0.004)	0.44 (0.001)
<b>2,0-3,0</b>	0.3 (0.003)	0.32 (0.001)	0.33 (0.002)
<b>3,0-4,0</b>	0.19 (0.020)	0.23 (0.004)	0.24 (0.003)
<b>4,0-5,0</b>	0.11 (0.010)	0.15 (0.004)	0.16 (0.004)
	<b>Panel B: female-headed households</b>		
	1st quartile	Sample mean	3rd quartile
	Rs.13, 606	Rs.24, 955	Rs. 30, 875
<b>1,0-2,0</b>	0.42 (0.010)	0.41 (0.020)	0.42 (0.003)
<b>2,0-3,0</b>	0.29 (0.004)	0.27 (0.003)	0.29 (0.010)
<b>3,0-4,0</b>	0.18 (0.004)	0.15 (0.002)	0.18 (0.001)
<b>4,0-5,0</b>	0.09 (0.011)	0.05 (0.005)	0.1 (0.010)

*Note: Bootstrapped standard errors are given in parenthesis.*

*Source: Author's compilation based on Department of Census and Statistics (2011a)*

## 5.2 Poverty Estimates by Gender of the Head of the Household

Table 5 provides the percentage of poor households, separately for male and female-headed households, under the conventional per-capita expenditure (PCE) approach and the alternative expenditure per equivalent adult (EPEA) approach. This exercise allows an examination of the effects of FCSE on poverty associated with household headship in the context of Sri Lanka



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**Tab.5** - Percentage of poor households under per-capita income and expenditure per equivalent adult, by gender of the head of the household

	Male-headed			Female-headed		
	PCE	EPEA	Change the percentage of poor households	PCE	EPEA	Change the percentage of poor households
National	12.48 (0.003)	3.08 (0.002)	9.4	12.63 (0.006)	3.05 (0.003)	9.58
Urban	4.38 (0.004)	1.08 (0.004)	3.3	5.97 (0.008)	1.52 (0.005)	4.45
Rural	13.17 (0.004)	3.49 (0.002)	9.68	12.8 (0.007)	2.63 (0.003)	10.17
Estate	22.88 (0.015)	6.91 (0.008)	15.97	30.89 (0.030)	8.43 (0.018)	22.46

*Note: Standard errors are given in parenthesis. The percentage of poor households was calculated using the national poverty line set of Rs. 3,028.*

*Source: Author's compilation based on Department of Census and Statistics (2011a)*

## 6 CONCLUSIONS

This study investigated whether the gender of the head of the household affects the level of FCSE achieved by households and examined the effect of such differences in FCSE on poverty measurements. For that purpose, this study considered a broader definition of female-headed households. The results indicated that the female-headship is associated with higher FCSE at the national.

One possible reason for higher FCSE observed among the female-headed households is that their income levels are lower than their male-headed counterparts. In addition to that, women's knowledge on indigenous food preparation and preservation methods, usually received from their mothers, may allow them an effective utilisation of food resources. This may play a significant role in lowering the cost of food consumption in female-headed households, particularly those that are in the rural areas. The results the poverty levels reveal that poverty head count ratio in both male-headed and female-headed households decline after necessary adjustments for FCSE are allowed for. By incorporating the concept of CSE, this study provides some interesting insights into the widespread discussion on household headship and poverty, taken from a different perspective.

As a future research direction, it would also be useful to explore the impact of different categories of female headship (e.g. widowed, divorced or temporally separated from the out-migrated male partner) on FCSE and their poverty status. Such an analysis could provide insights into sectoral and income level differences as well as to the types of social networks that could be facilitated by public authorities to better address the poverty being experienced by many female-headed households.

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## Exploring the Relationship between Tourism and Economic Growth in Small Island Economies: A Study of Fiji

*Nikeel Kumar, Ronald R. Kumar, Arvind Patel, Peter Stauverman*

### ABSTRACT

*This study examines the effect of tourism, measured by visitor arrivals) on the economic growth of Fiji, a small island economy, over the period 1975 to 2015. We use a neoclassical framework and regression analysis to examine the short-run and the long-run effects of tourism whilst accounting for structural breaks. We confirm the presence of a long-run association using the two-step procedure of Engle and Granger (1987) and the ARDL bounds test of Pesaran, Shin and Smith (2001). From the long-run results, we note that a 1% increase in visitor arrivals contribute about 0.22% to the GDP per capita. The short run elasticity is noted to be 0.19%. The study finds evidence of a unidirectional causality from economic growth to tourism, and mutually reinforcing effect between capital investment and tourism. Thus, we can expect greater impact of tourism on the economic growth through tourism related investment activities such as improvements in airports, roads, transportation, financial sector and telecommunications, and parks and beaches.*

**Keywords:** *International visitor arrivals, economic growth, Autoregressive Distributed Lag model, causality; Fiji.*

**JEL Classification:** F43, Z32, O56.

### 1 INTRODUCTION

Many developing countries rely on tourism as a key driver of socio-economic progress. The sector is pivotal in job creation, generating export revenue, triggering infrastructure development and other positive externalities. Tourism impacts a number of sectors and is an important link for many sectors progress. According to the UNWTO 2016 tourism highlights, (World Tourism Organization, 2016) international tourism receipts have grown from US\$495 billion in 2000 to US\$1,260 billion worldwide in 2015. Similarly, the visitor arrivals have grown from 674 million in 2000 to 1,186 million in 2015. Asia and the Pacific contributed 24% of arrivals and 33% of receipts in 2015. Oceania witnessed the largest growth in arrivals (7%), followed by the Americas (6%) and Europe (5%) in 2015. Among the Pacific Island destinations,

The contribution of tourism to improving GDP and labor productivity has been empirically examined in the tourism-growth literature across countries and regions (Lanza & Pigliaru, 2000). Most of the studies confirm positive association (Durberry (2004) for Mauritius, Lee and Chang (2008) for Non-OECD countries and Kumar and Kumar (2012) for Fiji). The tourism-led growth hypothesis is confirmed for Spain (Balaguer & Cantavella-Jorda, 2002), Mexico (Brida et al., 2008), and OECD countries (Lee & Chang, 2008). However, there are studies which confirm that growth is necessary for tourism to grow (see for example Kumar and Kumar (2012) for Fiji), tourism and growth are mutually reinforcing (for example Kim et

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al. (2006) for Taiwan) or tourism and growth evolve independent of each other (c.f. Kumar et al. (2015) for Malaysia).

Interestingly, while the general consensus on the effect of tourism on the economic growth is on the affirmative, the studies differ in terms of the causality and magnitude effects (elasticity) because of the sample size, type of measure used (tourism receipts, visitor arrivals, or some form of index), method of analysis, inclusion of structural breaks, and accounting for other sectors such as financial development, energy, information and communications technology, remittances, among other things (Durberry, 2004; Kumar & Kumar, 2012; Tang & Tan, 2015). Also, the studies using panel data focus on a number of countries usually grouped into regions or some form of classifications such as top ten tourist destinations etc. (Shahzad et al., 2017). These types of studies give a broad indication of the impact of tourism on economic activities. For instance, Fayissa et al. (2008) show that the growth effects of tourism 0.03 per cent for 42 African countries. Lee and Chang (2008) investigate OECD and Non-OECD countries and find that the elasticity of output with respect to tourism is 0.36 and 0.50 respectively. Narayan et al. (2010) consider for Pacific Island countries, namely Fiji, Tonga Solomon Islands and Papua New Guinea and note the contribution of tourism to the long-run economic growth is around 0.72 per cent. However, the panel analysis does not control for structural breaks, capital and labour stock, and heterogeneity among the countries; and it was noted that the contribution of tourism was highest for PNG (0.92%), followed by Fiji (0.79%), Tonga (0.63%) and Solomon Islands (0.55%). The study also finds support for growth-led tourism hypothesis for the four countries, however, in the long-run, tourism causes growth. In terms of country specific studies, the focus is on magnitude and causality effects with relatively more precise discussion on related policy for tourism development (Balaguer & Cantavella-Jorda, 2002; Cortez-Jimenez & Pulina 2006; Nowak et al., 2007; Kumar et al., 2015), Tang & Tan, 2015a; and Tang & Tan, 2015b; Kumar et al., 2015).

A summary of the reviewed literature is presented in Table 1, below. Some key points emerge from these studies. In most of the studies, tourism receipts are used to measure tourism development. Moreover, quite a number of studies do not incorporate the role of capital stock when estimating the impact of tourism on the economic growth, the latter measured in terms of GDP per capita or worker. Interestingly, recent studies tend to incorporate the role of structural breaks to better account the effects of tourism on the economic growth. Also, tourism-growth nexus is considered in conjunction with other factors such as exchange rates (Stauvermann, et al., 2017), remittances (Kumar, 2014), information and communication technology (Kumar and Kumar, 2012), foreign direct investment (Endo, 2006; Khoshnevis, Homa & Soheilzad, 2017), carbon emission (Lee & Brahmašreṇe, 2013), trade openness and financial development (Shahbaz, et al., 2017). The use of additional variables indicate the different channels through which tourism influence economic activities in a particular country. Overall, there is a general agreement that tourism is an important driver of economic growth. In terms of causality, the results are either unidirectional where either tourism granger cause growth (tourism-led growth) or growth causes tourism (growth-led tourism); or bidirectional, where both tourism and economic growth are mutually reinforcing. However, of much debate and focus has been on the magnitude effects of tourism, that is, the elasticity of output with respect to tourism. There is less attention to this aspect with greater focus on causality dynamics. For policy and forecasting purposes, it is important that the magnitude effects are captured properly, and much of which will depend on accounting for structural breaks, incorporating additional key sectors of the economy

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based on country characteristics and reliable data. Against this backdrop, in this study, we examine relationship and contribution of tourism using Fiji as a reference study.

Notably, tourism is the key sector for economic development in Fiji. The sector is the major provider of employment and income in the country. Fiji is also considered an attractive tourism destination. Among the Pacific region, Fiji ranked third for growth in arrivals (9%) and was only surpassed by Palau (15%) and Samoa (11%). Tourism earnings was about FJ\$1,405 and FJ\$1,560 million and accounted for 23% and 25% of real income in 2014 and 2015 respectively.<sup>22</sup> Also, Fiji is considered relatively well developed in terms of infrastructure and financial services, and among the top tourist destinations.

Figure 1 (above) shows a fairly stable tourism receipts averaging around 24% GDP. Moreover, according to the Fiji Bureau of Statistics (2017), the top three dominating source markets in terms of total arrivals to Fiji are Australia (41%), New Zealand (18%) and the USA (11%). The major purpose of visit is vacation (76%), followed by visiting family/friends (7%) and business (3%) (Table 1). Fiji's tourism industry has evolved considerably in the past 30 years with past and present Government's paying attention to support and promote the sector. The impact of tourism on Fiji's economy has been unprecedented over the past two decades, and with the decline in agriculture, the sector has gained even greater prominence for development.

Similar trends are noted for visitor arrivals and real GDP of Fiji (Figure 2, below). We note that visitor arrivals have grown from 294,070 in 2000 to 792,320 in 2016. However, there appears to be a slight drop in visitor arrivals during 1987 and 2000, which characterize the two periods of political crisis in the country. Interestingly, we note a rebound in visitor arrivals following the two periods.

The current study examines the impact of tourism to real GDP for the Fiji, a small island state in the Pacific. It is important to note that Fiji heavily depend on tourism for employment, foreign exchange and income. Interestingly, the visitor arrivals have been resilient and consistently growing in spite of a few episodes of political instability and natural disasters, thus making Fiji a popular tourist destination (Table 2). In addition to scholastic interest, the study aims to inform and facilitate policy dialogues viz. development.

In what follows, in Section 2, we describe the model and methods and data is discussed in Section 3. The results follow in Section 4, and in Section 5, we have the conclusion and policy suggestions.

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<sup>22</sup> 1 \$FJ is approximately \$0.50US

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**Tab.1** - Literature review summary

Authors and year	Country	Period	Explanatory Variables	LR elasticity	Causality
Balaguer & Cantavella-Jorda (2002)	Spain	1975Q1-1997Q1	Tourism receipts, exchange rates	0.30	$T \rightarrow Y$
Dritsakis (2004)	Greece	1960Q1-2000Q4	Tourism receipts, exchange rates	0.31	$T \leftrightarrow Y$
Durbarry (2004)	Mauritius	1952-1999	Physical & human capital stock, Labour stock, Tourism receipts	0.77	$T \leftrightarrow Y$
Demiroz & Ongan (2005)	Turkey	1980-2004	Tourism receipts, exchange rates	-	$T \leftrightarrow Y$
Gunduz and Hatemi (2005)	Turkey	1963-2002	Tourism receipts, exchange rates	-	$T \leftrightarrow Y$
Oh (2005)	South Korea	1956-2003	Tourism receipts	-	$Y \rightarrow T$
Cortez-Jimenez & Pulina (2006)	Spain	1964-2000	Tourism receipts, capital and human capital stock	1.07	$T \leftrightarrow Y$
Cortez-Jimenez & Pulina (2006)	Italy	1954-2000	Tourism receipts, capital and human capital stock	0.08	$T \leftrightarrow Y$
Kim et al (2006)	Taiwan	1971Q1-2003Q1	Tourism receipts	0.02	$T \leftrightarrow Y$
Kim et al (2006)	Taiwan	1956-2002	Tourism receipts	0.10	$T \leftrightarrow Y$
Nowak et al (2007)	Spain	1960-2003	Tourism receipts, machine imports	0.06	$T \leftrightarrow Y$
Fayissa et al (2008)	42 African countries	1995-2004	Tourism receipts, investment, economic freedom index, human capital, FDI	0.03	$T \rightarrow Y$
Sanchez, Brida & Risso (2008)	Mexico	1980Q1-2007Q2	Tourism receipts, exchange rates	0.69	$T \rightarrow Y$
Proenca and Soukiazis (2008)	Portugal	1993-2001	Tourism receipts	0.01	$T \rightarrow Y$
Lee and Chang (2008)	OECD	1990-2002	Tourism receipts	0.36	$T \rightarrow Y$
	Non OECD	1990-2002	Tourism receipts	0.50	$T \leftrightarrow Y$
Lee & Chien (2008)	Taiwan	1959-2003	Visitor arrivals, exchange rates	4.66	$T \leftrightarrow Y$
Brida et al (2009)	Colombia	1987Q1-2001Q1	Visitor arrivals, exchange rates	0.51	$T \rightarrow Y$
Narayan et al. (2010)	Fiji, Solomon Islands, PNG, Tonga	1988-2004	Tourism receipts	0.72	$T \rightarrow Y$
Lorde, Francis & Drakes (2011)	Barbados	1974Q1-2004Q4	Visitor arrivals, exchange rates	0.61	$T \rightarrow Y$
Seetanah (2011)	19 island economies	1990-2007	Tourism receipts	0.03-0.14	$T \leftrightarrow Y$
Kumar & Kumar (2012)	Fiji	1980-2008	Capital & labour stock, ICT, Tourism receipts	0.23	$T \leftrightarrow Y$
Massidda and Mattana (2013)	Italy	1987-2009	Visitor arrivals, trade	0.45	$T \leftrightarrow Y$
Kumar (2014a)	Vietnam	1980-2010	Capital & labour stock, Tourism receipts	0.03	$T \leftrightarrow Y$
Kumar (2014b)	Kenya	1978-2010	Capital & labour stock, Tourism receipts	0.08	$Y \leftrightarrow T$
Kumar et al. (2016)	Cook Islands	2009Q1-2014Q2	Visitor arrivals	0.83	$T \leftrightarrow Y$



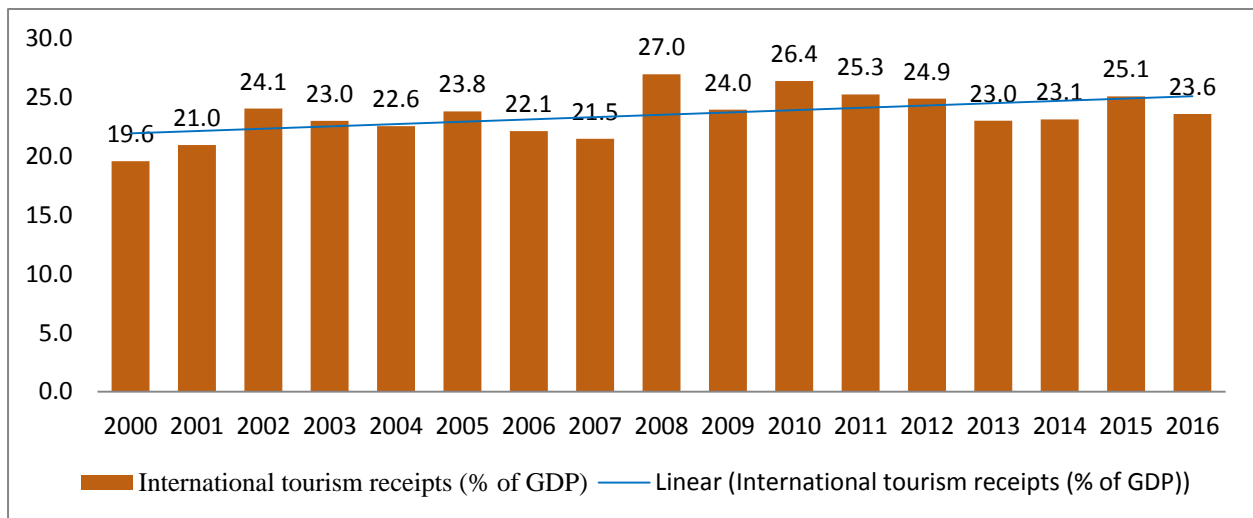
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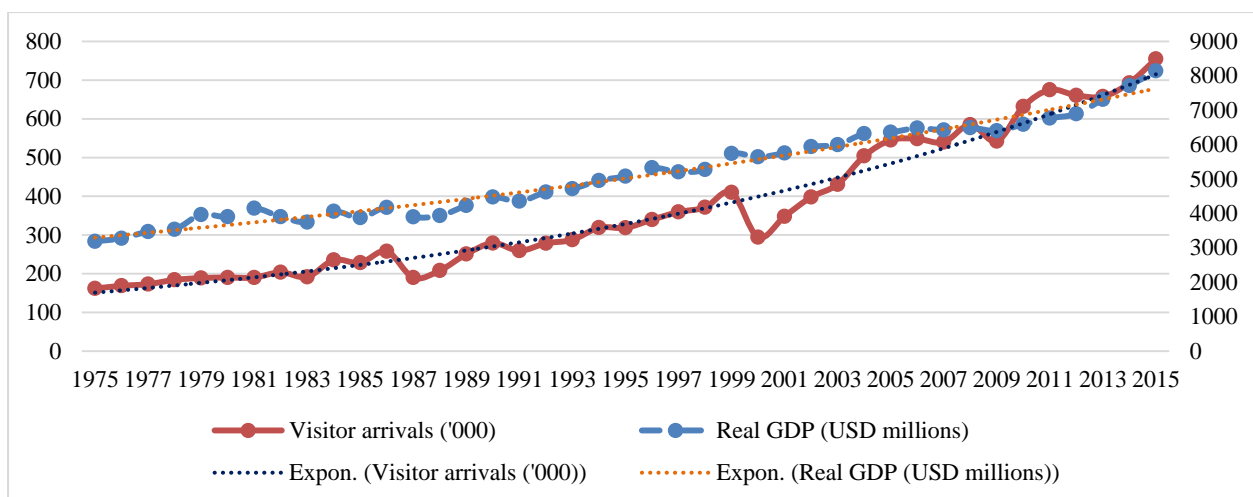
Tang & Tan (2015)	Malaysia	1975-2011	Tourism receipts, political stability	0.14	$T \rightarrow Y$
Stauvermann et al. (2016)	Sri-Lanka	1980-2014	Capital & labour stock, Tourism receipts and exchange rates	0.06	$T \rightarrow Y$

Note: VECM – Vector error correction model; ARDL – Autoregressive distributed lags bounds approach.  $T \rightarrow Y$ : Causality from Tourism to GDP;  $T \leftrightarrow Y$ : bidirectional causality in between tourism and GDP. LR refers to long run.



**Fig.1** - Tourism Receipts (% of GDP)

Source: World Bank's WDI database (2000-2015), Fiji Bureau of Statistics (2016) and authors' calculations.



**Fig.2** - Visitor Arrival & Real GDP - Fiji

Source: Fiji Bureau of Statistics (2016)

**Tab.2 - Key source markets for Fiji: Visitor arrivals (1975-2016)**

	1975-2010	2011	2012	2013	2014	2015	2016
<i>Australia</i>	<i>114,762</i>	<i>344,829</i>	<i>337,291</i>	<i>340,151</i>	<i>349,217</i>	<i>367,273</i>	<i>360,370</i>
<i>New Zealand</i>	<i>54,432</i>	<i>103,181</i>	<i>106,122</i>	<i>108,239</i>	<i>123,968</i>	<i>138,537</i>	<i>163,836</i>
<i>USA</i>	<i>44,486</i>	<i>55,086</i>	<i>56,478</i>	<i>55,385</i>	<i>61,924</i>	<i>67,831</i>	<i>69,628</i>
Canada	13,713	14,090	13,426	13,052	12,457	11,709	11,780
UK	21,158	24,054	17,076	17,209	16,782	16,716	16,712
Continental							
Europe	20,344	32,354	29,327	28,905	30,585	31,195	31,916
Japan	21,999	9,616	7,069	7,314	5,888	6,092	6,274
PICs	19,045	38,823	38,886	39,450	39,298	48,570	49,741
<b>TOTAL</b>	<b>322,520</b>	<b>675,050</b>	<b>660,590</b>	<b>657,707</b>	<b>692,630</b>	<b>754,835</b>	<b>792,320</b>

Source: Fiji Bureau of Statistics (2016). *Italicized rows indicate top three source markets for Fiji.*

## 2. MODEL & METHOD

### 2.1 Model, variable definitions & hypotheses

We use an augmented version of the Cobb-Douglas production function which is similar to the Solow (1956) growth methodology and is used by Rao (2010) and Sturm (1998). The model is given as:

$$Y_t = A_t K_t^\alpha L_t^\beta \quad (1)$$

Where  $A_t$  is the stock of technology and knowledge,  $K_t$  is the capital stock and  $L_t$  is the labour stock,  $\alpha > 0$  and  $\beta > 0$  are the capital and labour shares. Assuming constant returns to scale ( $\alpha + \beta = 1$ ) and dividing (1) by  $L_t$ , we arrive at:

$$y_t = A_t k_t^\alpha \quad (2)$$

The model assumes the evolution of technology given by:

$$\Phi_t = A_0 e^{gt} \quad (3)$$

Where  $A_0$  is the initial stock of technology and  $t$  is time trend. We introduce visitor arrivals (% of population) as shift variables (Rao, 2010).

$$\Psi_t = f(Vis) = vis_t^\vartheta \quad (4)$$

Where  $\vartheta > 0$  represents the elasticity of tourism, hence:

$$A_t = \Phi_t \Psi_t = A_0 e^{gt} vis_t^\vartheta \quad (5)$$

Finally, including this information in (2), we arrive at:

$$y_t = A_0 e^{gt} vis_t^\vartheta k_t^\alpha \quad (6)$$

Taking the log of (6), we arrive at the basic model for estimation as:

$$\ln y_t = \varphi + \alpha \ln k_t + \vartheta \ln vis_t + B_t + u_t \quad (7)$$

Where  $y_t$  is real GDP per worker,  $k_t$  is real capital stock per worker,  $vis_t$  is international visitor arrivals (% of Fiji's total population),  $B_t$  is the structural-break dummies, and  $u_t$  is the error term,  $\varphi$  is the constant. Total population is used as a measure of labour force in this paper due to the importance of the informal sector in Fiji (Chen & Singh, 2014). Also, we account for the structural break using formal break tests.

## 2.2 Methods

### 2.2.1 Unit root & cointegration

The order of integration of  $\ln y_t$ ,  $\ln k_t$  and  $\ln vis_t$  and cointegration in  $\hat{u}_t$  (estimated from equation 1) will be confirmed using the augmented Dickey-Fuller (ADF) unit root test. This test estimates equation (2):

$$\Delta Z_t = \phi_0 + \phi_1 T + \delta Z_{t-1} + \sum_{i=1}^m \phi_{2i} \Delta Z_{t-i} + v_t \quad (8)$$

where  $Z_t$  is either  $\ln y_t$ ,  $\ln k_t$ ,  $\ln vis_t$ , or  $\hat{u}_t$ ,  $\phi_0$  is the drift,  $T$  is the time trend and  $v_t$  is the error term. Inclusion of  $\phi_0$  or  $T$  is based on time-plot inspection of the series. First-differenced lagged terms are included to render  $v_t$  serially-uncorrelated. Non-rejection of the null hypothesis of the existence of a unit root implies that  $Z_t$  is non-stationary. Most economic time series are stationary in first differences, that is,  $I(1)$ .

If  $\ln y_t$ ,  $\ln k_t$  and  $\ln vis_t$  are  $I(1)$ , cointegration could exist and can be confirmed using the Engle & Granger (1987) two step procedure. Specifically, the residuals  $\hat{u}_t$  in equation 1 should be level stationary or  $I(0)$ .<sup>23</sup>

### 2.2.2. Error correction model (ECM)

Next, equation (3) is the error correction or short run disequilibrium model. The one period lagged cointegrating residuals ( $ECT_{t-1}$ ), is included to associate the short run behaviour of  $y_t$  to its long run value through a series of partial adjustments (mean reversion) once cointegration is confirmed.

$$\Delta \ln y_t = \beta_0 + \Delta B_t + \sum_{i=1}^q \beta_{2i} \Delta \ln y_{t-i} + \sum_{i=0}^q \beta_{3i} \Delta \ln k_{t-i} + \sum_{i=0}^q \beta_{4i} \Delta \ln vis_{t-i} - \lambda \widehat{ECT}_{t-1} + \varepsilon_t \quad (9)$$

To validate cointegration and for stability of the long run (equation 1), the effect of  $ECT_{t-1}$  should be within zero and negative one, the  $ECT_{t-1}$  captures the rate of adjustment of a short run disequilibrium situation, the selection of the optimal lags ( $q$ ) can be made using the criteria such as Akaike, Schwarz, Hannan-Quinn or based on the frequency of the data (Wooldridge, 2015). For our purpose, we use the latter approach.

### 2.2.3 Granger causality

Granger causality test is conducted through estimating a vector autoregression (VAR) (Toda & Yamamoto, 1995). The test of causality is a test of joint restrictions in equations 4-6. Specifically, in (4) Granger causality from  $\ln vis_t$  to  $\ln y_t$  and from  $\ln k_t$  to  $\ln y_t$  implies that  $\beta_{3i} \forall i \neq 0$  and  $\beta_{2i} \forall i \neq 0$ , respectively. In (5) Granger causality from  $\ln vis_t$  to  $\ln k_t$  and from  $\ln y_t$  to  $\ln k_t$  implies that  $\beta_{6i} \forall i \neq 0$  and  $\beta_{5i} \forall i \neq 0$ , respectively. Lastly, in (6) Granger causality from  $\ln k_t$  to  $\ln vis_t$  and from  $\ln y_t$  to  $\ln vis_t$  implies that  $\beta_{8i} \forall i \neq 0$  and  $\beta_{7i} \forall i \neq 0$ , respectively.

$$\ln y_t = \beta_{10} + \sum_{i=1}^q \beta_{1i} \ln y_{t-i} + \sum_{i=1}^q \beta_{2i} \ln k_{t-i} + \sum_{i=1}^q \beta_{3i} \ln vis_{t-i} + \varepsilon_{1t} \quad (10)$$

<sup>23</sup> Cointegration testing must exclude constant and trend terms because the error term has a mean of zero which implies randomness without any apparent trend.

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$$\ln k_t = \beta_{20} + \sum_{i=1}^q \beta_{4i} \ln y_{t-i} + \sum_{i=1}^q \beta_{5i} \ln k_{t-i} + \sum_{i=1}^q \beta_{6i} \ln vis_{t-i} + \varepsilon_{2t} \quad (11)$$

$$\ln vis_t = \beta_{30} + \sum_{i=1}^q \beta_{7i} \ln y_{t-i} + \sum_{i=1}^q \beta_{8i} \ln k_{t-i} + \sum_{i=1}^q \beta_{9i} \ln vis_{t-i} + \varepsilon_{3t} \quad (12)$$

The VAR is a system of autoregressive distributed lag (ARDL) equations each estimated by the OLS technique. The stability of the VAR system is contingent on the inverse roots of the VAR which should be within the positive and negative unity. However, for corrective measures to ensure the stability, either a trend term structural break dummies or lagged terms one more than the endogenous variables can be used as exogenous instruments in the VAR system (Stauvermann, et al., 2017).

## 3 DATA

### 3.1 Description

Annual data is used in this study over 1975-2015 ( $n = 41$ ). The data for real GDP ( $Y_t$ ), total population ( $Pop_t$ ) and gross fixed capital formation ( $I_t$ ) is sourced from the World Development Indicators and Global Development Finance database (World Bank, 2017). GDP and investment are measured in constant 2011 local currency units and are available from 1960-2015 and 1963-2008 & 2012-2015, respectively. Data on annual population is available from 1960-2015 and international visitor arrivals from 1795-2015, the latter sourced from the Fiji Bureau of Statistics. The physical capital stock series is constructed via the perpetual inventory method where the initial capital stock is set to 1.5 times the 1962 real GDP. The depreciation rate is assumed at 5 percent. The investment series was measured by the gross fixed capital formation which was available from 1975-2008 and 2013-2015. Thus, the missing data for investment (2009-2012) is interpolated using the automatic log-linear interpolation algorithm in Eviews 9. Given the different starting points of the series, for consistency, sample from 1975-2015 is used for the analysis.

### 3.2 Summary statistics

Table 3 presents a statistical summary of  $y_t$ ,  $k_t$  and  $vis_t$ . As noted,  $vis_t$  and  $y_t$  show a strong positive and significant correlation (0.948), there is also a strong and significant positive correlation between  $k_t$  and  $vis_t$  (0.920). The pair-wise correlation between  $\ln y_t$  and  $\ln k_t$  is 0.89;  $\ln vis_t$  and  $\ln y_t$  is 0.95; and  $\ln vis_t$  and  $\ln k_t$  is 0.93. For regression analysis, all variables are transformed using natural logarithms.

**Tab.3** - Descriptive statistics & correlation matrix over 1975-2015

Panel a. descriptive statistics	$y_t$	$k_t$	$vis_t$
Mean	6722.519	16045.30	46.56979
Median	6553.290	14330.62	41.06974
Maximum	9127.276	23356.71	84.60900
Minimum	5402.352	9757.803	26.30725
Standard deviation	986.0775	3727.650	17.73233
Skewness	0.481507	0.443979	0.687230
Kurtosis	2.294008	2.194087	2.061394
Jarque-Bera	2.435776	2.456522	4.732290
Probability	0.295854	0.292801	0.093842
Panel b. pair-wise correlation matrix	$y_t$	$k_t$	$vis_t$
$y_t$	1.000000		
	-----		
$k_t$	0.919987	1.000000	
	[0.0000]	-----	
$vis_t$	0.947522	0.953233	1.000000
	[0.0000]	[0.0000]	-----

Source: authors' estimation in Eviews 9. P value in square parenthesis.

## 4. RESULTS & DISCUSSION

### 4.1 Unit root & cointegration

The variables  $\ln y_t$ ,  $\ln k_t$  and  $\ln vis_t$  are confirmed I(1) using the ADF unit root test. A drift and trend term is included for the levels data, no constant or trend for  $\hat{u}_t$ ,  $\Delta \ln y_t$  or  $\Delta \ln vis_t$ . A drift term is included for the  $\Delta \ln k_t$  series. From the ADF test (Table 4), we note that the break-corrected residuals ( $\hat{u}_t$ ) are stationary. Also, enough lagged differenced terms were included to render equation (8) residuals serially un-correlated.

**Tab.4** - ADF unit root test

Variable	Level			1 <sup>st</sup> difference		
	Trend	T-statistic	Tau CV	Trend	T-statistic	Tau CV
$\ln y_t$	T	-2.144 [0]	-3.540	-	-7.353 [0] <sup>B</sup>	-1.950
$\ln k_t$	T	-2.710 [1]	-3.544	C	-2.290 [0] <sup>B</sup>	-1.678
$\ln vis_t$	T	-3.129 [0]	-3.568	-	-7.002 [0] <sup>B</sup>	-1.950
$\hat{u}_t$	-	-6.4075[0] <sup>B</sup>	-1.950			

Source: authors' estimation in Eviews 9 & Stata 13. C, T & - refers to constant, constant & trend, and no constant and no trend respectively; \*\* refers to stationarity at 5 percent. CV refers to 5 percent critical tau value obtained from Stata 13. Lags used are reported in square parenthesis and are determined automatically by Eviews 9.

#### 4.2 Bai and Perron (2003) break test

We identify plausible breaks in the series using the Bai and Perron (2003) (B-P) break test via break-least squares. The test identifies the existence of 3 significant breaks (Table 5).

Using the method of B-P break test, we identify 4 regimes (repartition breaks) in the data. We accordingly create three structural break dummy variables;  $B_{1t}$  set to one over 1982 to 1993,  $B_{2t}$  set to one over 1994-2008, and  $B_{3t}$  set to one from 2009-2015. These breaks are automatically created by the method of break-least squares (B-L-S) which is integrated with the B-P test in Eviews 9. The B-L-S procedure incorporates the identified breaks in both (1) an additive form and (2) an interactive form. Inclusion of the latter results in severe multicollinearity problems and model misspecification, we therefore include the identified breaks in terms of the former and hence, the slope estimates are not affected by the inclusion of the breaks in our final estimation.

**Tab.5** - Bai-Perron break test via break least squares

Break Test	Scaled F-statistic	Critical Value
0 vs. 1 <sup>A</sup>	18.87217	13.98
1 vs. 2 <sup>A</sup>	31.96049	15.72
2 vs. 3 <sup>A</sup>	21.92793	16.83
3 vs. 4	4.405556	17.61
Break dates:	Repartition	
1	1982	
2	1994	
3	2009	

Source: Authors estimation in Eviews 9. <sup>A</sup> indicates significance at 5%.

#### 4.3 Long-run

The equation (1) is estimated using the OLS based Cochrane-Orcutt Iterative Procedure (COIP). Convergence in the COIP was achieved in 5 iterations. This case of autocorrelation was not due to model misspecification because the estimated model had a p-value greater than 10 percent in the Ramsey RESET test with the results are presented in Table 6. As noted, all the coefficients are significant at 10% or less. The adjusted  $R^2$  is about 0.96 also, the DW statistic (2.05) exceeds the adjusted R-square, thus indicating the estimated model is not spurious. Breaks identified through the B-L-S procedure are significant and included without interaction effects; this solves the problems of multicollinearity and model misspecification (see section 5.2), but does not correct the slight parameter instability identified through the CUSUM squared test. To correct for this, we further include a pulse dummy  $B_{4t}$  set to one over the period of instability (2011-2014). The additional pulse dummy remains insignificant with no noticeable change in existing regressor coefficients at two decimal places or its significance level, however its inclusion corrects for parameter instability.

The cointegrating coefficient of  $\ln k_t$  is estimated at 0.33, which indicates that in the long run, a 1% increase in  $k_t$  increases  $y_t$  on average by 0.33%, ceteris-paribus. We note that the capital share figure equal to the stylized value of one-third. In terms of the lower and upper confidence limits, we note that the coefficient of  $\ln k_t$  ranges from 0.13 to 0.52, this indicating the possibility of GDP per capita increasing as high as 0.52 and as low as 0.13, with a 1% increase in capital per capita. Similarly, the cointegrating coefficient of  $\ln vis_t$  is 0.22 which implies that a 1% increase in visitor arrivals increase GDP per capita by 0.22%. The lower and upper confidence limit of the coefficient for visitor arrival is 0.13 and 0.26, respectively. Also, we note that the break three break periods identified have a negative association with visitor arrivals. Plausible events in these years are political tensions in 1982 (Lal, 1983), severe tropical cyclone in 1994 and the lagged effect of the Global Financial Crisis. The break dummies however do not influence the slope estimates of the long run model.

**Tab.6** - Estimated long run model

Panel 1: Coefficient statistics						
Variable	Coefficient	LCL	UCL	Standard error	T-statistic	P value
$\ln k_t$	0.337085 <sup>A</sup>	0.143204	0.530965	0.095296	3.537250	0.0012
$\ln vis_t$	0.222656 <sup>A</sup>	0.124957	0.320355	0.048021	4.636660	0.0001
Constant	4.786585 <sup>A</sup>	3.140768	6.432403	0.808948	5.917047	0.0000
$B_{1t}$	-0.112080 <sup>A</sup>	-0.168857	-0.055303	0.027907	-4.016210	0.0003
$B_{2t}$	-0.074559 <sup>C</sup>	-0.155209	0.006091	0.039641	-1.880854	0.0688
$B_{3t}$	-0.093807 <sup>C</sup>	-0.201790	0.014177	0.053076	-1.767407	0.0864

Panel 2: Model statistics

$R^2 = 0.965648$ , adjusted  $R^2 = 0.958361$ ,  $\hat{\sigma} = 0.029389$ ,  $n = 41$ ,  $F(6, 33) = 132.5197^A$ ,  $DW = 2.090505$ ;  $\hat{\rho} = 0.57822382330^A$ ;  $IR = 0.58$

Source: authors' estimation in Eviews 9. Notes: A denotes statistical significance at the 1 percent level, B at 5 percent and C at 10 percent; LCL & UCL represent the lower and upper confidence interval at the 5 percent significance level.

**4.4 Short-run**

The results of the short-run estimations are presented in Table 7.<sup>24</sup> The adjusted  $R^2$  is 0.52; the model explains 52 percent of the variation in  $\Delta \ln y_t$ .

As noted, in the short-run, capital stock (investment) has not significant association with growth. However, we note a positive and statistically significant impact of visitor arrivals on the growth. The coefficient of  $\Delta \ln vis_t$  is 0.1845 which implies that a 1% increase of visitor arrivals is expected to increase output by 0.19%, ceteris-paribus. The coefficient of  $ECT_{t-1}$  is

<sup>24</sup> Wooldridge (2015) identifies that 1 or 2 lags are sufficient for annual data, up to 4 lags for quarterly data and up to 12 lags for monthly data. Accordingly, we have used one lag for the differenced terms to estimate the error correction model (equation 3) in Table 6.

negative (-0.5841) and significant. This indicates that on average, following any shocks, the convergence to long run (static) equilibrium takes approximately 1.7 years, ceteris-paribus.

**Tab.7** - Estimated error correction model

Panel 1: Coefficient statistics						
Variable	Coefficient	LCL	UCL	Standard error	T-statistic	P value
Constant	0.005682	-0.009612	0.020976	0.007508	0.756754	0.4547
$\Delta \ln k_t$	0.190187	-0.311889	0.692263	0.246486	0.771593	0.4460
$\Delta \ln vis_t$	0.184506 <sup>A</sup>	0.089513	0.279498	0.046635	3.956367	0.0004
$\Delta B_{1t}$	-0.094483 <sup>A</sup>	-0.155974	-0.032991	0.030188	-3.129792	0.0037
$\Delta B_{2t}$	-0.069063	-0.158810	0.020684	0.044060	-1.567472	0.1268
$\Delta B_{3t}$	-0.106837 <sup>C</sup>	-0.215555	0.001881	0.053373	-2.001686	0.0539
$ECT_{t-1}$	-0.584082 <sup>A</sup>	-0.996621	-0.171543	0.202529	-2.883937	0.0070

Panel 2: Model statistics

$$R^2 = 0.6064, \text{ adjusted } R^2 = 0.5203, \hat{\sigma} = 0.029383, n = 40, F(7, 34) = 7.0438^A, DW = 1.8068$$

Source: authors' estimation in Eviews 9. Notes: A & C denotes statistical significance at the 1 & 5 percent levels; LCL & UCL refer to lower and upper confidence interval at the 5% level.

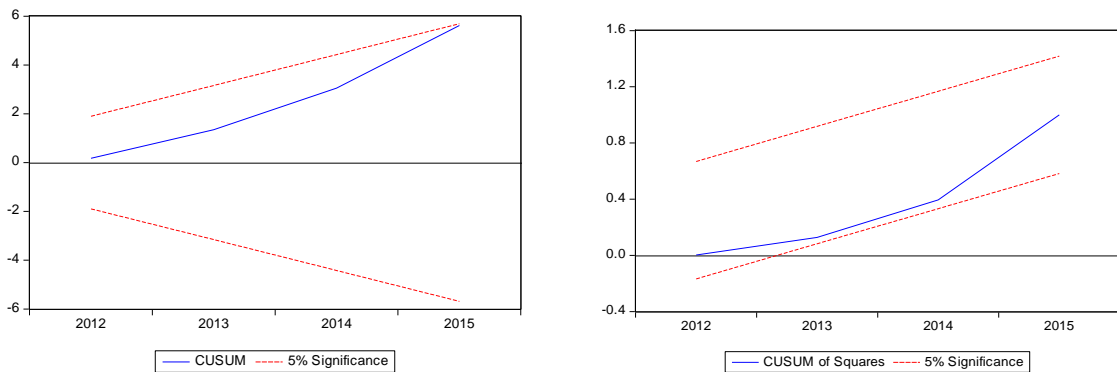
#### 4.5 Diagnostic tests

We use the Ramsey Reset test for detecting omitted variables and incorrect functional form, Breusch-Godfrey test for detecting residual autocorrelation, Breusch-Pagan-Godfrey test of heteroskedasticity, Skewness/Kurtosis test of residual normality based on the Jarque-Bera test, Durbin-Wu-Hausman test of regressor exogeneity and the Variance inflation factor (VIF) test for detecting multicollinearity. Finally, we check for parameter stability using the CUSUM and CUSUMQ (CUSUM squared) test (Table 8).

The initial OLS estimation with the inclusion of the break dummies did not solve the problem of autocorrelation. Other important diagnostics, specifically, regressor exogeneity for single equation techniques was met. The OLS-COIP estimator corrects for this shortcoming. The models do not appear to have any significant omitted variables or incorrect functional form and multicollinearity is not a severe problem in both panels.<sup>25</sup> The estimated parameters in the cointegrating and error correction models (break corrected) are stable according to the CUSUM and CUSUM of squares tests (Figure 3) at the 5%.

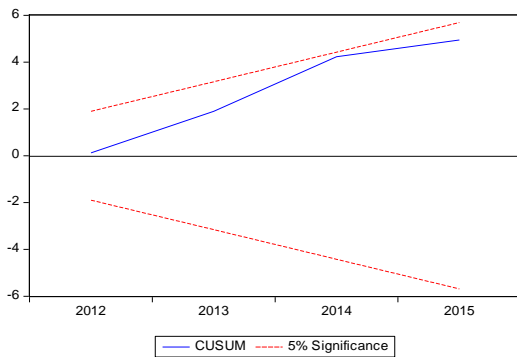
<sup>25</sup>Multicollinearity does not specifically violate any classical assumptions and hence the OLS estimators are still Blue and consistent. What it does do is decrease the precision of the estimates. A VIF less than 10 is acceptable by the literature.



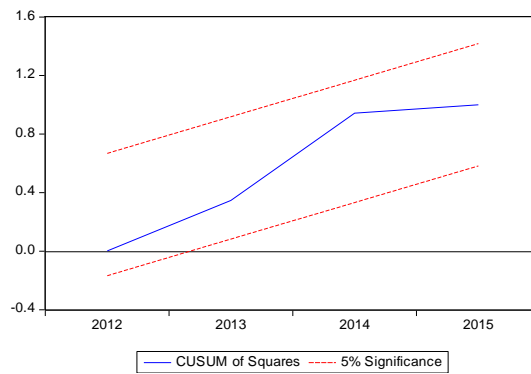


*Short-run*

*Cusum*



*Cusum squared*



**Fig.3** - Cusum stability test at 5%.

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**Tab.8 - Diagnostic tests**

Test	Null hypothesis	OLS		OLS-COIP: AR(1)	
		Test statistic	P value	Test statistic	P value
<u>Panel a: Long run</u>					
Ramsey RESET	H <sub>0</sub> : No omitted variables	F(1, 33) = 1.71	0.2000	F(1, 32) = 1.71 <sup>A</sup>	0.1012
Breusch-Godfrey	H <sub>0</sub> : No residual autocorrelation	$\chi^2(1) = 10.81$	0.0015	$\chi^2(1) = 0.53^A$	0.4669
Breusch-Pagan-Godfrey	H <sub>0</sub> : Homoskedasticity	$\chi^2(6) = 10.17$	0.1175	$\chi^2(6) = 3.89^A$	0.6916
Jarque-Bera skewness/kurtosis	H <sub>0</sub> : Residual normality	$\chi^2(1) = 1.41$	0.4949	$\chi^2(1) = 0.41^A$	0.8246
Durbin-Wu-Hausman	H <sub>0</sub> : Regressor exogeneity	$\chi^2(2) = 0.91$	0.6355	-	-
Variance inflation factor	H <sub>0</sub> : No severe multicollinearity	$\overline{VIF} = 7.95$	-	$\overline{VIF} = 3.61$	-
<u>Panel b: Short run</u>					
		ECT <sub>t-1</sub> : OLS		ECT <sub>t-1</sub> : OLS – COIP	
Ramsey RESET	H <sub>0</sub> : No omitted variables	F(1,31) = 0.68	0.4165	F(1,31) = 1.38 <sup>A</sup>	0.2496
Breusch-Godfrey	H <sub>0</sub> : No residual autocorrelation	$\chi^2(1) = 0.19$	0.6550	$\chi^2(1) = 3.60^B$	0.0579
Breusch-Pagan-Godfrey	H <sub>0</sub> : Homoskedasticity	$\chi^2(6) = 5.55$	0.5933	$\chi^2(7) = 5.72^A$	0.5731
Jarque-Bera skewness/kurtosis	H <sub>0</sub> : Residual normality	$\chi^2(1) = 0.31$	0.8600	$\chi^2(1) = 0.41^A$	0.8146
Durbin-Wu-Hausman	H <sub>0</sub> : Regressor exogeneity	$\chi^2(3) = 0.64$	0.8877	-	-
Variance inflation factor	H <sub>0</sub> : No severe multicollinearity	$\overline{VIF} = 2.12$	-	$\overline{VIF} = 2.07$	-

Source: Authors' estimation in Eviews 9, “-” refers to not applicable. A, B refers to non-rejection of the null hypothesis at the 1 and 5 percent level.

#### 4.6 Robustness tests

In addition, we use the ARDL model with sample specific bounds (Pesaran et al, 2001) to examine whether our results are reliable. The method has the advantage that (1) cointegration can be examined irrespective of whether the data is I(0) or I(1) or some combination of them, (2) it avoids the small sample bias because the long and short run models are estimated in a single step, (3) it avoids the endogeneity, simultaneity and omitted variables bias through its dynamic structure and (4) it avoids problems arising with measurement problems in the data. For these reasons, it provides super-consistent estimates even in small samples. Cointegration is confirmed when the calculated F statistic in the bounds test falls above the critical upper bound. The long and short run results from the ARDL model are presented in Table 9.

We note that the results are comparable to the earlier results, both in the long-run and the short-run. Specifically, the coefficient of  $\ln k_t$  is 0.33,  $\ln vis_t$  is 0.21, the adjusted goodness of fit criterion is 0.95 and the error correction terms effect is -0.3. Hence, the results from the OLS based COIP provides fairly robust and consistent results.

A comparison of the results of Kumar & Kumar (2012) examining the effect of tourism on growth in Fiji over 1980-2008, we note that the effect of tourism remains roughly the same in the two studies irrespective of the indicator variable, tourism receipts in the study of Kumar & Kumar (2012) and visitor arrivals in the current study and the length of the sample. We do differ in terms of the capital elasticity; the current study reports the capital elasticity at 0.33 which is equal to its stylized value. Plausible reasons for this include (1) a more developed Fijian economy relative to the last study whereby the capital elasticity shows signs of convergence to its stylized value, (2) use of structural breaks and (3) country specific analysis.

#### 4.7 Causality

Causality results based on  $\chi^2$  test is presented in Table 10. We note a unidirectional causality from  $\ln y_t$  to  $\ln vis_t$ , a bidirectional causality in between  $\ln k_t$  and  $\ln vis_t$  and a unidirectional causality from  $\ln y_t$  to  $\ln k_t$ . Interestingly, support feedback hypothesis is noted through tourism-investment channel of tourism, whereas economic growth causes tourism growth. On one hand, growth in tourism drives the need for improved infrastructure including roads, transportation, etc., on the hand, developments in tourism infrastructure improves tourism numbers. The overall economic progress also causes tourism demand. This finding has important implications for tourism policy.

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**Tab.9 - ARDL(1,1,1) results**

**Panel 1: Cointegrating Form**

Variable	Coefficient	Standard Error	T-Statistic	P Value
$\Delta \ln k_t$	-0.324762	0.435617	-0.745522	0.4618
$\Delta \ln vis_t$	0.220982 <sup>A</sup>	0.052346	4.221572	0.0002
$\Delta B_{1t}$	-0.103140 <sup>A</sup>	0.034434	-2.995276	0.0055
$\Delta B_{2t}$	-0.055986 <sup>C</sup>	0.031352	-1.785727	0.0843
$\Delta B_{3t}$	-0.079142	0.048438	-1.633864	0.1127
$ECT_{t-1}$	-0.532561 <sup>A</sup>	0.151341	-3.518942	0.0014

**Panel 2: Long Run Coefficients**

Variable	Coefficient	Standard Error	T-Statistic	P Value
$\ln k_t$	0.330528 <sup>C</sup>	0.166644	1.983440	0.0565
$\ln vis_t$	0.207193 <sup>C</sup>	0.106877	1.938614	0.0620
Constant	-0.193668 <sup>A</sup>	0.065755	-2.945301	0.0062
$B_{1t}$	-0.105127 <sup>C</sup>	0.061550	-1.708002	0.0980
$B_{2t}$	-0.148606	0.092682	-1.603396	0.1193
$B_{3t}$	0.016795	0.046167	0.363787	0.7186

**Panel 3: ARDL Model Statistics**

$R^2 = 0.9646$ , adjusted  $R^2 = 0.9539$ ,  $\hat{\sigma} = 0.0306$ ,  $n = 40$ ,  $F(9, 30) = 90.7513^{***}$ ,  $DW = 1.8339$ ,  $h = 1.8142$ ; Root MSE = 0.03064

**Panel 4: Bounds test**

Computed F statistic	4.2526 <sup>C</sup>
Upper critical bound	4.1400
Lower critical bound	3.1700

**Panel 5: ARDL Model Diagnostics**

$\chi_{sc}^2(1) = 0.12[0.7286]$  ;  $\chi_{hc}^2(8) = 5.88[0.7521]$  ;  $\chi_n^2(1) = 1.26[0.5335]$  ;  $F_{RR}(1, 30) = 0.44[0.5127]$ ; Cusum: Stable; Cusum squared: Stable

*Source: Authors' estimation in Eviews 9. A, B and C indicate significance at 1, 5 and 10 percent, SC refers to serial correlation, HC refers to heteroskedasticity, N refers to normality, RR refers to Ramsey RESET test. Model selection based on Akaike information criteria*

**Tab.10** - Causality test

Excluded	$\chi^2$	P Value
Dependent variable: $\ln y_t$		
$\ln vis_t$	$\chi^2(2) = 1.036153$	0.5957
$\ln k_t$	$\chi^2(2) = 1.645982$	0.4391
All	$\chi^2(4) = 4.679770$	0.3218
Dependent variable: $\ln vis_t$		
$\ln y_t$	$\chi^2(2) = 5.181144^C$	0.0750
$\ln k_t$	$\chi^2(2) = 5.576003^C$	0.0615
All	$\chi^2(4) = 11.33341^B$	0.0231
Dependent variable: $\ln k_t$		
$\ln y_t$	$\chi^2(2) = 6.336692^B$	0.0421
$\ln vis_t$	$\chi^2(2) = 6.254460^B$	0.0438
All	$\chi^2(4) = 12.67862^B$	0.0130

Source: Authors' estimation in Eviews 9. B and C indicate significance at 5 and 10 percent, respectively.

## 5 CONCLUSIONS & POLICY RECOMMENDATIONS

This study has examined the tourism led growth hypothesis in Fiji over the period 1975-2015. We noted the presence of a long run association between real GDP, visitor arrivals and capital stock (in per capita terms) by using the Engle and Granger (1987) two-step procedure. The error correction effect was noted at -0.51. The capital stock elasticity was noted at 0.33% and the tourism was around 0.22%. Importantly, the magnitude of capital stock is in line with economic theory and the magnitude of tourism measured as visitor arrivals is not significantly different from the results of Kumar and Kumar (2012). The study finds a unidirectional causality from real GDP to tourism, which was also noted for Fiji and other selected Pacific Island Countries by Narayan et al. (2010). However, our finding deviates from the earlier study in that we control for structural breaks at multiple points in the sample. Also, by including capital per worker in the estimation model, we noted bidirectional causality between investment and tourism. A unidirectional causality from growth to tourism is underscored. The results highlight that tourism is important for the economic growth via the investment channel, and that higher economic growth propels visitor arrivals to Fiji.

Subsequently, to account for and magnify the impact of tourism on the economy of Fiji, greater tourism related investment is necessary. Hard investments such development of roads, transportation, telecommunications, financial services, beaches and parks, among other thing, are vital. Equally important is the need for soft investments such as marketing Fiji as a tourist destination, creating greater awareness of the importance of tourism in the rural and remote highlands of Fiji through workshops and trainings, so that local residents are better prepared to host visitors.

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It must be noted that Fiji has a rich history and diverse culture given its multicultural composition. Additionally, there are some natural attractions such as forests, sand dunes, sandy beaches among other things. The tourism department should continue to proactively sell this product to the tourists, especially to countries which are major and emerging markets. The role of Fijian embassies in overseas countries will be decisive in promoting and boosting tourism in Fiji.

Greater impact of tourism on the Fijian economy is plausible if equal focus is given to the demand side factors. Hence, focusing on tourist preferences and their willingness to pay for critical, common and new products and services will provide valuable inputs to package and sell tourism. Additionally, destination re-marketing via new products and standards, underscoring the unique Fijian experience, investing in eco-friendly or green-tourism, establishing new direct routes emerging markets and visa relaxations, and establishing supportive regulations to facilitate investment in the entire tourism value chain are important policy considerations. Finally, it is important to ensure that price and exchange rates, and political environment are stable; and hence the role of government and central banks become critical. To ensure continuity in product development, innovation and investment in tourism, having a reliable projections of visitor arrivals (tourism demand) from the major source countries will be an important consideration. However, this will require developing a tourism demand model for Fiji and the neighbouring Pacific Island countries based on microeconomic foundations, something which future research related to small island economies in the Pacific must consider.

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## Analysis of Economic Development of Czech Republic and Vietnam

*Ninh V. Nguyen, Vu Minh Ngo, Quyen Phu Thi Phan, Tri Ho, Dao Phan*

### ABSTRACT

*In recent years, Czech companies have the tendency of investing in Vietnam. By analysis the economic development of Vietnam in comparison with Czech Republic economy, companies can refer and invest properly. For instances, they study economic development by measuring the related indexes of gross national product (GNP), as well as considering Gross Domestic Product (GDP) and the influence of CPI index of these both countries. The used data in the research are taken from the World Bank system. The exploitation of data by World Development Indicator (WDI) function provided by Vincent Arel - Bundock (University of Michigan). Current analysis results show that the GDP of Czech Republic is 8.3 times higher than Vietnam. GNP of Czech Republic is always 1.0 time higher than Vietnam. Meanwhile, the CPI of Vietnam fluctuates widely and less stable than Czech's one. Through the analysis of the measurement indicators of the economy, there is a big gap between the Czech Republic and Vietnam. Vietnam is still unstable in the consumer price index (CPI). Although investing in Vietnam is a potential opportunity, but CPI should be monitored closely.*

**Keyword:** *Economic Development, GDP, GNP, CPI, Czech Republic, Vietnam*

**JEL Code:** A31, F62, F63

### 1 INTRODUCTION

In recent years, economic and trade relations between Vietnam and the Czech Republic are established by contract bilateral economic cooperation (Agreement-Economic, 2005). The Czech Republic is one of the leading trade partners of Vietnam in the area of Eastern Europe, with two- way trade turnover at 250-300 million USD/year (2015 reached 248.3 million USD) and tend to increase. In the last 5 years, Czech companies have invested in Vietnam 36 projects, the total registered capital of 64 million USD (Le Hai Trieu, 2015). For the two Governments, the diplomatic relations between Vietnam and Czech have the past that great at present, this hope future achieved many accomplishments and promise. In the future, the two countries cooperate on areas such as energy, environment, science and technology, agriculture, health, education, vocational training, labor, defense, and tourism.

To see clearly over the prospects of economic growth of the two countries as well as help investors learn about partner bilateral trade exchange, connecting the two countries and businesses looking for investment markets. This research, conducted over 15 years data analysis about the indicator of GDP, GNP and CPI.

Economic growth is the increase of the gross domestic product (GDP) or gross national product (GNP) in a given time. Furthermore, analysis of consumer price index (CPI) to reflect the relative change of the price level of consumer goods over time. This is the

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indicator that is commonly used to measure prices and changes of the main price which the Economist called inflation.

At present, there are many independent reports in the two countries but not yet have reports related to the analysis of the growth and development of the Czech Republic and Vietnam. This study, see the review of the growth and development of an economy over time and make the consumer index comparison between the 2 countries.

Through the analysis of the indicators of growth of GDP, GNP, CPI will help investors better understand the growth and development of the two countries in order to help enterprises refer to decide to cooperate, proper. Moreover, this study helps government agencies reference in the negotiation of the Treaty with Vietnam the EU free trade (FTA) and to ratify the treaty partnership and cooperation agreement in Vietnam-European Union (PCA).

## 2 RESEARCH METHODS

### 2.1 Objectives of the study

Economic development of the Czech Republic and Vietnam is aimed to analyze via the measurement of index of GDP, GNP, and CPI. The data were gathered from World Bank's data source.

### 2.2 Measurement method

GDP, GNP and CPI are used to measure the economic development in national. The focus of the research on economic growth is the measure of national income. There are many basic indicators of national income. Gross national product (GNP) is the total value of the goods and services produced in a year. GNP does not include intermediate goods. The GNP computes the output produced by the citizens of a country, including the value of goods and services produced by citizens living outside the borders of the country. Gross domestic product (GDP) is similar to the GNP, except that it is up to the entire output produced within the borders of the country, including the output produced by foreign residents, but does not count the value of output of the citizens living outside the country.

The GNP (Gross National Product) is one of the most common indicators used in national income accounting. GNP was calculated by volume produced by citizens of a country, including the value of goods and services produced by citizens living outside the borders of a country. The World Bank and other multilateral organizations often call this the concept of national income (GNI).

GDP (Gross Domestic Product) or the total domestic product of a nation is the same as GNP, except the entire products produced within the borders of the country, including the output produced by foreign residents, but does not count the value of output of the citizens living outside the country.

The consumer price index (CPI) is the relative indicators reflect trends and the general price level over time of a fixed number of goods and services represent the final consumption, serving the normal life of the people.

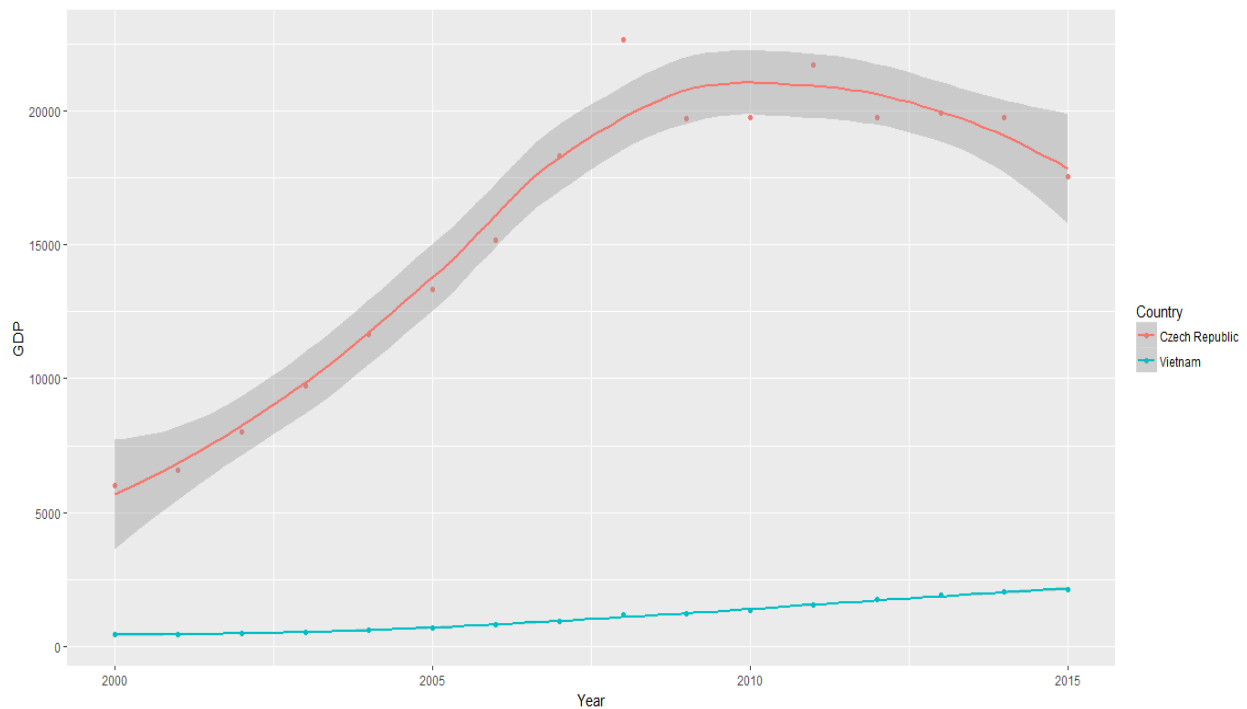
The figures are taken from the world development indicators WDI (World Development Indicator) is a World Bank (WB). Packages used in R are WDI by Vincent Arel - Bundock (University of Michigan).

## 2.3 Data analysis

The figures are presented in chart over the period put in the research. All data is processed by software R, Packages used to create the chart is ggplot2.

## 3 RESULTS

### 3.1 Results analysis GDP of Czech Republic and Vietnam



**Fig.1** - Performances of GDP the Czech Republic and Vietnam

Source: Data from World Bank, 2017

Gross domestic product (GDP), which is an indicator of economic activity, measures the total of gross value added by all resident producers in the economy together with any products taxes and minus any subsidies not included in the value of products. Vietnam is a developing country and gradually opening its economy. After focusing on building the liberalized market and opening the economy internationally, Vietnam economy has been maintained and sustained the fast growth rate of GDP to increase the level of people's living standard. The increasing GDP per capital shows that Vietnam might be on the right way for developing the economy. The economy successfully recovered and grew 7.48% during the five years from 2000 to 2005. In 2005, the growth level of Vietnam obtained US\$ 639.1 due to the fast development of all economic sectors, especially the industrial sector. Vietnam appears to have moved well beyond the slowdown to 5.7% after the national economic downturn in 2008. Vietnam's GDP surpassed \$100 billion in 2009 and it remained about 7 percent for nearly a decade, although decreasing as low as 5% in 2012. The growth rate increases slightly to \$193.59 billion at the end of 2015 (Statistics Portal, 2015b).

Meanwhile, Czech Republic is one of the European Union members and having strong links with the euro area countries in term of trading goods and services. It is the small open economy with a very high rate of export in goods to gross domestic product (GDP). These factors lead to a reduction in transaction costs and the elimination of exchange rate risk in

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Czech economy. Thus, the growth economy of Czech remains a gradually increasing with more 6% from 2005 – 2007 and 2.5 % in the year of 2008. When the financial and subsequently economic crisis broke out in 2008, the Czech economy halted in 2009 with an amount of 4.1% due to shrinking demand from the major trading partners in the euro area. This slowdown only happened in the first months of

2009 and it has gradually renewed in the last two year. However, the economic slowdown in this country has ongoing deepened in 2012 as the euro area crisis. Weak domestic and external consumer demand, which is mainly in term of private consumption, highlighted a marked drop in GDP in this year. In the second half of year 2013, the annual growth rate dropped to -2.2 %. Comparison with the period 2011 -2013, the ratio of the GDP decline in 2008-2009 was twice as large as (2.8 % and 5.5%, respectively). Despite a recovering in the economy, the growth of Czech Republic remains well above the pre-crisis level. Since 2014, Czech economy exceeded the 2008 pre-crisis figure for the first time and has sign of an economic recovery (Statistics Portal, 2015a).

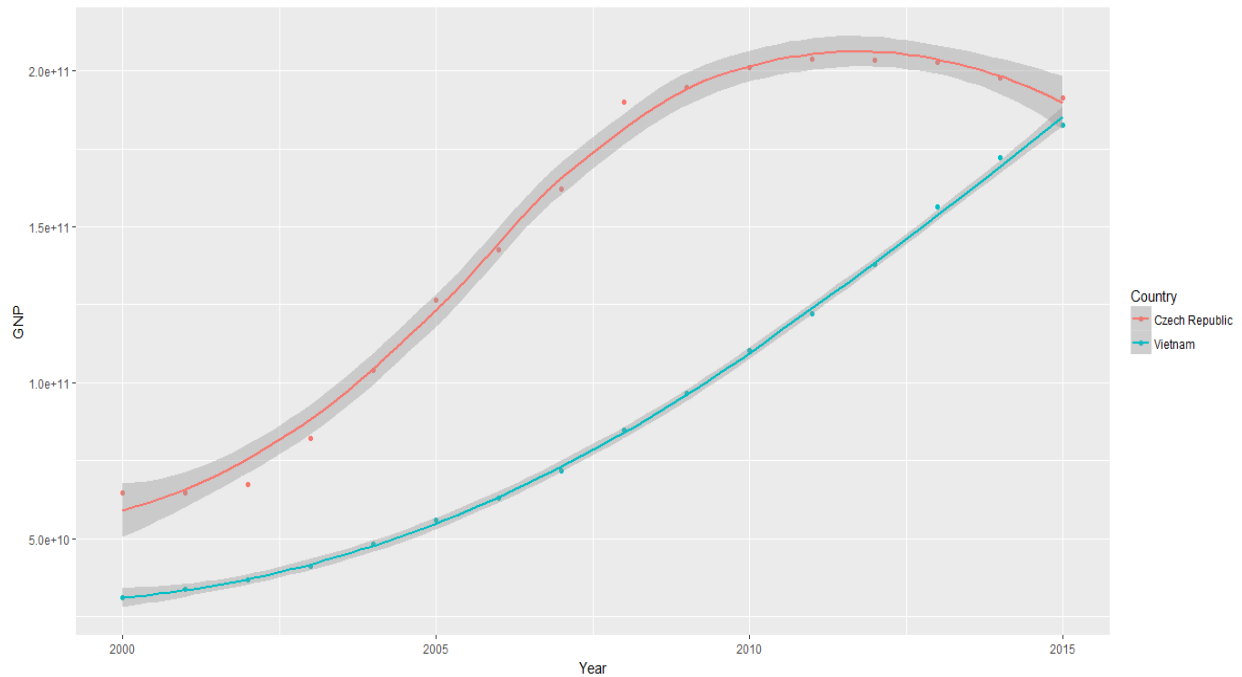
The figure 1 shows that there is an opposite direction between Vietnam and Czech. Although the GDP of Czech Republic has been higher than in Vietnam's economy; however, Czech Republic is showing signs of greater flexibility while Vietnam maintains a stable economic growth. Czech's economy has a strong alignment with the euro area, and the structure of economic activity with the euro area helps to reduce risks of economic shocks, but it still being hampered by some administrative barriers, especially barriers to starting a business. In the Czech Republic, the service and auto industry is the largest share of economic sectors. In contrast, Vietnam is a developing country with trade openness since 1993. After joined WTO in 2007 and the Free Trade Agreement with the European Union in 2016, Vietnam' economy grows and offer more business opportunities in service and industrial sector; however, the agriculture sector still plays a critical role in real GDP. To sum up, there is a huge gap between the GDP of Vietnam and Czech Republic due to the enormous differences in how added-values are generated from activities in the economy. Although having almost ten times bigger in population and so the work forces, Vietnamese economy is currently operating around and focusing on mostly low-value-added activities such as agricultures manufacturing. In addition, the obsolete methods and technology used in most industrial and services sectors also dampen largely the productivity of the economy in generating value-added products. However, these issues are also the opportunities for foreign companies when investing in Vietnam where new and innovation technologies are desired and rewarded with many preferential benefits from both private business communities and government policies.

The GNP is one of the common indicators are used in national income accounting. The World Bank and other multilateral organizations often call this the concept of national income (GNI). There are many factors that directly or indirectly affect economic growth (Sachs & Malaney, 2002). May list the following important factors affecting economic growth, such as the quantity and quality of labour has done; the quality level of labour; Labor tools (Nemat Shafik, 2016); trade and foreign direct investment (Makki, 2004); Science and technology; organizational structure; natural resources; the infrastructure and natural environment (Nemat Shafik, 2016). These elements constitute the production capacity and the economic growth of a country.

Through data analysis, the economy of Czech Republic growth higher than Vietnam and always distance disparity is huge (Fig. 2). Might consider in the structure of the economy, the Czech Republic has service trade sectors accounted for 60%, the industry

accounted for 37.5% density, and agriculture only accounts for 2.5% (CIA, 2016). Meanwhile, the economy of Vietnam has a trade industry group services accounted for 44%, 39%, and industrial agriculture 17% (CIA, 2016).

### 3.2. Results analysis GNP of the Czech Republic and Vietnam

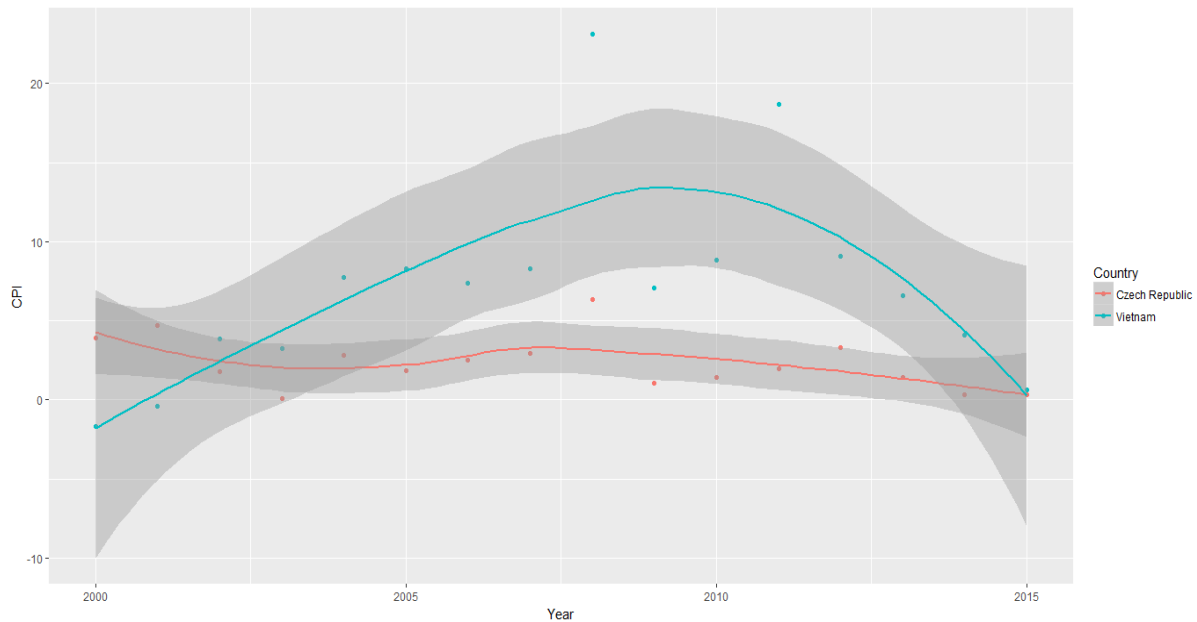


**Fig.2** - Performances of GNP the Czech Republic and Vietnam

Source: Data from World Bank, 2017

This shows that Vietnam's economy is still heavily dependent on agriculture at the same time under the influence of global climate change and agricultural production of rough, spontaneous. Agricultural products, fishery products not yet have value properties, the majority just stops processing the raw format products. In particular, in Vietnam there is speed environmental degradation affecting agriculture, the cost of solving environmental pollution is high and the economy growing risk of unsustainable (D'haeze, Deckers, Raes, Phong, & Loi, 2005). As for the industry group, Vietnam does not have the spearhead sectors such as the Czech Republic economy, Vietnam exported most of the mineral resources, in raw form, the mechanical industry, the import of raw materials. With the economy in the Czech Republic has spearheaded industry exports such as iron and steel, metal working, automotive, chemicals, electronics, transport equipment, textiles, glass, porcelain, ceramics, beer, pharmaceutical products. Meanwhile, the Czech Republic focuses on developing the service trade sectors and this has brought rapid growth economy and stability in Eastern Europe. However, the results of analysis of the level of stability in the economic growth in Vietnam, then have more stable part of the Czech Republic but the pace of Vietnam's economic growth slower than the Czech Republic.

### 3.3. The analysis of consumer price index (CPI)



**Fig.3** - Performances of consumer price index the Czech Republic and Vietnam

Source: Data from World Bank, 2017

A consumer price index (CPI) measures and presents changes in the prices of goods and services which is important to households' cost of living. For this purpose, the CPI is derived from a fixed and supposedly representative basket of goods and services provided in the domestic market to measure a cost-of-living index. Thus, changes in CPI index can be a quite reliable representative for the changes in real purchasing power of consumers' incomes and their welfare. CPI is normally used as a measure of general inflation of an economy which affects largely the consistency in the development of an economy (Práce, 2004). In this study, the CPI is measured as a change between two time periods in the total expenditure needed to purchase a given set, or basket, of consumption goods and services. Although, there are still controversies around the bias of CPI measurement method (Andrew Dabalen et al., 2016), analyzing CPI recent trend might provide useful indications about the future development and the quality of economic growth in a country.

In general, Vietnam CPI is consistently higher than other emerging market in the regions in the past decade (Bhattacharya, 2014). In the past, Vietnam encountered a severe hyperinflation in the late of the 1980s and early 1990s. Since then, tight monetary and fiscal policy are employed proactively to dampen inflation from more than 300 percent in 1986-1988 to below 20 percent in

1992 and to close to 10 percent in 1995 (Ulrich Camen, 2006). These administrative efforts contributed to a strong economic growth in the early 1990s. In two years 2000 and 2001, Vietnam experienced the mild deflation caused by the depressed commodity price and excess supply after many years of strong economic growth. In 2002 and 2003, inflation rates remained slow and stable (Wojciech and Maliszewski, 2010). However, the inflation and CPI index started to rise sharply between 2004 and mid-2008 due to the increase in international commodity prices and the surges in excess demand. The excess demand in this period was rooted in the heavy investment by state- own enterprises and a surge in foreign direct

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investment when Vietnam was finally fully becoming a member of World Trade Organization. As presented in figure 3, the CPI index rose to more than 25% in 2008. After the economic crisis in 2007-2008, the inflation and CPI index rising again in 2009 and 2010 when government introduced the stimulus package which is around 5% of GDP in response to the slowdown in economic growth. Especially in 2010, the monetary policy is reverse from tightening to loosening in unpredictable manners which make the inflations and CPI index widely fluctuated in this period. In addition, foreign exchange rate devaluation policy from Vietnamese government to boost the exporting performance also contributed to the raise of CPI index and inflation due to many types of research (Ulrich Camen, 2006; Santitam, 2011). Recognizing the unstable in inflation can destroy the quality of economic growth, in Feburaty-2011, Vietnamese government issued "Resolution 11" policy which made enormous impacts on the way how to approach the tradeoff between the quality and how fast of the economic growth. Since then, because of the quality of growth has been focused, tightening monetary and fiscal policy measures have been employed. Although the economic growth in recent year rate has been slowdown, the CPI index has decreased significantly which help to stabilize the economy and improve the image of Vietnam economy growth in foreign investors. According to Vietnam General Statistical Office, the target inflation of Vietnam in 2017 is 4% (Nguyen Bich Lam, 2016).

On the other hand, CPI index in the Czech Republic has been very stable since they join the European Union and employed the inflation targeting regime in January 1998 by Czech National Bank (CNB). The main focus of inflation targeting is its medium-term level of inflation. For

achieving the medium-term objective, CNB exploits two main tools: the use of an inflation forecast and the explicit public announcement of an inflation target or sequence of targets. In its monetary policy decision-making the CNB Bank Board assesses the latest CNB forecast and evaluates the risks of non-fulfillment of this forecast. When formulating monetary policy, CNB Board in charge of targeting inflation need to consider the target level and forecasts of inflation pressures, then change the settings of monetary policy instruments to keep inflation in the target band. In general, CNB has been successfully implementing the inflation targeting regime so far. The actual headline inflation rates in recent years are in the accepted interval of target inflation. Inflation was below the IR III/2015 forecast in 2016 Q4 and therefore below the CNB's 2% target, although it was converging rapidly towards the target.

As conclusion, there are many differences in inflation between Czech Republic and Vietnam economies. These differences are rooted mainly from the stage of economic development and how inflation is managed from the monetary policy point of view. Depending too much on capital investing from fiscal programs and foreign investors for growing the economy make the inflation in Vietnam is much more unpredictable than in Czech Republic where inflation targeting regime is employed.

### 4 CONCLUSION

Results of data analysis in terms of the economy of the Czech Republic and Vietnam, the Czech Republic's GDP 8.1 times higher than Vietnam's GDP, but analysis of Gross National Product (GNP), the GNP of the two countries near equal. On the other hand, the result of analysis CPI of two countries is a big difference. Before the year 2010, Vietnam's CPI increase is very high, and large oscillation level. After the year 2010, the CPI in Vietnam are



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better control and decrease close to the CPI of the Czech Republic. However, the CPI of the Czech Republic was stable control during the past 15 years.

This result has implications for foreign investors to reference the policies Trans-Pacific Partnership Agreement (TPP) with Southeast Asian countries as well as cooperation with the ASEAN Trade Association. This will be the reference in the discussions and sign free trade agreement between the European Union and Vietnam (FTA) and to ratify the treaty partnership and cooperation agreement in Vietnam-European Union (PCA).

This research as well as other research, it has cons is tapping data from World Bank. Moreover, the analysis may consider many other aspects. Therefore, the reliability of the results depends on the side of the measuring data and have much better data interpretations. However, all data of this research retrieved from a source at the World Bank, should the level of uniformity of the measurement methods are reliable.

Overall, the economy of the Czech Republic is still growing faster than Vietnam, although both the economy all impact of the financial crisis and global recession. At present, the Czech Republic is a country with high growth and stability in the European Union (EU). While Vietnam also grew but no good solution to control inflation, the balance of trade and a stable exchange rate.

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## Modeling the Fundamental Value of a Company: a Case Study of Electricity Distribution and Supply Company (keds)

*Florin Aliu, Adriana Knapkova, NdreMusolli*

### ABSTRACT

*Privatization of Kosovo Electricity Distribution and Supply Company (KEDS) was followed by scandalous arguments among economists. Electricity is a vital input for daily activities of the economic agents. Prices imposed on the electricity influence living standard of low income people, company performance and overall economic engines of the country. Our work aims to capture the intrinsic value of KEDS (Kosovo Electricity Distribution and Supply Company), if the company was properly valued in the privatization process. DCF method has been employed to detain intrinsic value, while Monte Carlo simulation has been used in predicting future outcomes of the company performance. WACC has been adjusted standing of the company and country risk. Kosovo does not have a stock market which would have been a benchmark for capturing the volatility risk levied on the company. Standing under these limitations, we have used standard methods of obtaining beta coefficient as a risk measure for the company. The results of our study show that Electricity Distribution and Supply Company (KEDS) has been undervalued at the moment of privatization.*

**Keywords:** *Privatization, Kosovo Electricity Distribution and Supply Company, fundamental value, DCF method, Management techniques.*

**JEL Classification:** L3

### 1 INTRODUCTION

The fall of the Berlin wall and the vast political and economic transformations that followed countries of eastern and central Europe, privatization was standing as the fundamental concern in the inclusive course of democratization. Privatization during the entire history of the economy has been analyzed within equity and efficiency trade-off. In contrast, privatization in Kosovo has been led mainly under the optic of efficiency. The economic transition of Kosovo was followed by the streams of market fundamentalism, mainly guided from the international financial institutions. Privatization permanently generated controversial opinions among left and right wing economists, concerning the outcomes delivered from the restructuring process of state owned enterprises. Privatization in many countries was unsuccessful to reach the goals that were intended from the economic theories, in terms of: efficiency, prices delivered to consumers and economic inequality (Stiglitz, 2002). Moreover, Hashani (2016) considers that privatization process in the former Yugoslav countries increased efficiency level and sales volume while it had negative feedback on employment. Socioeconomic changes that occurred in ex-socialist countries shaped the economic habits within state owned enterprises (Lipton et al. 1990). However, the Yugoslav economic system was arranged in different format from the traditional ex-communist countries, where decentralization and market sentiment within SOE-s (Socially Owned Enterprises) was installed in the early stages (Vanek, 1967). Market anomalies reflected with

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strong macroeconomic phenomena such as higher inflation characterized ex-socialist countries. Yugoslav and Hungarian hyperinflations have been more visible, since the treatment required longer time (Dem et al.2001). Beside cost and benefits reached from the privatization, there was no attempt by scholars to capture if the companies were properly valued in the privatization process (to our best knowledge). Valuing companies stand under the paradigm that economic entities are profit maximizing. SOE-s generally were operating under different commitments than companies in countries where the capitalist system was viable. SOE-s were mainly focused on output targets, not on profit margins. In addition, the assets of the Social and State Owned Enterprises were underutilized, that produce extra difficulty in valuing them. Valuing SOE-s under these limitations requires shaping the existing paradigms in the valuation theories. The company is being valued for the future outcomes that intends to reach not because of the present financial position (Damodaran, 1996). Nevertheless, the value of the company (not the market price) is the initial price signal to potential investors. There were tension discussions if the Electricity Distribution and Supply Company(KEDS) company was sold within the fundamental value. GAP Institute(2012) confirms that there was a lack of transparency of the Kosovo government during the privatization of KEDS. Our work differentiates itself from the previous studies, since is the first research oriented on determining fundamental value of State Owned Enterprises in Kosovo. Previous studies on privatization process in Kosovo were mainly focused on capturing the cost-benefit effect delivered from the process. In addition, our work finds the difference within the price that Electricity Distribution and Supply Company(KEDS) has been sold and fundamental value of the company.

The rest of the paper is structured as follows: first part comprises a brief introduction on privatization and valuation issues. The second part stands on the company background, while the third part specifies the model used. A fourth part captures the methodology employed and the fifth part comments the results obtained. Conclusion and future research to be followed stands on the last part.

## 2 COMPANY BACKGROUND

The government of Kosovo in 2009, decided to initiate the process of changing the ownership structure of the Kosovo Distribution and Supply of Energy (KEDS).KEDS before privatization was performing under KEK (Kosovo Energy Corporation). KEK was standing as the monopoly company to the production and supply of energy. However, KEDS was established in 2009 as a new company by the government decision to privatize electricity distribution market. All responsibilities of assets, contracts and respective obligations were transferred from KEK to KEDS. KEDS did not inherit any liabilities related to the operations of KEK prior to the transfer date. There were rights that were moved to KEDS, such as: the right for distribution energy and the right for the public energy services. The activity of the KEDS is governed by the Law, which is established from the Kosovo parliament (Law on electricity energy, 2010) and supervised by the Energy Regulatory Office (ERO). An energy regulatory office is an independent agency, constrained by rules and laws established by the Assembly of the Republic of Kosovo. While by December 2014, KEDS had 2652 employees working within different sectors (KEDS, 2015). Monopolies are mainly inefficient in their nature, in terms of the quality of outputs and the speed of production (Halvarian, 2002). Since monopolies are price setters in terms of outputs and inputs, governmental agencies are set up to control their prices. The Energy Regulatory Office (ERO) is an independent body that control prices imposed by the companies operating in the electricity distribution market.

In terms of debt ratios, KEDS was standing within the range of 40.9% in 2013 while ending up in 2015 with 31% of debt to total assets, which reflects how much the company is indebted. The KESCO new electricity distribution company that entered the market in 2015 was highly indebted where 70% of her assets were financed by debt. ROE (Return on Equity) as a performance ratio, which shows the returns generated for shareholders, stands in quite high ranges. ROE in 2013 was 38.3%, while in 2015 was 24.5%, which reflects levels of performance within the company. Moreover, ROE for KESCO in 2015 was standing in the range of 77.5%. Both companies reflect that they are healthy and good performing, in terms of debt structure and performance ratios (MF, 2013-2015)

### 3 MODEL SPECIFICATION

Valuation requires steps and procedures that must be strictly followed in order to gain a proper outcome. There are numerous assumptions linked with the process that makes the process unstable and to a certain extent unreliable. Fernandez (2014) considers that beta coefficient obtained from the inefficient stock markets misrepresents the risk level of the company, while capturing risk from the qualitative measures enables a holistic view of the risk. There are certain inputs that create uncertainty in the valuation procedures, such as: the proper risk free rate, cost of equity, cost of debt, future cash flows, etc. Small deviation in these inputs creates a huge impact on the intrinsic value of the companies.

$$\beta = \frac{Cov(rs,rm)}{var(rm)} \quad (1)$$

Beta coefficient is influenced by factors, such as: covariance of security returns with market returns  $cov(rs,rm)$  and variance (volatility) of market returns  $var(rm)$ . Higher beta coefficient reflects a higher risk on the securities and the other way around. Beta coefficient equal to zero represents that the securities are not sensitive to market movements. Beta equal to one, confirms that securities are moving in the same line with market returns. Diversification is proven to reduce the risk of the portfolio while raises the returns, through eliminating unsystematic risk or diversifiable risk (Sharpe, 1964). In addition, this paradigm is not limited only by the scope of the portfolio management entities, but also in the manufacturing and non-manufacturing companies (if the company is producing only one line of products is more opposed to the nonsystematic risk). Moreover, nonsystematic risk can be eliminated by raising the number of securities (sorts of products) that you keep in your balance sheet or portfolio and remaining only systematic risk or market risk (Olibe et al. 2007). Systematic risk that stands beyond the ability of the management to be controlled, is measured from the beta coefficient (Drake and Fabozzi, 2010). The CAPM has been extended and developed more by Mossin (1966), Fama (1968a; 1968b), and Long (1972). Beta coefficient captures systematic risk, while well managed portfolios are capable to eliminate only unsystematic risk (Elton et al, 2003).

$$CAPM = RFR + \beta(RM - RFR)(2)$$

Formula concerning the Capital Asset Pricing Model (CAPM) contains: RFR- represent risk free securities such as government bonds (interest paid on the government bonds),  $\beta$ - shows the beta coefficient, RM- stands for risk premium as the difference within market returns and risk free government bonds. Capital Asset Pricing model first was proposed by Sharpe (1964) and Lintner (1965) standing on the propositions of the mean variance optimization by the Markowitz (1952). The viability of the model stands on the assumption that markets are strongly efficient, there are no transactions, investor's select only efficient portfolios with the

same mean variance, investors stand on the equal expectations while in contrast all of them have different utility functions and there are no constrains to borrow at the risk free rate. Roll (1977) considers that CAPM fails to capture the risk premium since is built with a limited number of assets, which makes the model unreliable and unstable. Ross (1976) claims that arbitrage pricing theory stands as an alternative theory to the CAPM, which capture multi dimensions aspects of risk and return tradeoffs. In addition, Breeden (1979) proposed a consumption beta instead of the standard beta (accounting beta). Since the systematic risk is captured from beta coefficient ( $\beta$ ), unsystematic risk is measured by variance of returns ( $\sigma^2$ ).

$$WACC = \left[ \left( \frac{MV(Debt)}{MV(Equity) + MV(Debt)} \right) \times rd \times (1 - tax.rate) \right] + \left[ \left( \frac{MV(Equity)}{MV(Equity) + MV(Debt)} \right) \times r \right] \quad (3)$$

Since our model used free cash flow to the firm (FCFF) as an input within geometric progression, WACC is required as the discount rate. WACC measures the cost of financing by debt and the cost of financing by equity (Brealey and Myers, 2012). The formula is built for public companies, but is widely used also for nonpublic companies with certain adjustments. Cost of equity is obtained from the capital asset pricing model (CAPM) while cost of debt is obtained from the average interest rate on Kosovo banking industry.

$$\sigma^2 = \sqrt{w_1^2 * \sigma_1^2 + w_2^2 * \sigma_2^2 + w_3^2 * \sigma_3^2 + 2w_1w_22\rho(1,2)\sigma_1\sigma_2 + 2w_1w_32\rho(1,3)\sigma_1\sigma_3 + 2w_2w_32\rho(2,3)\sigma_2\sigma_3}$$

$w_{ij}$ - Weights of each security within the portfolio

$\sigma_{ij}^2$ - Variance of returns of each security within the portfolio

$\rho_{ij}$ - Measures correlation of returns between each security

$\sigma$ - Standard deviation of returns of each security

Since unsystematic risk is eliminated through diversification between financial securities when their returns are moving in opposite directions. The formula shows that unsystematic risk is influenced from: weights of the securities, correlation coefficient within them and volatility of their returns. Higher correlation coefficient within assets, higher standard deviation and higher concentration generates higher risk within the portfolio. In contrast, spreading investments weights in different securities while in the same time finding securities with negative correlation reduce unsystematic risk of the portfolio.

#### 4 MATERIAL AND METHODS

Our work aimed to capture the intrinsic value of the KED-s company, standing on the risk level of the country and the industry where the company is operating. The data have been gathered from the financial statements of the company, declared on the annual basis. Since the study is quantitative in nature, secondary data have been used to reach the objectives of the study. The DCF model has been used to detain fundamental value of the company, not the market price. Normal geometric progression and Monte Carlo Simulation have been employed in generating future possible outcomes. Normal geometric progression is limited to one line of possible future cash flows, while Monte Carlo simulation distributes all possible future cash flows. Necessary adjustments have been done on the items within financial

statements in order to prepare the valuation process. Normal geometric progression has been arranged with a Visual Basic program.

## 5 RESULTS

KED-s is profit maximizing monopoly, where electricity prices are controlled by the governmental agency. According to the standard theories on the valuation issues, present value of the company is influenced from various uncertainties. Growth rate, unsystematic risk and systematic risk are factors shooting the value of the company upside or downside. The company has been sold for 26.3 million from the government. While our results tend to detect if there is any deviation of the intrinsic value of the privatization price. Reliable beta Coefficient that corresponds to the risk level of the company is a result of efficient stock markets. Beta coefficient measures the sensitivity of the company returns with the market returns. Since Kosovo does not have a stock market, obtaining beta coefficient from the regression analysis is not viable. Faced with these limitations, beta coefficient has been gained from Damodaran database. The beta coefficient for energy sector stands in the range of 1.4, while remaining constant during the entire future cash flows (that represents one of the limitations of our work). The formula shows the normal geometric progression without probability distribution. A formula that has been built shows that both models are viable, since in the year ten they are almost the same. Monte Carlo simulation in the year ten DCF ≈ 162 million is in the range of 162 million, while the results gained from normal geometric progression are more than 162 million (DCF=162,517 million). This is because Monte Carlo Simulation involves also standard deviation in the mean returns, while normal geometric progression does not include standard deviation. Inputs within the DCF are such as: **CF<sub>1</sub>=35404; r=0.209; g=1.0397**

$$CF_1 = 35404$$

$$CF_2 = CF_1 * g^1$$

$$CF_3 = CF_2 * g = CF_1 * g * g = CF_1 * g^2$$

$$CF_4 = CF_3 * g = CF_2 * g * g = CF_1 * g * g * g = CF_1 * g^3$$

\*

\*

\*

$$CF_i = CF_1 * g^{i-1}$$

$$DCF_n = \frac{CF_1}{(1+r)^1} + \frac{CF_1 * g^1}{(1+r)^2} + \frac{CF_1 * g^2}{(1+r)^3} + \frac{CF_1 * g^3}{(1+r)^4} + \frac{CF_1 * g^4}{(1+r)^4} + \dots + \frac{CF_1 * g^{(n-1)}}{(1+r)^n}$$

\*

\*

$$DCF = \sum_{i=1}^n \frac{CF_1 * g^{i-1}}{(1+r)^i}$$



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**Formula explanation:** Mathematical geometric progression is represented through discounted cash flow method. The formula has been adjusted based on the net cash flow from operation that considers dividends paid to shareholders. Nevertheless, mathematical geometric progression stops within forty years, since the denominator increase in a higher scale than the nominator. After forty years added value of the company is negligible, continuing geometric progression under these terms is useless.

Based on the results from normal geometric progression, without recognizing standard deviation of return. The intrinsic value of the company stands in the range of 208 million. Geometric progression does not deliver added value within the DCF after fifty years. After 20 years, the added value of the company starts to increase on a decreasing scale. After 50 years, the added value of the company converges close 208 million euro, since the denominator becomes so large that does not allow the nominator to add additional value.

Tax rate from the Table 1. has been set up based on the profit tax rate imposed on the Kosovo corporations. Interest as a key component in determining the cost of debt has been collected from the average interest rate imposed from the Kosovo banking industry (CBK, 2004-2015). Free Cash Flow to the firm has been used within DCF, since future cash flows has been discounted by the weighted average cost of capital (WACC). Since interest rates in the Kosovo banking industry were high compared to the regional average, the cost of debt stands in the higher range. Higher cost of debt imposes higher discount and as a reverse lower company value. Cost of debt has been captured on the market value, since debt is paid on the constrained time interval and is denominated in the market terms. The initial assumption that the cost of equity is higher than the cost of debt ( $R_e > R_d$ ), has been fulfilled.

Table 2. Shows necessary items that are used and adjusted during the valuation process. Cost of debt tends to decline during the years, since the average interest rate has been declining on the Kosovo banking industry. The tax rate has been steady, since the government hasn't changed profit tax during entire years. Table 3 represents main risk factors incarcerated within DCF model, such as: weighted average cost of capital (WACC), cost of equity ( $R_e$ ), cost of debt ( $R_d$ ) and the beta coefficient. Risk premium has been obtained as the difference between risk free investments (RFR) and return generated from the Standard & Poor's (S&P). S&P has been used as the opportunity benchmark for the potential investors on the KED-s company. Kosovo government bonds have been used as risk free investments, while in reality there are no risk free investments. Returns provided by the Kosovo government bonds (the interest rate paid on them), remains constant among the years.

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**Tab.1** - Normal geometric progression within 50 years.

YEAR	CF-i	Value	DCF-i	Value
2016	1	35404.16	1	29283.84
2017	2	36809.71	2	54300.26
2018	3	38271.06	3	75922.33
2019	4	39790.42	4	94515.99
2020	5	41370.10	5	110489.01
2021	6	43012.49	6	124231.02
2022	7	44720.08	7	136061.73
2023	8	46495.47	8	146235.80
2024	9	48341.34	9	154993.29
2025	10	50260.49	10	162517.32
2026	11	52255.83	11	168992.64
2027	12	54330.39	12	174559.28
2028	13	56487.31	13	179346.35
2029	14	58729.85	14	183464.86
2030	15	61061.43	15	187006.71
2031	16	63485.56	16	190053.05
2032	17	66005.94	17	192672.34
2033	18	68626.38	18	194925.34
2034	19	71350.84	19	196862.65
2035	20	74183.47	20	198528.95
2036	21	77128.56	21	199961.77
2037	22	80190.56	22	201194.15
2038	23	83374.12	23	202253.95
2039	24	86684.08	24	203165.27
2040	25	90125.44	25	203949.04
2041	26	93703.41	26	204623.02
2042	27	97423.44	27	205202.65
2043	28	101291.15	28	205701.11
2044	29	105312.41	29	206129.77
2045	30	109493.31	30	206498.40
2046	31	113840.20	31	206815.42
2047	32	118359.65	32	207088.04
2048	33	123058.53	33	207322.49
2049	34	127943.95	34	207524.11
2050	35	133023.33	35	207697.50
2051	36	138304.35	36	207846.61
2052	37	143795.04	37	207974.84
2053	38	149503.70	38	208085.11
2054	39	155439.00	39	208179.94
2055	40	161609.92	40	208261.49
2056	41	168025.84	41	208331.62
2057	42	174696.46	42	208391.93
2058	43	181631.91	43	208443.80
2059	44	188842.70	44	208488.41
2060	45	196339.75	45	208526.77
2061	46	204134.44	46	208559.76
2062	47	212238.58	47	208588.13
2063	48	220664.45	48	208612.53
2064	49	229424.83	49	208633.51

*Source: Authors own calculation*

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**Tab.2** - Represents most influential inputs used in the valuation

	2013	2014	2015	2015
	KEDS	KEDS	KEDS	KESCO
<b>CFO = Cash Flow from Operations (used: net cash flow from operations)</b>	23259	19744	23795	11896
<b>FCFF=CFO + [Int x (1-tax rate)] – FCInv</b>	€ 7,024.13	€ 1,073.12	€ 13,053.11	85064.08
<b>1-Tax Rate</b>	0.9	0.9	0.9	0.9
<b>Interest expenses x (1-Tax Rate)</b>	0.13077	0.1224	0.1053	0.0828

Source: Authors own calculation

**Tab.3** - Represents Free Cash Flow to the Firm, cost of debt, Fixed Capital Investments etc.

In thousands (000)	2013	2014	2015	2015
	KEDS	KEDS	KEDS	KESCO
<b>CFO = Cash Flow from Operations (used: net cash flow from operations)</b>	23259	19744	23795	11896
<b>FCFF=CFO + [Int x (1-tax rate)] – FCInv</b>	€ 7,024.13	€ 1,073.12	€ 13,053.11	85064.08
<b>1-Tax Rate</b>	0.9	0.9	0.9	0.9
<b>Interest expenses x (1-Tax Rate)</b>	0.13077	0.1224	0.1053	0.0828
<b>Int = Interest Expense</b>	0.1453	0.136	0.117	0.092
<b>FCInv = Fixed Capital Investment (total capital expenditures)</b>	€ 16,235.00	€ 18,671.00	€ 10,742.00	-73168
<b>Tax rate</b>	0.1	0.1	0.1	0.1
<b>Rd = cost of debt</b>	0.13077	0.1224	0.1053	0.0828
<b>E = book value of the firm's equity</b>	65031	88475	103565	62014
<b>D = book value of the firm's debt</b>	45006	41998	32148	37497

Source: Authors own calculations

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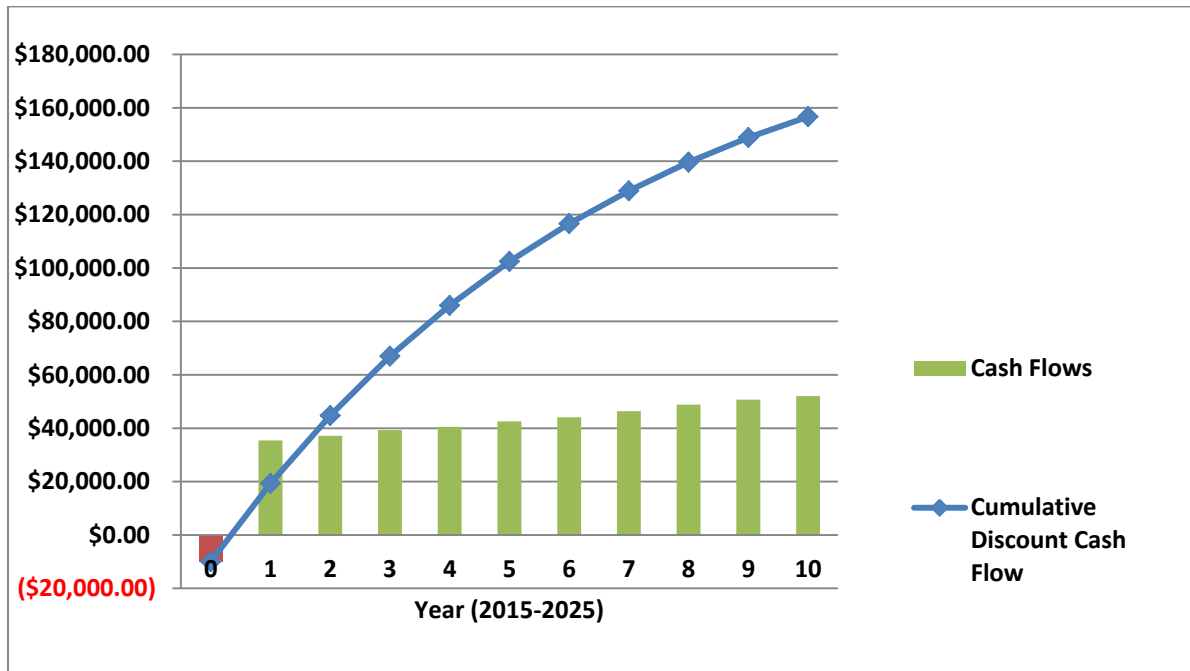
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Capital asset pricing model (CAPM) has been employed to calculate cost of equity. The cost of the equity for the company in 2013 stands in the range of 16.6%, while the cost of debt 5.3%. Cost of equity is inclining during the years, since the market return has been rising. Investors' confidence in U.S stock market has been inclining since the last financial turmoil of 2008. The capital structure of the company shows that company is highly indebted, which oppose the company toward bankruptcy when economic growth declines. Graph 1, shows the increasing scale of the cumulative free cash flow to the firm based on the growth rate assumptions. The growth rate assumption has been set up based on the average growth rate of the Kosovo economy (World Bank, 2004-2015). The Kosovo average growth rate was standing in the range of 3.97%.

**Tab.4** - Contains risk factors, such as: weighted average cost of capital (WACC), cost of equity, cost of debt, risk premium and the beta coefficient.

	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2015</b>
	<b>KEDS</b>	<b>KEDS</b>	<b>KEDS</b>	<b>KESCO</b>
<b>WACC (cost of capital)=Cost of Equity%(weight of equity)+Cd(%weight of debt)</b>	0.152	0.054	0.161	0.258
<b>Cost of Equity</b>	0.098	0.014	0.136	0.227
<b>Cost of debt</b>	0.053	0.039	0.024	0.031
<b>Cost of Equity = Risk-Free Rate + Beta * (Market Rate of Return - Risk-Free Rate)</b>	0.166	0.021	0.179	0.364
<b>Risk Premium (RM-RFR) (<a href="http://people.stern.nyu.edu/adamodar/">http://people.stern.nyu.edu/adamodar/</a>)</b>	0.133	0.006	0.143	0.306
<b>Risk Free Rate (RFR) (Kosovo Government Bonds)</b>	0.015	0.015	0.015	0.015
<b>Beta*(Market Rate of Return - Risk-Free Rate)</b>	0.151	0.0068	0.164	0.349
<b>Standard and Poors (S&amp;P 500)</b>	0.148	0.021	0.158	0.321

*Source: Authors own calculation*



**Fig.1 - Cumulative cash flow**

*Source: Authors own calculation*

Table 4. represents future cash flows of the company (2016-2026) generate with ten years' geometric progression. Monte Carlo Simulation that captures cash flow uncertainties, delivers all future possible outcomes. Since there is uncertainty associated in the future, Monte Carlo simulation eliminates part of the future risk through distributing possible cash flows based on the risk level of the company and the economy. DCF in general is built under certain assumptions and this make the model unstable in certain dimensions. DCF model does not consider bankruptcy risks while contain numerous assumptions.

Results from the Monte Carlo Simulation for ten years (2016-2025) based on the limitations recognized within the DCF model, the value of the company is 162 million. The maximum value of the company within 10 years is 169 million euro. The minimum value of the company is 155 million euro. Our simulation methodology considered an opportunity of investing one million euro in the KEDS. In that case the payback period is less than one year that reflects the profitability level of the KEDS company. Internal rate of the return is 3544%, in the case you invest one million euro and become part of the ownership structure of the company.

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**Tab.4** - Geometric progression delivered from the Monte Carlo Simulation within a 10-year period (2016-2025).

Year	0	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
<b>Growth : g =</b>		<b>4.37</b>	<b>4.04</b>	<b>3.18</b>	<b>4.22</b>	<b>4.40</b>	<b>4.72</b>	<b>4.34</b>	<b>3.96</b>	<b>4.11</b>	<b>3.43</b>
<b><math>\mu + \sigma * Z</math></b>		<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>	<b>%</b>
<b>Cash Flows</b>	<b>(\$1,000.00)</b>	<b>\$35,404.00</b>	<b>\$36,835.98</b>	<b>\$38,007.21</b>	<b>\$39,610.58</b>	<b>\$41,354.07</b>	<b>\$43,306.40</b>	<b>\$45,186.20</b>	<b>\$46,974.24</b>	<b>\$48,904.31</b>	<b>\$50,582.95</b>
<b>Discount Cash Flow FACTOR</b>	<b>1.000000</b>	<b>0.827335</b>	<b>0.684483</b>	<b>0.566297</b>	<b>0.468518</b>	<b>0.387621</b>	<b>0.320693</b>	<b>0.265320</b>	<b>0.219509</b>	<b>0.181607</b>	<b>0.150250</b>
<b>Discount cash Flow</b>	<b>(\$1,000.00)</b>	<b>\$29,290.97</b>	<b>\$25,213.62</b>	<b>\$21,523.37</b>	<b>\$18,558.25</b>	<b>\$16,029.71</b>	<b>\$13,888.04</b>	<b>\$11,988.81</b>	<b>\$10,311.26</b>	<b>\$8,881.38</b>	<b>\$7,600.09</b>
<b>Cumulative Discount Cash Flow</b>		<b>\$28,290.97</b>	<b>\$53,504.59</b>	<b>\$75,027.96</b>	<b>\$93,586.22</b>	<b>\$109,615.93</b>	<b>\$123,503.97</b>	<b>\$135,492.78</b>	<b>\$145,804.04</b>	<b>\$154,685.41</b>	<b>\$162,285.51</b>

*Source: Authors own calculations*

**Tab.5** - Monte Carlo Simulation results.

<b>Number of Samples:</b>	<b>1,000</b>		
<b>DCF Mean</b>	<b>\$ 162,005.68</b>		<b><math>\mu</math></b>
<b>DCF - Standard Deviation</b>	<b>\$ 2,074.23</b>	<b>1.28%</b>	<b><math>\sigma</math></b>
<b>Minimum</b>	<b>\$ 155,598.79</b>		
<b>Maximum</b>	<b>\$ 169,522.00</b>		
<b>5% Percentile</b>	<b>\$ 158,533.02</b>		

*Source: Authors own calculations*

## 6 CONCLUSION

Transparency is considered a crucial element in eliminating asymmetric information and moral hazard. Privatization of national assets has been pursued by scandalous facts, not only in Kosovo, but worldwide, in terms of: to whom assets were sold, prices and under what conditions assets were sold. Kosovo government was not transparent in selling Kosovo Electricity Distribution and Supply Company, since the intrinsic value was not announced before the privatization occurred. Faced with these arguments, our work concludes that the company was undervalued at the moment of privatization. The study used DCF (Discounted Cash Flow Method) to capture the present value of the company. Normal geometric progression and Monte Carlo Simulation were used in capturing future outcomes of the company. According to the results obtained with normal geometric progression (conducted for 50 years' future outcomes), fundamental value of the company stands in the range of 208 million euro. Under Monte Carlo Simulation within ten years' time period, the difference within fundamental value and the price sold stands in the range of 130 million euro. Recognizing the limitations in the methodology, fundamental value of the company with Monte Carlo simulation with 1000 samples in the range of ten years stands in the level of 162

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million euro. Maximum price according to the distributional outcomes can reach the level of 136 million euro, while the minimum stands in the range of 155 million euro. In contrast, Government of Kosovo sold the company for 26 million euro. The deviation between the two (fundamental value vs. price sold) might stand for different reasons, such as: government was using different methods in the valuation of KEDS or the asset was illiquid that the price must have been declined in order to sell it. Future research might clarify this deviation within fundamental value and the price sold.

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## APPENDIX:

<b>DCF</b>	<b>\$ 163,125.36</b>	<b>By Formula</b>
<b>DCF</b>	<b>\$ 163,125.36</b>	<b>By XLS Function</b>
<b>IRR</b>	<b>3544.10%</b>	
<b>PI</b>	<b>164.13</b>	
<b>Pay Back</b>	<b>-0.917</b>	<b>Years</b>

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## Risk Management and VaR with Application on ASIAN Market

*Duc Tran Cong, Jo Yu Wang*

### ABSTRACT

*As Basel committee on Banking Supervision (BCBS) announced Capital Accord tincorporating market risks, risk management became an critical issue in banking sector. J.P.Morgan proposed the RiskMetrics methodology to calculate the market risk and introduced the concept of value at risk (VaR) in 1996. VaR becomes the essential tool in measuring market risk in the financial institutions. Previous research focused on VaR modelling of matured markets, however less attention had been paid at emerging markets, especially the Asian markets. As known the distributions of financial assets return such as stock equityare more likely skewed and thick . In this paper, three special distributions such as generalised hyperbolic distribution (GH), skew Student t distribution (ST), and normal inversed Gaussian distribution (NIG) are applied to measure market risk of the market with less attentions. We also poredict sample 1day-Var and Expected shortfall for 4 markets as Taiwan Stock Exchange (TWSE), Kuala Lumpur Stock Exchange (KLSE), The Korea Stock Composite Index (KOSPI) and Ho Chi Minh Stock Exchange (HOSE).*

*The final results show that the NIG outperforms three other models in most of cases. Malaysia is the best evidence that show the market could control the risk rather well than the others. Viet Nam is an interested case as showing the similar to others despite its market is more immature and inexperienced than most of ASIAN financial markets. All evidences (excepting Malaysia) look to be slightly conservative in risk management and they could certainly loss the advantage in investing. However, that situation relatively show ASIAN markets are more carefull in risk management prior to extreme events, especially after two financial crisis.*

**Keywords:** *Value at Risk, risk management, ASIAN*

**JEL Classification:** O30, G23, G41

### 1 INTRODUCTION

The method value at risk (VaR) was marked as a market risk measureas the announcement of *Basel committee on Banking Supervision and J.P.Morgan's launch of RiskMestrics*. Hence, VaR is usually used as a essential tools in the banking and financial sector. In the past twenty years, VaR is the most important risk measurehowever the concept of it still critized due to the major drawbacks proposed by Artzner, Delbaen, Eber, and Heath (1999). Furthermore, the financial returns are asymmetric due to behavior of investors will be different to bad and good news following Engle and Ng (1993). *This implies that extreme events are much more likely to occur in practise than would be predicted by the symmetric thinner-tailed normal distribution, Turan, Hengyong, and Yi (2008)*. Since skewed generalized t distribution (GT) was presented firstly by *McDonald and Newey (1988)*, then extent by *Hansen (1994) and Theodossiou (1998)*. This distribution supplied the flexible tool to estimate VaR due to it is an assymmetric distribution with fat-tailed, skewness and leptokutosis characteristics.

## 2 LITERATURE REVIEW

It is interesting that some concepts in the literature are consistent with the one of VaR. For example, (Markowitz, 1952) has been the first one paper proposing the concept of VaR measure. His idea depended on how to select the portfolio investment to gain the best return. In other words, it optimizes the profit based on a determined level of risk. These are relative number of research which contributed and expanded to VaR measures. From the early 1990's, (Kupiec, 1995); (Studer, 1995) and (Fallon, 1996) introduced the basis technique for verifying the accuracy of VaR based on portfolio losses. (Morgan, 1997) described CreditMetrics, a framework for quantifying credit risk in portfolios of traditional credit products. Then, (Christoffersen, 1998) interpret interval forecasts and incorporate with risk measurement.

Parametric is the method widely used by financial institutions due to its simplicity. This approach always supposes that the asset return follow a specific distribution such as normal distribution. (Bollerslev, 1987) emphasized that the distribution of asset returns is skewed, fat-tailed and peaked around the mean. This distribution provides a flexible tool for modelling the empirical distribution of financial data exhibiting skewness, leptokurtosis and fat-tails, and nests many well-known highly flexible distribution functions (Turan et al., 2008). In this paper content, we will focus on Generalised Hyperbolic skew student's t-distribution (GHD) and its special case is Normal inversed Gaussian Distribution (NIG), comparing to Skew t distribution (STD). *Furthermore, VaR (J.P.Morgan 1996) and Expected shortfall (Artzner et al 1997 and Artner 1999) estimation will show the promising in practice of tail characteristic.*

## 3 METHODOLOGY

In first step, we will use three models to fit data and compare each other including Skew student's t-distribution, generalised Hyperbolic skew Student's t-distribution and its special case is Normal inversed Gaussian distribution. The most important purpose of this step is that from those results, we could see which model could fit data rather well than others.

Second step, we will use the versus estimated distributions above to determine the risk by using:

$$VaR_{\alpha} = \inf\{l \in \mathbb{R} : (P(L > l)) \leq 1 - \alpha\} = \inf\{l \in \mathbb{R} : F_L(l) \geq \alpha\} , \quad (1)$$

And expected shortfall (ES) or called as conditional Value at Risk (CVaR) is used in order to overcome VaR's disadvantages (about extreme losses and subadditive STD a) at different confident levels:

$$ES_{\alpha} = \frac{1}{1 - \alpha} \int_{\alpha}^1 q_u(F_L) du , \quad (2)$$

Where  $q_u(F_L)$  is the quantile function of the loss distribution ( $F_L$ ). The ES can therefore be expressed in terms of the VaR as

$$ES_{\alpha} = \frac{1}{1 - \alpha} \int_{\alpha}^1 VaR_u(L) du , \quad (3)$$

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Due to VaR only estimate a quartile of the distribution, ignores the important information regarding the tails of the distribution beyond this quantile. Conversely, ES could describe the tail risk better.

## 4 DATA

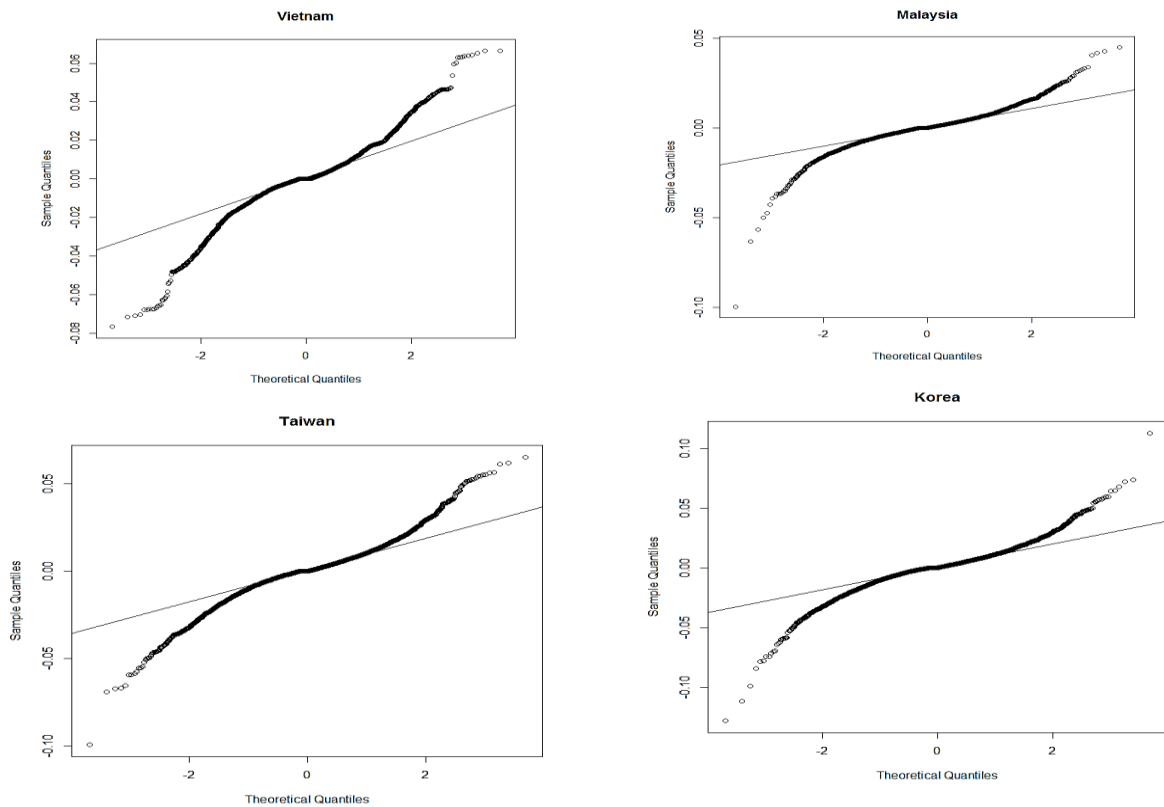
In this paper, four Asian equity indices are applied to examine the fitness in measuring market risk based on the concept of VaR. They are Taiwan Stock Exchange (TWSE), Kuala Lumpur Stock Exchange (KLSE), The Korea Stock Composite Index (KOSPI) and Ho Chi Minh Stock Exchange (HOSE). The daily closing prices from 28, July 2000 to the end of 2016.. The general data description is shown in Table 1. The results of ADF and KPSS test show that these are not any unit-root significances, or in another way, the data that used in this paper is stationary. The majority of JB test cannot be rejected indicating that the skewness and kurtosis of the data are far from normal distribution.

**Tab.1** - Data statistic summary

	<b>Mean</b>	<b>Median</b>	<b>Skewness</b>	<b>Kurtosis</b>	<b>ADF test</b>	<b>KPSS test</b>	<b>Jarque Bera</b>
Malaysia	0.000168	0.000014	-0.9156	11.7752	-15.514**	0.0879	0
Taiwan	0.000030	0.000000	-0.2752	3.7237	-14.967**	0.1071	0
Korea	0.000251	0.000128	-0.5156	6.7505	-16.619**	0.0695	0
Vietnam	0.000442	0.000000	-0.2549	3.3023	-13.013**	0.1988	0

Figure 1 shows the normal QQ-plots for the data return. For most of the data stock return, both tails are heavier than normal or Gaussian distribution, excepting Malaysia that has right tail is lighter than left tail.

Hence, all distributions are definitely skewed, having two heavy tails or one heavy and one semi-heavy (more likely Gaussian tail). From those characteristics, generalized skew student's T, generalized hyperbolic and Normal inversed Gaussian distributions will be employed to fit data in next section.

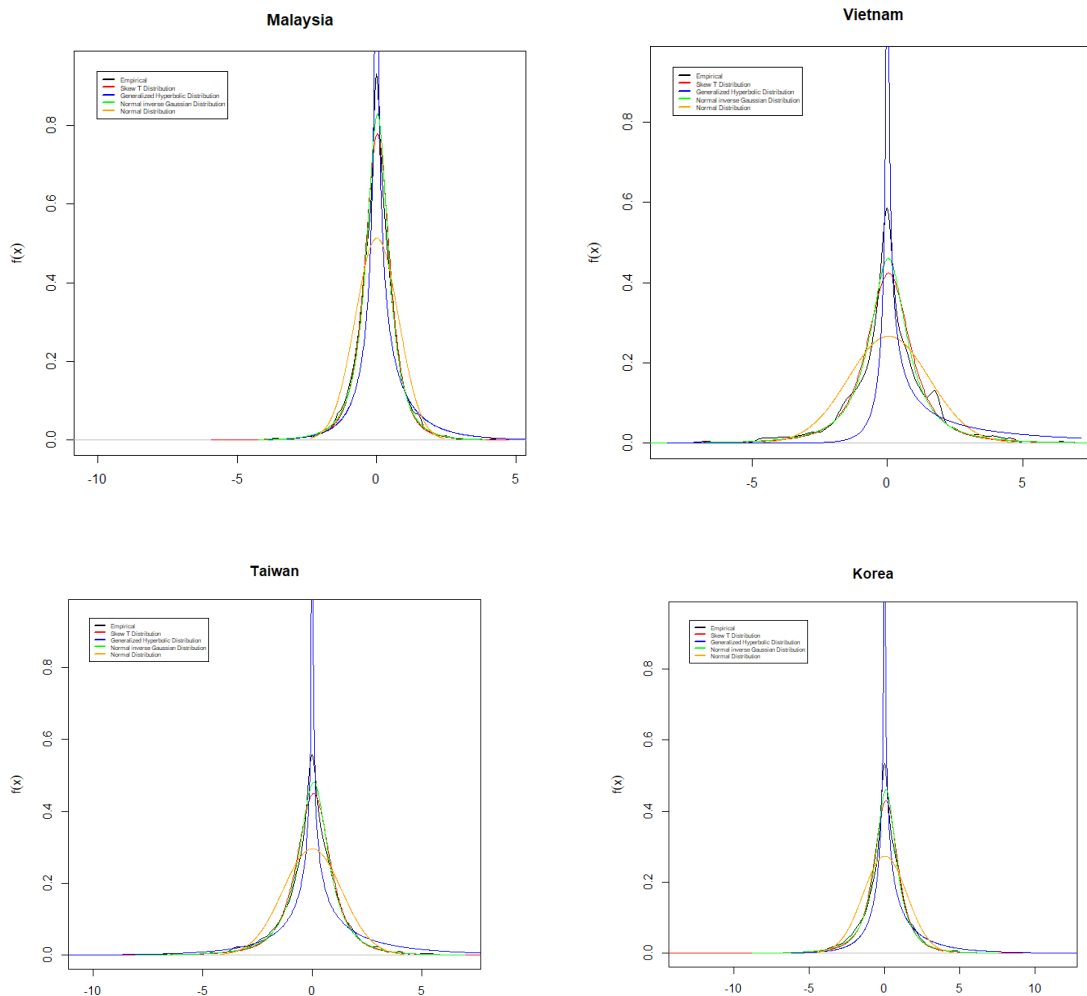


**Fig.1** - QQ-plots for log return of stock market variables

## 5 RESULTS AND DISCUSSIONS

### 5.1 Parameters estimation

The figure 2 shows the empirical and fitted densities. From this figure, the normal distribution is rather poor for describing the empirical from all of evidences evidently. Gaussian falls short of capturing the excess kurtosis. In contrast, STD and NIG track the data rather well than others, especially GHD overestimates the empirical line. The fitted STD and NIG models are not so far to describe empirical, however, NIG look to mirror the return better than STD.



**Fig.2** - Fitted densities for each stock equity return

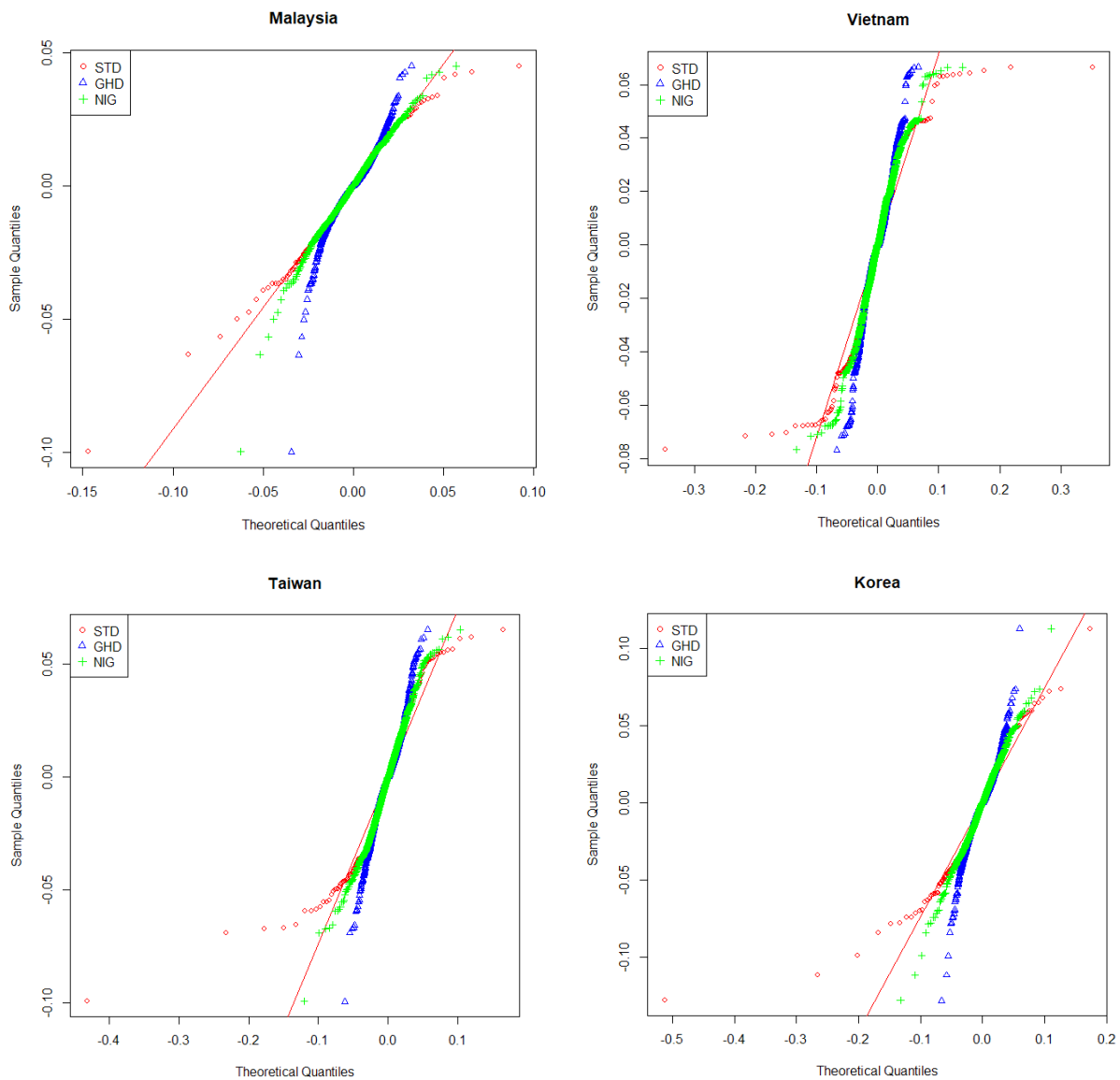
Source: Own computation based on data resources

In order to show more details, figure 3 interprets the QQ-plot for each models based on parameters. From the results above and make the better clarify, we will drop out of normal distribution. Here only includes STD, GHD and NIG models. We could see that the GHD is very poor in describing the daily return in all of cases. Conversely, STD and GHD show the good significant in tracking the data, the different is not so far. Insofar, STD tracks the data rather well than NIG distribution, especially in left tail.

### 5.2 VaR derived from STD, GHD and NIG

Due to we focus on return instead of loss, these are defined for the left tail of the distribution. Figure 4 shows the results of VaR for each countries. The special case of GHD is NIG track the associated empirical loss levels quite closely in most of cases. This model only overestimates the risk in confidence region of 98% and above. Moreover, The VaR derived from normal distribution seem to be conservative and the investors could be lost their advantage if put their position in here. In ordering of goodness of fit for three distributions (excepting normal distribution) could be summarized that: STD and NIG models could track

the data rather well than GHD. However, it's very complex in Vietnam. Both STD and NIG only track data rather well for the confidence region between 98% to 98.5% and overestimates for region above these.



**Fig.3** - QQ-Plot of fitted GHD for data return

Source: Own computation based on data resources

### 5.3 Expected shortfall derived from the STD, GHD and NIG

In contrast to the VaR, expected shortfall exhibits the results more clearer than Value at Risk (VaR). Here the risk estimation derived from NIG and STD consistently overestimate the expected loss in most of cases (except Malaysia which ES trajectory of NIG lower than empirical line in confident region above 98%). The overestimation (underestimation in Malaysia) is less severe for the NIG-based model and for the less (more) conservative levels. In all of models, the ES derived from normal distribution and GHD are the worst. Hence, we could see that the NIG is the best model for ES deriving. In most of cases, NIG could track the data rather well than others, especially for the confident level between 95% to 98%.

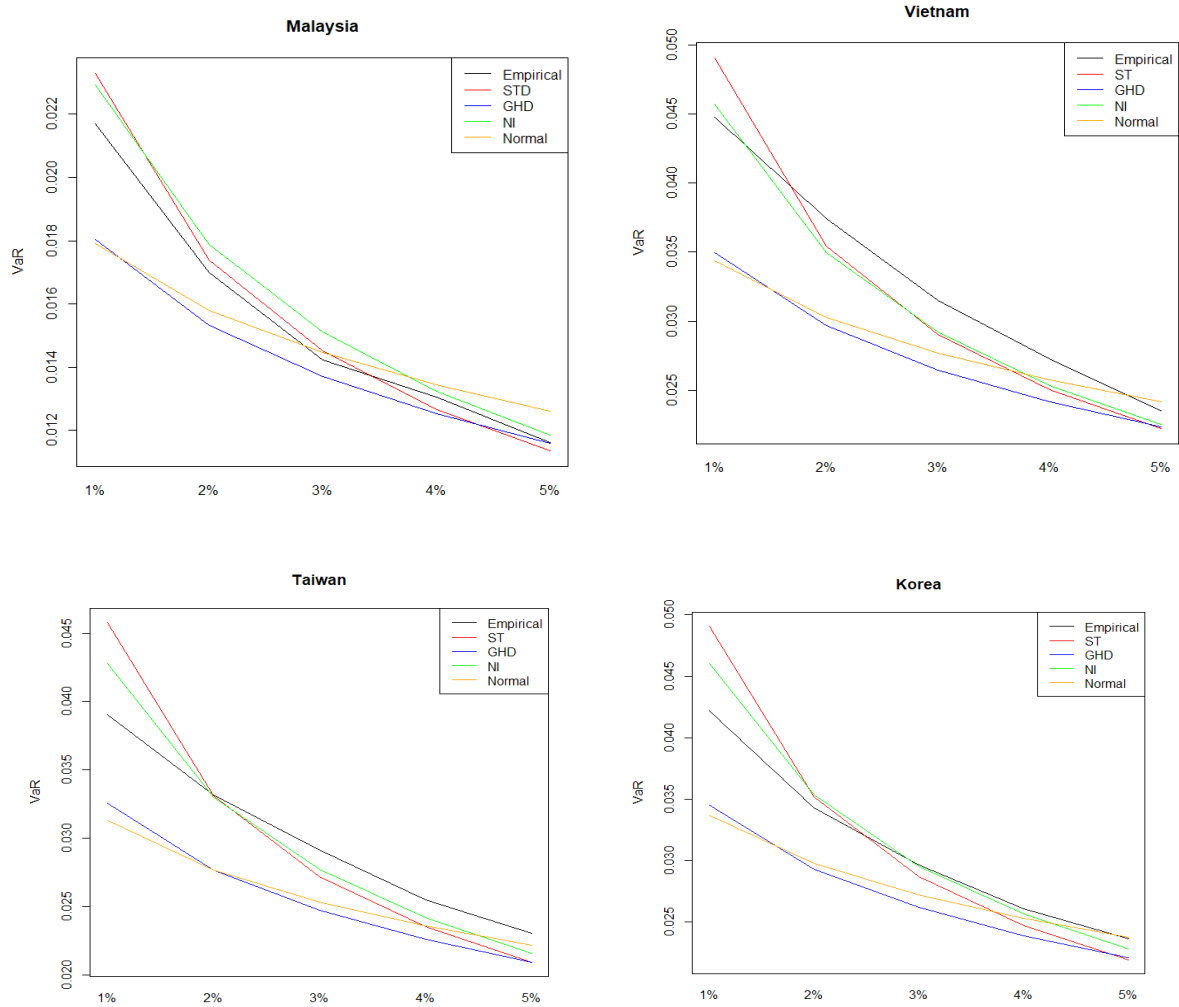


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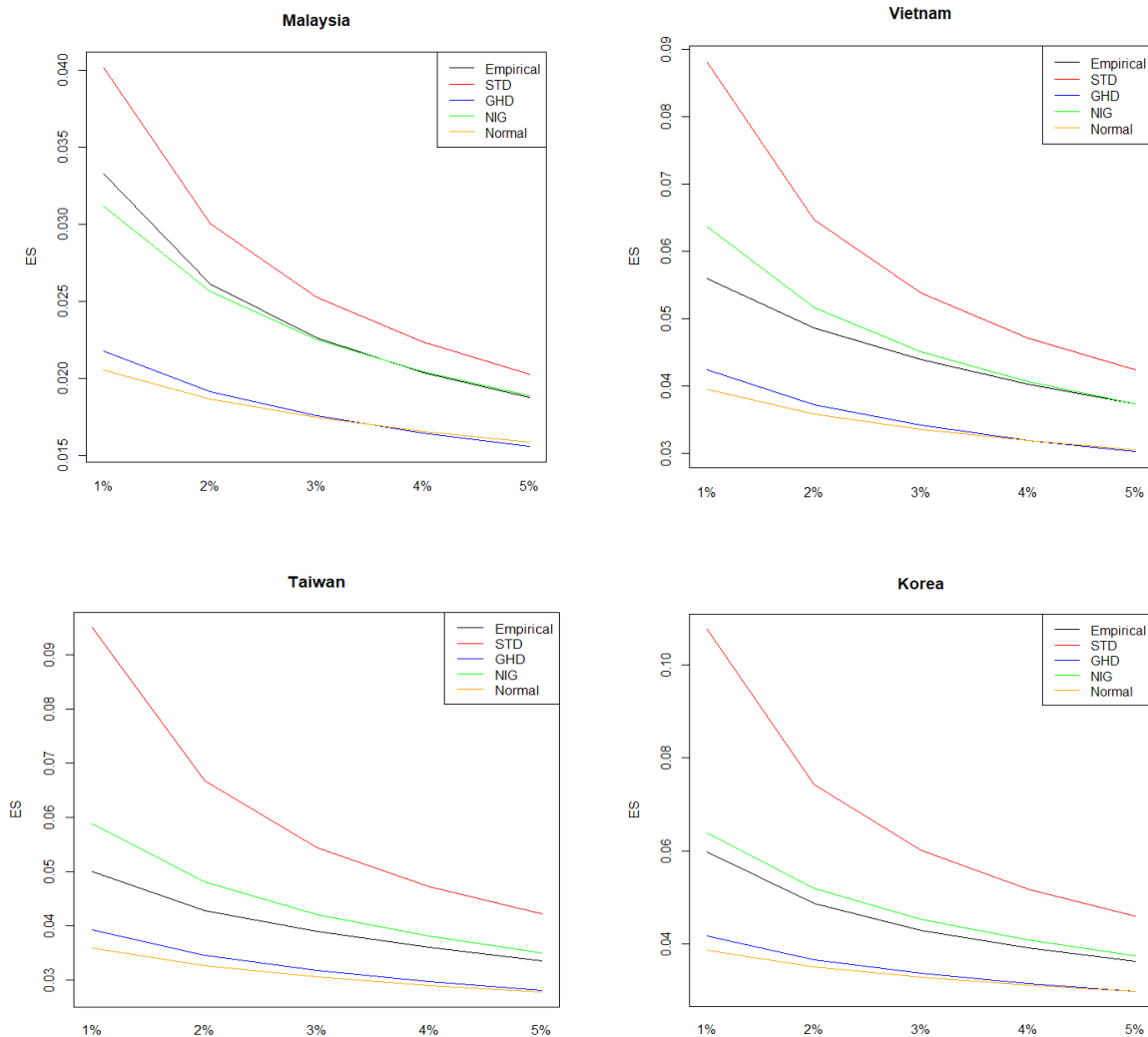
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Summary the expected shortfall results, STD, GHD and normal distribution obviously are failed to capture the risk. Malaysia is the best market in all of cases when the risk measure derived from NIG consistently the expected loss. Hence, the Malaysian investor could control the risk very well. In Taiwan and Korea, the market locates their holding position too conservative due to the risk measures that derived from NIG trajectory lies upper than the empirical loss. Moreover, the investor can lose their advantage in investing and could ignore the opportunities of trading and would affect to their performance or achievement. Vietnam is one interested case that its market has just established for around 26 years (From 2001). Comparing to different markets. Vietnam is the smallest about the scaling economy and financial experience. However, from the following result, we could see the expected shortfall derived from NIG tracks the empirical loss relatively well, the market is too conservative under confident region above 97%. In the fact that, due to Viet Nam was not affected intensively like others countries by the ASIAN financial crisis in 1997 and get through safety the mortgage crisis in 2008, moreover, Viet Nam government want to avoid any mistakes which were happened in the past and try to control the market prior to the extreme events.



**Fig.4** - VaR trajectory based upon STD, GHD and NIG models

*Source: Own computation based on data resources*



**Fig.5** - ES trajectory based upon STD, GHD and NIG models

Source: Own computation based on data resources

## 6 CONCLUSIONS

As a rule, profit is the most important goal in business. However, the uncertainly characteristic of market makes the investor have to think about the losses control due to the loss sometime could collapse their business if profit is less than the risk. Nowadays, these are more and more people who begin caring about risk management and VaR become the essential tool to estimate the risk. We also emphasized that despite the VaR concept is very simple but its measure is highly complex.

In this study, we have argued for a special case of the generalised hyperbolic distribution that we denote is NIG and then comparing it to STD, GHD and Gaussian distribution. STD and NIG could be very usefull to apply for finance field, especial in banking and stock market. We also poredict sample 1day-Var and Expected shortfall for 4 countries (Malaysia, Vietnam, Taiwan and Korea). Backtesting result shows that the NIG outperforms three other models in most of cases. Malaysia is the best evidence that show the market could control the

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risk rather well than the others. Viet Nam is a very interested case as showing the similar to others despite its market is more immature and inexperienced than most of ASIAN financial markets. All evidences (excepting Malaysia) look to be slightly conservative in risk management and they could certainly lose the advantage in investing. However, that situation relatively shows the risk hedging of ASIAN markets prior to extreme events after two financial crises.

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## Adoption and Impacts of Hybrid Seeds - an Evidence from Rice Farmers in Vietnam

*Pham Tien Thanh*

### ABSTRACT

*This paper is aimed at examining the economic impact of adoption of hybrid seeds. The research employs the panel data from the large scale surveys of rural households in Vietnam in 2012 and 2014. The results are estimated using regression Random and Fixed Effect Models. The findings reveal that adoption of hybrid seeds significantly increases the productivity and total output value from rice farming. However, since the adoption of hybrid induces higher intermediary cost, it is also found that there is no evidence to conclude the impact of the adoption of these new inputs on value added derived from rice cultivation.*

**Keywords:** Adoption, Farm households, Hybrid Seeds, Impact, Vietnam

**JEL Classification:** Q12, Q16

### 1 INTRODUCTION

Agriculture plays a crucial role in the economy of every country, especially the developing countries. Agriculture contributes to ensure food security and generate income for economic development. Moreover, in the developing countries, agriculture is a major income source of rural households that derives from domestic sales and export. Therefore, the improvement of quantity and quality of agricultural output is a focal point of the government in the developing countries (Bonnin & Turner, 2012). However, the population in the world as well as in the developing countries has increased more and more and the urbanization has been so rapid, which results in less land resource for agricultural production. Thenceforth, productivity improvement via expanding land area is no longer appropriate. Therefore, the most possible solution to enhance production output is to adopt new high-yielding technology.

The adoption of new agricultural technologies continues to play a key role in increasing agricultural productivity and enhancing food security in developing countries as well as in stimulating sustainable economic growth (Faltermeier & Abdulai, 2009). Literature proves the role of agricultural technology in improving welfare of the rural poor directly via enhancing their income, and indirectly by creating job, increasing wage of landless households, as well as lowering price of agricultural products.

The literature documents that new agricultural technologies are measured by different criteria such as improved varieties or breeds (Shiferaw et al., 2008), commercial fertilizer (Ricker-Gilbert et al., 2011), etc. In this research, hybrid rice varieties would be used to define agricultural innovation.

Rice is considered one of the main staples in the world as well as in developing countries like Vietnam. Adoption of improved rice varieties is considered as an effective to enhance productivity due to their attributes of short duration and high yield (Sall et al., 2000). Many

empirical studies investigate the adoption of improved cultivar varieties and the adopting impact on productivity and welfare (Shiferaw et al., 2008; Berceril & Abdulai, 2010).

Although modern rice varieties have been adopted in Vietnam since Doi Moi for nearly 30 years and had great contribution to the export performance of in the world rice market, there have been few studies quantifying the effects of modern rice varieties adoption on productivity and household income. This study examines the economic impact of adoption of hybrid varieties. The results are estimated with an application of regression using panel data. Both Random Effect Model (REM) and Fixed Effect Model (FEM) are employed to estimate the results. This research uses data from Vietnam Access to Resources Household Survey (VARHS) in 2012 and 2014.

## **2 LITERATURE REVIEW**

There have been a plethora of empirical studies on the economic impact of adoption of modern cultivar varieties (Sall et al., 2000; Shiferaw et al., 2008; Tambo & Abdoulaye, 2012; Berceril & Abdulai, 2010; Yorobe et al., 2016; Verkaart et al., 2017).

The adoption of modern rice varieties can enhance productivity due to their attributes of short duration and high yield (Sall et al., 2000).

Berceril and Abdulai (2010) find a positive and significant impact of adoption of improved maize varieties on farm household welfare. Specifically, improved maize varieties significantly increase farm household per capita and reduce their likelihood of falling below the poverty line.

Khonje et al. (2015) investigate the relationship between the adoption and welfare impacts of improved maize varieties in Zambia and find that adoption of improved maize significantly improves crop incomes, consumption, and food security as well as reduce poverty. Yorobe et al. (2016) reveal that green super rice variety significantly improves yields, thereby improving food security and contributing to poverty reduction.

Verkaart et al. (2017) find that adoption of improved chickpea significantly improves farm household income and also has significant poverty-reducing effect.

Shiferaw et al., (2008) reveal that smallholder farmers are the major beneficiaries from adoption of improved pigeonpea varieties. Moreover, consumers and rural net-buyers also benefit from this new technology due to lower market prices induced by higher productivity from adoption.

It is noteworthy that the adoption of modern varieties may only enhance productivity when being combined with new fertilizers and modern cultivation practices (Karanja et al., 2003). Nakano and Kajisa (2012) also find a complementary relationship between modern varieties and water control, and that modern varieties should be applied as a package of technologies including other agronomic practices to optimize their outcomes.

### 3 METHODOLOGY

#### 3.1 Estimation strategy

The estimation model using pooled OLS is written as follows:

$$Y_{it} = \beta_0 + \beta_1 A_{it} + \beta_2 X_{it} + \beta_3 Z_i + e_{it} + u_i \quad (1)$$

Where  $i$  and  $t$  denote households  $i$  and time periods  $t$ , respectively.  $Y$  is the economic outcome of interest (i.e. productivity, production value, value added or cost).  $A$  is the adoption variable.

$X$  are a set of time-variant factors that affect outcomes, including attribute of household head (i.e., education, marital status, age) and household-specific characteristics (i.e., household size, loan size, land).  $Z$  are a vector of time-invariant factors such as gender and ethnicity of household head, provincial region and so forth.  $e_{it}$  and  $u_i$  are error terms that account for time-variant and time-invariant unobservables that may affect the outcomes.

It indicates that the estimated results using equation (1) may be biased due to two sources of unobserved heterogeneity. With panel data, it is possible to resolve this problem via an application of household-level fixed effects (FE) regression. By taking the difference of equation (1) over two periods, the estimation model is as follows:

$$(Y_{i1} - Y_{i0}) = \beta_1 (A_{i1} - A_{i0}) + \beta_2 (X_{i1} - X_{i0}) + e_{it}$$

Or

$$\Delta Y_i = \beta_1 \Delta A_i + \beta_2 \Delta X_i + \Delta e_{it} \quad (2)$$

In equation (2), the time-invariant observable ( $Z$ ) and unobservable ( $u_i$ ) factors are cancelled out. Therefore, the bias associated with time-invariant factors are removed and the equation (2) may yield less biased estimate of impact of hybrid seeds adoption.

An application of FEM will swept out the time-invariant heterogeneity; however, the estimates may be still biased due to time-variant heterogeneity. Therefore, a combination of FEM and Instrumental variable (IV) should be applied to resolve the remaining bias.

#### 3.2 Selection of variables used for analysis

Adoption variable is defined as whether rice farmers adopt hybrid seeds from Vietnam or China, and equals 1 if farmers adopt hybrid seeds and 0 if they adopt other local varieties.

Literature documents that there are many indicators to define outcomes derived from rice cultivation, including productivity (measured by quantity per hectare, quantity per labor), income per capita, net benefit (benefit – cost), income, poverty gap or poverty severity (Alene et al., 2009; Amare et al., 2009; Wu et al., 2010; Mason & Smale, 2013). In this research, productivity, total production value, intermediate cost and value added are employed to reflect the farmers' economic outcomes from rice cultivation.

In addition to varieties, other factors may affect such outcomes. Therefore, on the basis of empirical studies and availability of data, the model also incorporate other control variables, including characteristics of household head, household and commune (Mason & Smale, 2013; Yorobe et al., 2016; Verkaart et al., 2017). The variables used for analysis and their definition are presented in **Table 1**.



**Tab.1** - Variables used for Analysis – Definition

<b>Variable</b>	<b>Definition</b>
<b><i>Adoption</i></b>	
<i>Hybrid Seeds</i>	Adoption of Hybrid Seeds from Vietnam or China (1=Yes; 0 otherwise)
<b><i>Control Variables</i></b>	
Education	Years of Schooling of Household Head
Age	Age of Household Head
<i>Marital Status</i>	<i>Marital Status of Household Head (1=Married; 0 otherwise)</i>
<i>Gender</i>	<i>Gender of Household Head (1=Male; 0 otherwise)</i>
<i>Ethnicity</i>	<i>Ethnicity of Household Head (1=Kinh; 0 otherwise)</i>
Production credit	Loan Amount used for Production (Million VND)
Saving	Saving Amount (Million VND)
Production Asset	Value of Production Assets (Million VND)
Transfer	Value of Transfer (Million VND)
<i>Poverty Status</i>	<i>Household holding a poverty certificate (1=Yes; 0 otherwise)</i>
Agricultural	Number of Labor actively involved in Agriculture
<i>Extension Visit</i>	<i>Visit by Agricultural Extension Agent (1=Yes; 0 otherwise)</i>
Cultivation Land	Total Area of Cultivation Land (Hectare)
Distance	Distance from Home to Main Road (Kilometer)
<i>Market</i>	<i>Market in the commune (1=Yes; 0 otherwise)</i>
<b><i>Outcome</i></b>	
Productivity	Rice Quantity per hectare (Ton per hectare)
Production Value	Total production value per hectare (Million VND)
Intermediary Cost	Intermediary (non-seed) cost (Million VND)
Value Added	Value added equals production value minus cost (Million VND)

*Note: HHH= Household Heads; Dummies are in Italic.*

## 4 DATA

### 4.1. Data Source

This paper uses the data from Vietnam Access to Resource Household Survey (VARHS) in 2012 and 2014. VARHS are conducted under the cooperation of the Central Institute for Economic Management (CIEM), Ministry of Planning and Investment (MPI), the Center for Agricultural Policy (CAP), Institute of Labor Science and Social Affairs (ILSSA), Ministry of labor - Invalids and social affairs (MOLISA); the Development Economics Research Group (DERG), the University of Copenhagen; and the Ministry of Foreign Affairs (DANIDA), Denmark.

Vietnam Access to Resource Household Survey (VARHS) is a large-scale survey. This survey collects data from rural households in 47 communes located in 12 provinces in Vietnam, including Ha Tay, Lao Cai, Phu Tho, Lai Chau, Dien Bien, Nghe An, Quang Nam, Khanh Hoa, Dak Lak, Dak Nong, Lam Dong and Long An. These 12 provinces represents 7 socio-economic regions in Vietnam, including Red River Delta, North East, North West, North Central, South Central Coast, Central Highlands and Mekong River Delta.

VARHS survey provides detailed information about a wide range of important demographic, economic and social characteristics of the farm households, such as on farm- and farmer-specific attributes, resources endowment, agricultural inputs and outputs, economic activities and welfare, savings and borrowings etc.

## 4.2. Research Sample

From 3703 household survey in 2012, 3644 households are re-interviewed in 2014. Since the research objective is to examine the role of adoption of hybrid seeds, only rice farmers are retained for quantitative analysis. In order to create a balance panel data, some observations with missing data are dropped out of the research sample. The final sample used for estimation are 4,574 observations, including 2,287 households each survey.

## 4.3. Descriptive Statistics

**Table 2** shows some summary statistics of the variables used for analysis for the case of pooled sample in two surveys. 3,063 farm households are found to adopt hybrid seeds while the number of adopters is 1,511. It indicates that the proportion of hybrid seeds adopters in this research is quite high. **Table 2** also presents summary statistics on means for continuous variables and proportions for discrete variables for whole sample, hybrid seed adopters and non-adopters.

For the case of whole sample, the average grade completed by household heads is around 6, and the adopters seem to have higher education level than non-adopter. Average age of household head is about 49.3 and about 85.1% are male-headed. Adopters (about 49.7 years old) seems to be older than non-adopters (about 48.1 years old), and the ratio of male household heads of adopting group (85.5%) is higher than that of non-adopting group (84.4%). Around 85.8 percent of household heads are married, and the proportion of married household head of adopters (86.0%) is higher than that of non-adopters (85.2%). Kinh ethnic households account for around 53.5 per cent. Adopters (60.8%) have higher proportion of Kinh ethnicity households compared to non-adopters (38.8%).

There are around 25.9 percent of poor households, and the ratio of poor in adopting group (22.5%) is smaller than that in non-adopting groups (32.7%). 19.9 per cent of rice farmers have access to production credit and the average loan size is around 34.4 million VND. The proportion of borrowers and loan size in adopting group are higher than those in non-adopting group. On average, the rice farmers own saving of 16.8 million VND, transfer of 9.7 million VND and production asset of 4 million VND. Adopters seem to own more saving, transfer and production assets than non-adopters.

Rice farmers, on average, have three labors actively involved in agriculture and 0.7 hectares of cultivation land. Adopting farmers seem to have less agricultural labors but more cultivation land than non-adopting group. On average, the proportion of farmers visited by agricultural extension agents is around 16.5 percent, and that ratio in adopting group is higher than that in non-adopting group. Rice farmers locate around 1.8 kilometers from main road. Adopters seem to reside closer from main road than non-adopters. 56.5 per cent of farmers reside in the communes that have at least one market within and that ratio in adopters is higher than that in non-adopters.

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**Tab.2** - Variables used for Analysis – Summary Statistics

Variable	Whole Sample		Adopters		Non-Adopters	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
<i><b>Control Variables</b></i>						
Education	5.951	3.969	6.439	3.872	4.961	3.979
Age	49.262	12.849	49.684	12.857	48.408	12.794
<i>Marital Status</i>	0.858	0.349	0.860	0.347	0.852	0.355
<i>Gender</i>	0.851	0.356	0.855	0.352	0.844	0.363
<i>Ethnicity</i>	0.535	0.499	0.608	0.488	0.388	0.488
Production credit	6.797	28.347	7.339	29.982	5.698	24.675
<i>Borrowers</i>	0.198	0.398	0.201	0.401	0.191	0.393
Loan size	34.389	55.852	36.490	58.396	29.894	49.775
Saving	16.837	39.917	18.852	41.601	12.752	35.930
Production Asset	3.997	35.271	4.222	33.377	3.541	38.834
Transfer	9.745	24.460	10.371	27.090	8.476	17.924
<i>Poverty Status</i>	0.259	0.438	0.225	0.418	0.327	0.469
Agricultural Labor	3.070	1.419	2.994	1.377	3.223	1.489
Extension Visit	0.165	0.371	0.180	0.384	0.133	0.340
Cultivation Land	0.678	1.518	0.564	0.844	0.909	2.334
Distance	1.788	2.058	1.684	1.938	1.998	2.269
<i>Market</i>	0.565	0.496	0.632	0.482	0.430	0.495
<i><b>Outcome Variables</b></i>						
Productivity	4.547	1.534	4.729	1.401	4.177	1.717
Production Value	27.677	8.725	28.969	8.029	25.059	9.466
Intermediary Cost	13.013	9.857	14.422	10.342	10.158	8.071
Value Added	12.781	10.450	12.513	11.228	13.324	8.638
<b>Obs</b>	4,574		3,063		1,511	

*Source: Author's own calculation from the research data.*

*Note: Dummies are in Italic.*

## 5 RESULTS AND DISCUSSIONS

**Table 3** presents the estimates using both REM and FEM. The Hausman test shows that FE models are more favourable than RE models. Therefore, the discussion and the interpretation will be presented using the estimated results from FE models.

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**Tab.3** - Economic Impacts of Hybrid Seeds Adoption: FEM and REM estimations

Variable	Productivity		Production Value	
	FE	RE	FE	RE
Hybrid Seed	0.191*** (0.002)	0.240*** (0.000)	1.449*** (0.000)	2.120*** (0.000)
Education	0.013 (0.482)	0.006 (0.407)	0.135 (0.223)	0.135*** (0.001)
Age	0.008 (0.332)	0.000 (0.803)	0.117** (0.017)	0.005 (0.630)
Marital Status	0.015 (0.937)	0.012 (0.902)	-0.274 (0.810)	0.120 (0.827)
Gender	-0.078 (0.723)	-0.019 (0.843)	-0.592 (0.661)	-0.477 (0.371)
Ethnicity	0.527 (0.398)	0.995*** (0.000)	0.517 (0.893)	3.714*** (0.000)
Production credit	0.001 (0.325)	0.001 (0.277)	0.007 (0.244)	0.001 (0.860)
Saving	-0.000 (0.776)	0.002*** (0.000)	0.003 (0.519)	0.013*** (0.000)
Production Assets	0.001 (0.479)	0.001** (0.025)	0.006 (0.196)	0.006* (0.065)
Transfer	-0.000 (0.938)	-0.002*** (0.005)	0.009 (0.219)	-0.004 (0.462)
Poverty Status	-0.149* (0.054)	-0.347*** (0.000)	-1.468*** (0.002)	-2.064*** (0.000)
Agricultural Labor	0.032 (0.243)	0.011 (0.520)	0.221 (0.189)	0.135 (0.172)
Extension Visit	0.199*** (0.004)	0.161*** (0.003)	0.624 (0.138)	0.579* (0.066)
Cultivation Land	-0.010 (0.585)	-0.009 (0.529)	-0.077 (0.507)	-0.342*** (0.000)
Distance	0.004 (0.815)	0.006 (0.580)	-0.052 (0.628)	-0.160*** (0.008)
Market	0.101 (0.299)	0.098* (0.051)	1.663*** (0.006)	1.063*** (0.000)
Constant	3.582*** (0.000)	3.749*** (0.000)	19.175*** (0.000)	23.238*** (0.000)
Hausman test (FEM-REM)	<b>chi2(16) = 44.38</b> <b>Prob&gt;chi2 = 0.0002</b>		<b>chi2(16) = 45.59</b> <b>Prob&gt;chi2 = 0.0001</b>	
Obs	4,574		4,574	
No. of Households	2,287		2,287	

Note: p-value in parentheses; \*\*\*, \*\* and \* : Significant at 1%, 5% and 10%, respectively Hausman test under null hypothesis that estimators of FEM and REM are consistent, and if P-value<0.05, FEM is more favorable.

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**Tab.3** - Estimated Results (cont)

Variable	Value Added		Intermediary Cost	
	FE	RE	FE	RE
Hybrid Seed	0.228 (0.663)	-0.820** (0.016)	0.997** (0.022)	2.427*** (0.000)
Education	0.106 (0.493)	0.094* (0.061)	0.044 (0.734)	0.032 (0.481)
Age	0.007 (0.923)	0.023 (0.103)	0.114** (0.044)	-0.018 (0.149)
Marital Status	-1.073 (0.497)	-0.151 (0.832)	0.634 (0.629)	0.127 (0.839)
Gender	-1.540 (0.412)	-0.128 (0.852)	1.101 (0.481)	-0.260 (0.669)
Ethnicity	2.234 (0.676)	0.783* (0.085)	0.449 (0.920)	3.395*** (0.000)
Production credit	0.009 (0.298)	-0.012** (0.037)	-0.001 (0.879)	0.011** (0.021)
Saving	-0.012* (0.054)	-0.017*** (0.000)	0.018*** (0.001)	0.031*** (0.000)
Production Assets	-0.002 (0.727)	-0.000 (0.957)	0.008 (0.185)	0.006 (0.137)
Transfer	-0.007 (0.482)	-0.002 (0.713)	0.014* (0.086)	-0.003 (0.602)
Poverty Status	-0.456 (0.491)	-0.936** (0.018)	-0.752 (0.173)	-1.115*** (0.001)
Agricultural Labor	0.538** (0.021)	0.422*** (0.001)	-0.291 (0.135)	-0.293*** (0.009)
Extension Visit	0.058 (0.921)	-0.677 (0.106)	0.413 (0.395)	1.095*** (0.002)
Cultivation Land	0.035 (0.828)	-0.096 (0.363)	-0.068 (0.613)	-0.232** (0.011)
Distance	-0.001 (0.995)	0.006 (0.935)	0.015 (0.900)	-0.165** (0.017)
Market	0.436 (0.602)	-0.664* (0.068)	1.189* (0.087)	1.538*** (0.000)
Constant	11.118** (0.027)	11.341*** (0.000)	4.647 (0.265)	10.377*** (0.000)
Hausman test (FEM-REM)	<b>chi2(16) = 27.90</b> <b>Prob&gt;chi2 = 0.0325</b>		<b>chi2(16) = 64.78</b> <b>Prob&gt;chi2 = 0.0000</b>	
Obs	4,574		4,574	
No. of Households	2,287		2,287	

Note: p-value in parentheses; \*\*\*, \*\* and \*: Significant at 1%, 5% and 10%, respectively  
Hausman test under null hypothesis that estimators of FEM and REM are consistent, and if P-value<0.05, FEM is more favorable.

The results indicate that the adoption of hybrid rice varieties has statistically significant impact on productivity, but the impact magnitude is quite small. In particular, on average, productivity of hybrid varieties is only around 0.191 ton per hectare higher than that of local

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varieties. Similarly, adoption of hybrid seeds leads to an increase in total output value at around 1.449 million VND per hectare. Regarding value added, the estimated results show that rice farmers do not benefit from adopting hybrid seeds. Moreover, the adopters of hybrid seeds are found to spend more on intermediate cost at around 0.997 million VND per hectare.

Though adoption of hybrid seeds leads to a significant increase in productivity and total production value, the increasing magnitude is quite small. It may indicate that rice farmers have not optimized the potentials of these hybrid seeds. The adoption of modern varieties may only optimize the outcomes when being combined with new fertilizers, modern cultivation practices or water control (Karanja et al., 2003; Nakano and Kajisa, 2012) also find a complementary relationship between modern varieties and water control, and that modern varieties should be applied as a package of technologies including other agronomic practices to optimize their outcomes. However, due to data unavailability, this research can not test the impact of hybrid seeds in combination with other factors of technology package.

It is also noteworthy that poverty status has significant and negative effects on productivity and total output value, which thereby indicates that the poor have less advantage in rice farming than the non-poor. The significant and positive effect of coefficients *Extension Visit* shows that the agricultural extension agent plays an important role in improving the effectiveness of rice farming. Agricultural extension agents may support the rice farmers in terms of providing information, knowledge and training activities; thenceforth, the farmers can optimize the return from hybrid rice cultivation.

## 6 CONCLUSIONS

This study examines the adoption of hybrid rice seeds in rural Vietnam. It employs estimations using FEM and REM to quantify the impact of the adoption of hybrid seeds on various economic outcomes measured by productivity, total output value, value added and intermediary cost.

The findings reveal a significantly positive impact of hybrid seed adoption on productivity and total output value. However, there is no evidence to conclude the impact of adoption of these new inputs on value added derived from rice farming. One plausible explanation is that adoption of new technologies normally incurs high initial costs, which is reflected via the significant and positive effects on intermediary costs.

It is implied that modern varieties should be applied as a package of technologies to optimize their potentials (Karanja et al., 2003; Nakano and Kajisa, 2012). New varieties also require new cultivation practice. Thenceforth, the role of agricultural extension centers and farmers union should be promoted to provide farmers with relevant training. The role of cooperatives should also be promoted to help farmers access to input and output markets, hence farmers can reduce intermediary costs and increase the output value derived from rice farming.

Regarding econometric estimations, though the application of FEM can control for time-invariant factors that may affect the results, the estimates may be still biased due to time-varying unobservable determinants of outcomes. A further research using instrumental variables should be conducted to solve this issue.

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**APPENDIX**

**Appendix.1 - Economic Impacts of Hybrid Seeds Adoption: Pooled OLS estimations**

<b>Variables</b>	<b>Productivity</b>	<b>Production Value</b>	<b>Value Added</b>	<b>Intermediary Cost</b>
Hybrid Seed	0.254*** (0.000)	2.226*** (0.000)	-0.887*** (0.009)	2.616*** (0.000)
Education	0.004 (0.509)	0.132*** (0.000)	0.095* (0.054)	0.028 (0.516)
Age	0.000 (0.814)	0.004 (0.662)	0.023* (0.090)	-0.019 (0.105)
Marital Status	0.008 (0.927)	0.159 (0.763)	-0.129 (0.853)	0.117 (0.846)
Gender	-0.016 (0.854)	-0.493 (0.329)	-0.106 (0.873)	-0.317 (0.584)
Ethnicity	0.974*** (0.000)	3.681*** (0.000)	0.808* (0.067)	3.314*** (0.000)
Production credit	0.001 (0.387)	-0.000 (0.938)	-0.014** (0.019)	0.013*** (0.008)
Saving	0.003*** (0.000)	0.014*** (0.000)	-0.017*** (0.000)	0.033*** (0.000)
Production Assets	0.002*** (0.010)	0.006* (0.062)	-0.000 (0.999)	0.006 (0.164)
Transfer	-0.003*** (0.000)	-0.006 (0.232)	-0.002 (0.749)	-0.006 (0.321)
Poverty Status	-0.391*** (0.000)	-2.117*** (0.000)	-0.967** (0.014)	-1.128*** (0.001)
Agricultural Labor	0.005 (0.753)	0.124 (0.197)	0.417*** (0.001)	-0.294*** (0.008)
Extension Visit	0.146*** (0.008)	0.567* (0.075)	-0.736* (0.079)	1.205*** (0.001)
Cultivation Land	-0.009 (0.522)	-0.383*** (0.000)	-0.104 (0.318)	-0.253*** (0.005)
Distance	0.007 (0.484)	-0.168*** (0.005)	0.008 (0.915)	-0.181*** (0.008)
Market	0.096** (0.042)	0.992*** (0.000)	-0.690* (0.053)	1.525*** (0.000)
Constant	3.791*** (0.000)	23.354*** (0.000)	11.390*** (0.000)	10.444*** (0.000)
Obs			4,574	
No. of Households			2,287	

*Note: p-value in parentheses; \*\*\*, \*\* and \* : Significant at 1%, 5% and 10%, respectively*

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## Socioeconomic Analysis of Agricultural Production among Small Scale Farmers in Vayoc Dzor Province, Armenia

*Davit Alaverdyan, Olagunju Kehinde Oluseyi*

### ABSTRACT

*Small-scale farmers are known to produce the greater proportion of food consumed in the Third World, especially in Armenia. Therefore, there is a need to study the various socioeconomic factors responsible for agricultural production at the farm household level in Armenia. Data were collected with the aid of structured questionnaires. Analytical adopted for the study include: descriptive statistics, gross margin and regression analysis. We found that the gross margin of small scale farmers in the study area is 580.16 Euro per production cycle. Further, age of farmers, household size, years of farming experience, educational status, access to agricultural training and access to credit facilities are identified significant socioeconomic factors that influencing agricultural productivity in the study area. In summary, we recommend that effective credit facilities structure and agricultural trainings should be made accessible to farmers, while farmers that receive financial aid/support from government should be well monitored by appropriate government agency. Also, youth participation in agricultural production activities should be encouraged.*

**Keywords:** *Agricultural productivity, Small-scale farming, gross margin, Ordinary Least Square, Socioeconomics, Armenia,*

**JEL Classification:** A14, Q12, Q13, Q1, O13 Q120

### 1 INTRODUCTION

Armenia is an upper-middle-income country with a small-sized economy. Armenia has the world's 135 (CIA Factbook, 2014) largest economy by nominal GDP which in 2014 with the 3.4% growth was 11.6\$ billion (World Bank, 2014). Republic of Armenia (RA), like in many other developing countries, agriculture is the major livelihood among the rural households. Sector plays a very important role in Armenian economy as it employs large share of the entire population and also has a large contribution to the national GDP (Alaverdyan et al, 2015). In 2014, together with the associated agro-processing, agriculture accounted for about 21.9% of GDP, about 18% of export earnings, and about 40% of employment. The fast-economic growth over the last decade has generated new opportunities for the agriculture sector, which has grown at a robust rate averaging more than 6% annually since 1997 despite the downturn in 2009-10 (APIU, 2013). Manufacturing and industry in Armenian economy account for 30.4% of GDP and employs 16.80% of the population. The service sector accounts for 47.7% of the GDP and employs 39% of the population (CIA Factbook, 2014). In the agricultural production sphere, the main land users are private farmers who own 71.7% of privatized arable lands, 78.3% of perennial crop areas, and 48.4% of grasslands. As a result, the private sector produces over 98% of the gross agricultural product (Avetisyan, 2010). Approximately forty percent of Armenia is not suitable for agriculture. Armenian has 494.3 thousand hectares of arable land, 63.8 thousand hectares of perennial grass, 138.9

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thousand hectares of hay lands and 694 thousand hectares of pasture. Agriculture is heavily dependent on irrigation (Jeffrey and Sardaryan, 2006). After independence in 1991, Armenia took steps to liberalize its economy in general, and the agricultural sector in particular, by introducing major reform programs. The Armenian land privatization program was unique among former Soviet Republics in regard to the speed and completeness of its implementation (APIU). During that period various factors have caused a decrease in the area covered by gardens, the yield has dropped and the volumes of fruit processing have declined (Urutyanyan and Thalmann 2011). In 1992, Armenia's business and agricultural sectors were stagnant and non-functional. The breakup of the collective agriculture resulted in about 340,000 small scale farms, with the lack of machinery and equipment, irrigation and skills to conduct effective farming practices (Urutyanyan and Vardanyan 2012). Farm inputs, machinery, farm size, and capital either disappeared or became obsolete while the market for farm products changed radically. In a period of five to ten years, Armenian agriculture went from being high output and export oriented to subsistence level with a rural population that experienced a serious degradation and decline in their quality of life. Moreover, deterioration in the use of land such as neglecting of crop rotations, use of fertilizers and pest or diseases control agents dropped significantly. Finally, absence of machinery resulted in overall decrease of agricultural productivity (Navasardyan, 2000). Currently, rural population of Armenia represents 37.2% of the total population (World Bank, 2014). As a result of privatization, each farmer received on average 1.4 ha of land and faced problems of transformation from one political and economic system into another. Agriculture is the main income source for rural inhabitants. Different studies indicate that large farms with more than 10 hectares currently represent only 6% of all farms (Urutyanyan and Vardanyan, 2012). As we stated by National Statistical Service (NSS, 2015) there is more than proportional increase in crop output and considerable growth in the major products and by-products from livestock and poultry (Alaverdyan et al, 2015). However, the sector currently is experience significant challenges, not only in production, but also in market access and competitiveness. There is a lack of economies of scale, increased input costs, and Armenian farmers have not invested in the appropriate food safety certifications, such as Global GAP, that would allow them to enter higher-value markets like the EU. Armenian farmers are also facing increased regional competition from other CIS and Eastern European countries. Other factors conditioning the limitation of Armenian agricultural products are:

- Price of raw materials and fertilizers
- Lack of social support
- Technological limitations
- Lack of highly qualified personnel
- Lack of irrigation systems
- Lack of infrastructure (on harvesting and further stages, storage/ cold storage, processing, etc.)
- Interruption of supplies, seasonality.
- Absence of insurance from natural disasters, etc. The development of agriculture is hindered also due to the following factors:
- There are problems with coordinated and targeted use of natural feeding areas particularly pastures and hayfields.

Moreover, poor use of arable lands is essentially dependent on the lack of financial resources of businesses employed in agriculture, low profitability, difficult access to machine works, fragmented land parcels, difficulties in marketing agricultural products, etc. In some boarder

communities, designated use of arable lands is affected by dangers associated with borderline land cultivation. The success of any agribusiness enterprise does not solely depend on the size of the enterprise but on the totality of socioeconomic of the entrepreneur (Smékalová, 2014). Currently, around 95% of agricultural machinery has expired term of use, which resulted in low functioning and productivity and high maintenance costs (Avenue, 2014).

## **2 MATERIAL AND METHODS**

### **2.1 The Study Area**

Armenia is subdivided into ten administrative divisions, or provinces (marzes). Within each province are self-governing communities, consisting of one or more settlements. Communities are classified as either urban or rural. Currently, there are 915 communities, 49 urban and 866 rural administrative communities. The capital, Yerevan, also has the status of a community and is divided into twelve semiautonomous districts (FAO, 2012). Vayoc Dzor province is located in South East of Republic of Armenia (RA) and has 51000 inhabitants. It is 175 km far from the capital Yerevan and has area of 2308 km<sup>2</sup>. Province consist of 44 communities: 3 urban and 41 rural areas. 12 communities are located within the national border, 7 are in high mountainous and 13 in mountainous areas. Approximately 65% of population is living in rural areas and is deeply specialized in agriculture. The economy of the province is one of the weakest in the country (NSS, 2015). Main agricultural activities in the region are animal husbandry and horticulture. Farmers in the province also cultivate cereals, tobacco, greens and fodder crops. Between the 2 major agricultural sectors animal husbandry has a leading position by having 66.1% share in the agricultural GDP (NSS, 2015). The province is chosen as a study area because it has high potential for developing various activities related agricultural and can easily have endogenous development in case of proper management.

### **2.2 Method of data collection**

Data for the study were obtained from both primary and secondary sources. Data were obtained from primary source through the aid of well-structured questionnaire. The questionnaire was administered to farmers in the study area, so as to collect data on their: general socio-economic characteristics, type of agricultural practices, main agricultural constraints faced by farmers, input variables (fertilizer, seed, land area, herbicides and many more), farm output and information about bank loans. Simple random technique was used in the course of the research in which 46 respondents were selected from the agricultural zone in Vayoc Dzor province. There was limited sample size owing lack of resources but this did not affect the sampling process because the observations were taken appropriately. In addition, secondary data required was collected from sources such as the Armenia Statistical Office

### **2.3 Analytical Technique**

Descriptive analysis was used to analyse the socio-economic characteristic and the structure and profile of small scale farming in RA. While regression analysis was used to analyse influence of the socioeconomic factors on farms productivity.

#### **2.3.1 Gross Margin Analysis**

This is the difference between the Gross Farm Income (GFI) and the total variable cost (TVC) (Mshelia *et al*, 2005; Olukosi *et al*, 1988). The technique was used to determine cost and return associated to agricultural production. It is mathematically expressed as;

$$GM = GFI - TVC \dots\dots\dots (1)$$

Where; GM = Gross Margin (Euro/Ha)

GFI = Gross Farm Income (Euro)

TVC = Total Variable Costs (Euro/Ha)

### 2.3.2 Regression Analysis of factors influencing on agricultural profitability

Regression analysis was used to analyze the factors affecting on farm profitability measure by the gross margin. The empirical model specifies agricultural profitability as the dependent variable(Y) and independent variables are the selected factors which include, age of farmers, household size, farm size, educational status, monthly expenditure, access to agricultural training and access to credit facilities

This can be implicitly and explicitly being expressed as:

$$\text{Implicitly; } Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, e) \quad (2)$$

$$\text{Explicitly; } Y = \beta + aX_1 + bX_2 + cX_3 + dX_4 + eX_5 + fX_6 + gX_7 + e \quad (3)$$

Where Y = Farm profitability (Euro/Ha)

X<sub>1</sub> = Age of farmers (Years)

X<sub>2</sub> = Household size (Number)

X<sub>3</sub> = Farm size (Hectares)

X<sub>4</sub> = Educational status (1, if tertiary, 0, otherwise)

X<sub>5</sub> = Monthly expenditure (Euro)

X<sub>6</sub> = Access to agricultural training (1, if Yes, 0, otherwise)

X<sub>7</sub> = Access to credit facilities (1, if Yes, 0, otherwise)

e<sub>i</sub> = Error term

β, a, b, c,.....,f are the parameters where “a” is the constant/intercept and “b”, “c”,.....,f” are the slopes.

It is noteworthy to state that outliers were corrected for before the regression analysis was carried due to small size.

### 2.3.3 Regression Analysis of effects of socioeconomic factors on agricultural productivity

Regression analysis was used to analyse to analyze the effects of socioeconomic factors on farm productivity index(Y). The empirical model specifies crop productivity as the dependent variable(Y) and independent variables are the selected socioeconomic characteristics which include, age of farmers, marital status, household size, farm size, years of farming

experience, educational status, monthly expenditure, access to agricultural training, access to credit facilities

This can be implicitly and explicitly be expressed as:

$$\text{Implicitly; } Y = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, e) \quad (1)$$

$$\text{Explicitly: } Y = \beta + aX_1 + bX_2 + cX_3 + dX_4 + eX_5 + fX_6 + gX_7 + hX_8 + iX_9 + e \quad (2)$$

$$Y = \text{total productivity index} = \frac{\text{value of output}}{\text{total cost of input}} \quad (3)$$

Where Y = Total productivity index

X<sub>1</sub> = Age of farmers (Years)

X<sub>2</sub> = Marital Status (1, if married, 0, otherwise)

X<sub>3</sub> = Household size (Number)

X<sub>4</sub> = Farm size (Hectares)

X<sub>5</sub> = Years of Farming experience (Years)

X<sub>6</sub> = Educational status (1, if tertiary, 0, otherwise)

X<sub>7</sub> = Monthly expenditure (Armenian Dram)

X<sub>8</sub> = Access to agricultural training (1, if Yes, 0, otherwise)

X<sub>9</sub> = Access to credit facilities (1, if Yes, 0, otherwise)

e<sub>i</sub> = Error term

β, a, b, c, …, h are the parameters where “a” is the constant/intercept and “b”, “c”, …, “h” are the slopes.

### 3 RESULTS AND DISCUSSION

#### 3.1 Farming household characteristics

Table 1 illustrates the socioeconomic characteristics of the respondents from Vayoc Dzor province. Survey shows that the region does not face a problem of female exclusion from main household activities. It reveals that majority of respondents were female farmers with 58.7%. Moreover, the same amount of respondents have tertiary education. Although, being geographically far from the capital and having no higher education institution around the province, yet majority of farmers have tertiary education. According to the results of the survey 58.7% of respondents received higher education.

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**Tab.1 - Socioeconomic Characteristics of Respondents**

Variable	Frequency	Percentage	Minimum	Maximum	Mean
<i>Gender</i>					
Male	19	41.3			
Female	27	58.7			
<i>Marital status</i>					
Married	34	73.9			
Single	11	23.9			
Divorced	1	2.2			
<i>Educational level</i>					
Primary	19	41.3			
Tertiary	27	58.7			
<i>Age of respondents</i>					
20-35	12	26.1	21	65	42
36-50	24	52.2			
51-65	10	21.7			
More than 66	0				
<i>Household size</i>					
1-3	7	15.2	2	8	5
4-6	28	60.9			
More than 7	9	19.6			
<i>Monthly income</i>					
Less than 100€	4	8.7	80	1000	150
101-200€	10	21.7			
201-300€	12	26.1			
300-400 €	9	19.6			
Greater than 400€	6	13			
<i>Size of a land(ha)</i>					
1-3	7	15.2	0.6	30	1.8
4-6	4	8.7			
More than 7	2	4.3			
<i>Years of farming experience</i>					
Less than 5	8	17.4	2	48	17
6-10	9	19.6			
11-15	6	13			
More than 16	22	47.8			
<i>Access to extension</i>					
Yes	11	23.9			
No	35	76.1			

Source: Author's editing, 2016

Table shows that the average age of farmers is 42 years and the maximum age of respondents is 65. Economically active age group, which is 36-50 has the highest percentage among the all age groups. In the province there is a very big positive result of young farmers. In our survey the youngest age of the farmers is 21 and the youngest age group comprised from the farmers aged 20-35 is the second biggest. Survey shows that the household sizes in the province are relatively big. Households comprised from 4-6 members are dominant in the



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province with 60.9% and households that have 7 and more members are the second dominant size in the province. Wages in Armenia increased to 188292 Armenian Dram (AMD)/Year (355EUR) in the third quarter of 2015 from 180864 AMD/Year (340EUR) in the second quarter of 2015 (Trading economics, 2016). According to the National Statistic Service (NSS, 2014) average monthly salary in Armenia was 139,331 AMD (an equivalent of 263 EUR) in 2013. As it is illustrated in the Table 1, the average monthly income of in the province is relatively lower from national average. Farmers that earn higher than national average is only 19.6%. But if we consider that in the province household size is relatively big, we can state that monthly earnings that are mainly derived from agriculture will not be enough for standard lifestyle. In the Vayoc Dzor province, as in all other regions of Armenia, average size of the land is not so big. According to our survey the average land area is 1.8 ha, that is very close to national average (1.4ha), while maximum is 30 ha which is a rare case in Armenian agriculture. Survey once again shows that people in the province are engaged in agriculture and have very big years of experience in agriculture. Overwhelming majority if the respondents (47.8%) are farming more than 16 years and the average years of farming activities in the province is 17 years. Meanwhile, support services that are created for farmers are not operating properly in the province. In RA every province has its agricultural extension centers that are supported by the state. Survey shows that majority of the respondents (76.1%) do not have access to extension services and only few farmers are aware about them and are benefiting from their activities.

### 3.2 Marketing outlets of farmers

Table 2 gives us information about the possible ways that farmers are selling their products. It shows that only 2.2% of the farmers have connection with processors and are able to sell their products to processing companies. Main reason of this is the small plots of the farmers that cannot ensure big proportion of output. Survey shows that only 34.8% of the farmers are able to sell their product on their own in the market. Meanwhile, almost half of the respondents sell their products through the retailers or by giving it to shops. Some of the farmers find it easy to sell their product to the wholesales and only 6.5% of the respondents export their products.

**Tab.2** - Marketing outlets of farmers

Marketing outlets	Frequency	Percent
Giving to the processors	1	2.2
Selling in the market	16	34.8
Selling in wholesales	4	8.7
Giving to shops/retailors	22	47.8
Export	3	6.5
<b>Total</b>	<b>46</b>	<b>100.0</b>

Source: Authors' editing, 2016

### 3.3 Structure and Types of Farming Activities

Table 2 gives us information about main types of farming activities carried out by the farmers of the province. Because of the high prices of input farmers are not able to keep more livestock in their farms and they mainly have one or two cattle in their farms to assure dairy products for their families. Table illustrates that all farmers who are doing animal husbandry have cattle. Meantime, it is also common in the province to keep pigs with cattle. Further, survey shows that keeping sheep is not common in the province, while it is more preferable to keep birds with cows and pigs. According to our survey in Vayoc Dzor province vegetable cultivation is the main agricultural activity. More than half of the respondents (56.5%) are cultivating only vegetables. Furthermore, 21.7% of farmers from the crop production subsector are cultivation fruits with vegetables. Few percent of respondents (3%) are combining cereal and watermelon cultivation with vegetables.

**Tab.3** - Main type of farming activities

Type of farming	Frequency	Percent
<b>Animal husbandry</b>		
-Cows	7	15.2
-Cows and pigs	7	15.2
-Cows and sheep	2	4.3
-Cows, pigs and birds	5	10.9
<b>Crop production</b>		
-Vegetable cultivation	26	56.5
-Vegetable and watermelon	3	6.5
-Vegetables and fruits	10	21.7
-Vegetables and cereals	3	6.5

*\*Note: Percentages do not add to 100*

*Source: Authors' editing, 2016*

### 3.4 Profitability analysis

The profitability of small scale farming in the study was estimated using gross margin analysis, estimated by taking the difference between gross farm income and the total variable cost. Table 3 below shows the results of the analysis which revealed that the total variable cost per hectare was 1270.89 Euro while the average total revenue 1851.05 Euro.

**Tab.4** - Profitability Analysis of Small Scale Farmers in Vayoc Dzor province, Armenia

Cost/Revenue Item	Value of cost/revenue item for one production cycle (Euro)
Total Variable Cost	1270.89
Gross Farm Income	1851.05
Gross Margin per farming household	580.16
Operation Ratio	0.68
Return on capital investment	0.45

*Source: Authors' editing, 2016*

The final estimation revealed that the gross margin of an average small scale farmer per production cycle was 580.16Euro. Also, the table revealed that operation ratio of 0.68 while the return on investment on every 1 Euro invested was 0.45; thus indicate that the gross profit made by the farmers was not enough to cover the total variable cost. This depicts the inefficiency in production and marketing of small scale farmers in the region understudy.

### 3.5 Regression Analysis of factors influencing on agricultural profitability in the study area

In this sub-section, the regression analysis was used to analyse the factors influencing on agricultural profitability in the study area proxied by gross margin. The factors considered in the analysis include: **age, household size, size of land, educational status, monthly income, access to agricultural training and access to credit facilities.** Based on the consideration of statistical and economic criteria the results are presented below, the R-squared value is 0.615, showing that 61.50 percent of the variation in the dependent variable was explained by the explanatory variables. Also, the F- statistics is significant at 1% implying that the explanatory variables jointly affect the dependent variable significantly. This means that the model is a good fit for relationship among the variables. Farm size, educational status, access to formal agricultural training and access to credit facilities were found to be statistically significant factors that influenced agricultural profitability in the study area.

*Farm size* was found to be significant at 10 percent with positive relationship with the profitability level of the farms understudy. This estimate showed that a unit increase in the farm size will lead to increase in farm profit by 0.325 Euro per hectare. This can be adduced to the fact that as farm size determines the scale of production implying that the larger farm size will receive huge proceed which would be marketed thereby increasing the farm gross income.

**Tab.5** - Regression analysis of the factors influencing small scale farms' profitability in the study area

Variables	Coefficient	t-statistics
Age of Farmers	-81.954	-0.061
Household size	-0.167	-0.903
Farm size	0.325*	1.828
Educational status	0.344**	2.152
Monthly income	0.069	0.258
Access to agricultural training	2.529*	5.671
Access to credit facilities	4.021**	2.237
Constant	23.45	3.624
<i>R<sup>2</sup> = 0.15</i> <i>Adjusted R<sup>2</sup> = 0.601</i> <i>F- Statistics = 97.532</i> <i>Prob. Of F-Statistics = 0.000</i>		

\* =Statistically significant at 1 percent level, \*\* = Statistically significant at 5 percent level, \*\*\* = Statistically significant at 10 percent level

Source: Authors' editing, 2016

*Educational status* was found to be significant and positively impacted profitability of the farmers as expected. Educational status is a dummy variable, therefore, its coefficient is explained as follows: More farmers that attained tertiary education will have higher profitability than their counterparts that have lower level of educational background. Education plays an important role in proper farm management and marketing activities.

### 3.6 Regression Analysis socioeconomic factors influencing on farm productivity

For the regression analysis, linear functional form gave the best fit and was chosen as the best functional form that explains the causal relationship between agricultural productivity proxy (total productivity index) and socioeconomic characteristics which include **age, gender, marital status, years of farming experience, educational status, household size, monthly income, access to agricultural training, size of land and access to credit facilities**. Based on the consideration of statistical and economic criteria the results are presented below, the R-squared value is 0.675, showing that 67.50 percent of the variation in the dependent variable was explained by the explanatory variables. Also, the F- statistics is significant at 1% implying that the explanatory variables jointly affect the dependent variable significantly. This means that the model is a good fit for relationship among the variables.

Age of farmers, years of farming experience, educational status, household size, access to formal agricultural training and access to credit facilities were found to be statistically significant socioeconomic factors that agricultural productivity in the study area.

*Age of Farmers* was found to be significant at 5 percent with negative relationship with the productivity of the farmers. This estimate showed that a unit increase in the age of farmers decreases the productivity of the farmers by 1.19 units. This can be adduced to the fact that as farmers grows old there is loss of vigor to put into production and this necessitates the need to motivate youths to actively participate in agriculture.

*Household size* was found to be significant at 1 percent and positive. The coefficient of household size is 0.123 which revealed that a unit increase in the size of the farming households leads to 1.23 unit increase in the productivity. Large household sizes are good source of family labor which tends to enhance productivity.

*Years of Farming Experience* tends to be a key instrument in attaining goals and objectives of an agribusiness. Farming experience was found to be significant and had a positive relationship with coefficient of 2.541. Thus, a unit increase in the experience of the farmers' leads to 2.541 unit increase in the productivity. As the farmers engages more in farming activities, the more the productivity growth. Overtime farmers tend to have better understanding of farming practices.

*Educational status* was found to be significant and positively impacted productivity of the farmers as expected. Educational status is a dummy variable, therefore, its coefficient is explained as follows: More farmers that attained tertiary education will have higher productivity than their counterparts that have lower level of educational background. Education plays an important role in proper farm management activities therefore resulting to improvement in the level of farm productivity.

*Access to agricultural training* was found to be significant and positively impacted productivity of the farmers. This estimate revealed that farmers that have access to agricultural training will have higher productivity than their counterparts that have no access to agricultural training. During formal and informal agricultural trainings, workshops

and seminars, farmers have interactions with extension agent who introduces new agricultural technologies and farming practices and adoption of these new practices have higher probability of improving farms productivity.

*Access to credit facilities* was found to be significant and negatively impacted productivity of the farmers. This estimate revealed that farmers that have access to credit facilities may have lower productivity. This result is in contrast with expected result as credit access is expected to improved productivity. However, this result could be adduced to fund diversion into different productive activities rather than using for agricultural production.

**Tab.6** - Regression analysis of the socioeconomic factors influencing farm productivity

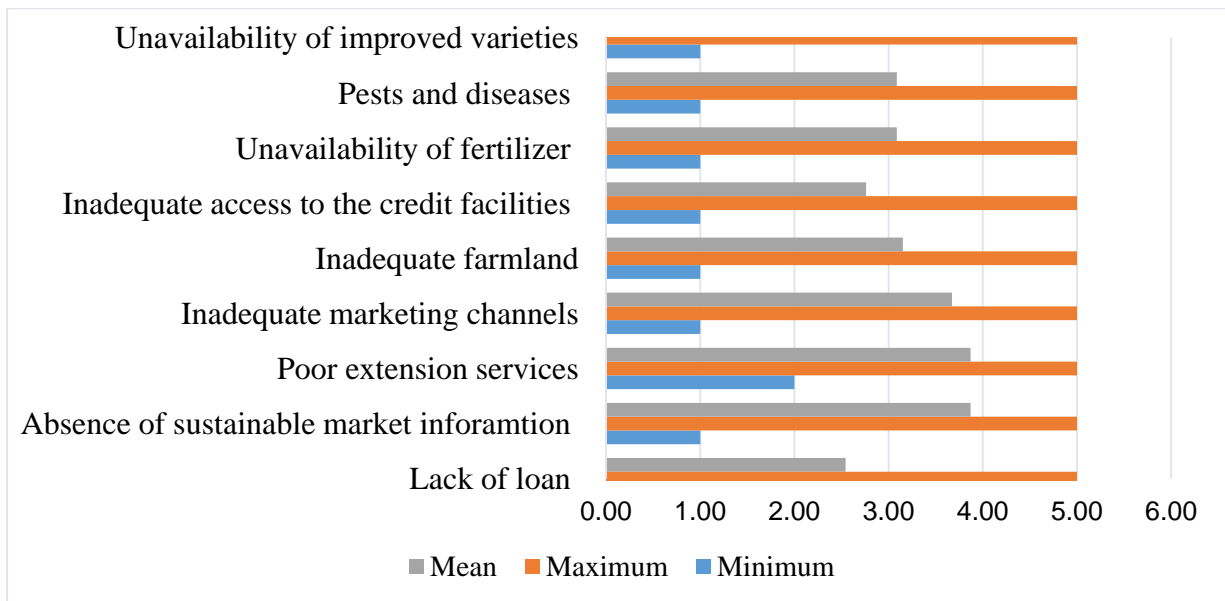
Variables	Coefficient	t-statistics
Age of Farmers	-1.190**	-2.491
Marital Status	-0.598	-0.578
Household size	0.123***	1.795
Farm size	68.250	0.494
Years of Farming experience	2.541***	1.921
Educational status	0.344**	2.152
Monthly expenditure	-0.001	-0.156
Access to agricultural training	2.529*	5.671
Access to credit facilities	-4.021**	2.237
Constant	23.45	3.624
$R^2 = 0.6709$ $Adjusted R^2 = 0.675$ $F- Statistics = 141.232$ $Prob. Of F-Statistics = 0.000$		

\* =Statistically significant at 1 percent level, \*\* = Statistically significant at 5 percent level, \*\*\* = Statistically significant at 10 percent level

Source: Authors' editing, 2016

### 3.7 Main constraints and possible solutions given by farmers.

In the next step of our survey farmers were asked to rank a particular constraint as an obstacle to run their agricultural activities and suggest several solutions to overcome them. Ranking of the constraints was in a descending order from 1 to 5. As shown in Figure 1, all provided constraints have an average very high level of ranking. Survey results show that absence of sustainable market information and market channels, poor extension services and inadequate farmland are identified as a major constraint to run their activities. Farmers do not count absence of the loan and inadequate access to the credit facilities major obstacle to run agriculture.



**Fig.1** - Ranking of the main agricultural constraints by the respondents

Source: Authors' editing, 2016

For the absence of the flexible loan system and inadequate credit facilities farmers suggested to decrease the mutuality period and interest rates of the loans. There were also suggestions of creating special agricultural loans that will be without interest rates. To overcome the constraints of inadequate farmland, farmers insisted that agricultural cooperatives and more exploitation of state reserved lands in communities can be the proper solution. In agriculture the information flow is urgently important and to receive sustainable market information farmers offered to establish central-concentrated information centers and organize more seminars about marketing and provide information about neighbor country's markets. According to the farmers, poor extension service can be solved in case more farmers are involved in extension activities. Moreover, new and well operating agencies should be established that can provide reliable information and implement more seminars in all rural areas. Currently one of the major problems in Armenia is the inadequate marketing channels and markets. Farmers suggested to create more markets for their products and exclude the presence of retailers. For unavailability of fertilizer and lack of improved seed varieties respondents find a solution in receiving correct and reliable information or consultancy. Prices of fertilizers and seed varieties are also higher for the farmers and it would be a big step if flexible trade facilities can be applied in the input market as well. Farmers also need reliable and correct information provided by experts to overcome the burden of pests and diseases.

**Tab.7** - Constraints to Small Scale Farming and Suggested Solutions by farmers

Constraint	Solution	Constraint	Solution
Lack of loan and inadequate access to the credit facilities	<ul style="list-style-type: none"> <li>• Decrease the mutuality period</li> <li>• decrease interest rates of the loans</li> <li>• Issuing special agricultural loans</li> </ul>	Pests and diseases, unavailability of improved varieties and fertilizer	<ul style="list-style-type: none"> <li>• To receive correct and reliable information or consultancy</li> <li>• flexible trade facilities can be applied in the input market</li> </ul>
Absence of sustainable market information	<ul style="list-style-type: none"> <li>• Establish central-concentrated information centers</li> <li>• organize more seminars about marketing of products</li> <li>• provide information about neighbor country's markets</li> </ul>	Inadequate marketing channels	<ul style="list-style-type: none"> <li>• Create more markets for their products and exclude retailers</li> </ul>
Poor extension services	<ul style="list-style-type: none"> <li>• More involvement of farmers in extension activities.</li> <li>• Establishment of well operating agencies</li> <li>• Implement more seminars in all rural areas.</li> </ul>	Inadequate farmland	<ul style="list-style-type: none"> <li>• Creating agricultural cooperatives</li> <li>• Exploiting state reserved lands in communities</li> </ul>

Source: Authors' editing, 2016

#### 4 CONCLUSION AND RECOMMENDATIONS

The present study examined the effect of socioeconomic characteristics on the productivity of agricultural production and by extension on the resource use efficiency by the farmers. Among the socioeconomic factors considered in the study, age of farmers, household size, years of farming experience, educational status, access to agricultural training and access to credit facilities were significant factors that influence agricultural productivity and resource use in RA implying that to improve the structure and performance of small scale farmers and their competitiveness among their competitor in the agri-value chain, policies targeted at improving these socioeconomic factor are key.

On the other hand, marital status, farm size and monthly expenditure were identified as non-significant socioeconomic variable that influence agricultural productivity. However, these factor should not discarded but also be considered in agricultural policy making process directed toward small scale farmers.

The following recommendations are made based on the findings of the present study. Years of farming experience, educational status and access to agricultural training had a positive relationship with agricultural productivity. Thus, there should be a wider campaign by extension agents on proper training on improving resource use efficiency through innovative farming practices. Policy directed at improving literacy level of small scale farmers will enhance reception of new agricultural innovations. As s corollary, information centres should

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be established and maintained close to the farmers. This will corroborate the knowledge and experience of farmers to increase in yield.

In addition, access to credit facilities has a negative relationship with agricultural productivity which is in contrast with a prior expectation. This can be adduced to the credit diversion by farmers other non-farm activities. Therefore, we recommend that government through the appropriate office should ensure not just disbursement of credit and subsidy but also put in place proper monitoring mechanism.

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## Analyzing The Impact of FDI On Vietnam Living Environment

*Ho Thanh Tri, Phan Dao, Nguyen Van Ninh, Juraj Sipko*

### ABSTRACT

*The primary goal of the paper is to analyze how FDI has contributed to the growth and development Vietnamese's economy. The foreign investors have invested in almost all sectors of the economy, but mainly, in processing and manufacturing industries (84.9%). Besides an active contribution to the economic development of Vietnam, the FDI has affected the living environment of the people where the production plant. Based on the analysis the paper concluded that the FDI significantly have contributed to new technology, know-how as well as managerial skills. Also, the presented results of the study might be useful for policy-makers within the Vietnamese's authorities.*

**Keywords:** *Foreign direct investment, FDI, environment, Vietnam*

**JEL Classification:** B22

### 1 INTRODUCTION

Nowadays, exploit, rational use the natural resource and protect the living environment is critical for a fulfillment of the sustainable development goals around the globe. This issue becomes urgent when the natural resources in the world are gradually exhausting; the living environment is still heavily polluted. Many countries in the world suffered from ecological crisis affecting the quality lives of people such as the Ha Tinh Formosa in Vietnam, air pollution in China and Philippine. This standard of the environment has strongly influenced daily life. Uality of the environment has strongly affected everyday life. Therefore, the economic development with exploiting resources and use the rational nature resources and protect an environment has gradually become a concern of the world community.

The exploitation and use the natural resource in Vietnam just like the developing countries in the world. Because of the policies control an environment in Vietnam not good today. Between the promulgation and implementation of policy about protecting an environment in Vietnam is a difference. Part of the cause is the corruption from executors.

The highlight of this event was the fish dead along four central provinces of Vietnam. The 2016 Vietnam Marine life disaster was a water pollution crisis affecting four provinces in central Vietnam, including Ha Tinh, Quang Binh, Quang Tri and Thua Thien Hue. Ho Binh Minh (28 April 2016) fish carcasses were reported to be washed up on the beaches of Ha Tinh province from at least 6 April 2016. Diep. P and Mai. N.C (2 May 2016), later, a large number of dead fish were found on the coast of Ha Tinh and three other provinces (Quang Binh, Quang Tri, and Thua Thien Hue) until 18 April 2016. A steel plant built by the Taiwanese corporation Formosa Plastics is responsible for discharging toxic industrial waste illegally into the ocean through drainage pipes. Steve (30 June 2016), after denying responsibility for months, Formosa accepted responsibility for the fish deaths on June 30, 2016.

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So the goal of economic - social development of each country must be attached with protecting the environment. Foreign direct investment (FDI) contributed significantly to economic growth through the addition of domestic sources of capital, technology transfer, modern techniques, etc. for the country receiving investment. But the government need to control the FDI flows in Vietnam, it has an impact negatively on the environment or not? This is an issue we need considering and resolve.

## 2. LITERATURE REVIEW

The factors promote foreign investment

Marginal productivity disparity of capital between countries: Helpman said that there are differences of marginal productivity of capital between countries. A capital surplus country will lower the marginal productivity. Also, a state that lacked money will have higher marginal productivity. This situation will lead to the move of capital flow from the surplus to the deficit to maximize profits.

The cycle life of the product: According to (Vernon 1966) research foreign direct investment by American companies in the countries of Eastern Europe after the second world war in the industrial production in the period from 1950-1970. Over times, The United States has imported the most goods that it has ever produced, developed and exported. Vernon based on a business cycle of the including three stages: (1) The period of invention and introduction; (2) Development stage and go to perfection; (3) The perfect stage and standardized. In the early stages, new products hit the market still being developed, sales growth slows, not profitable because it costs more for the introduction of goods to the market. Next, in the period of growth, products are received market rapidly, and the production of the product reached the stage of standardization in the development cycle also at the market of this product there are many suppliers. At this juncture, The products not improved, there was competition between providers, which led to the decision of reducing the price, thus resulted in the decision to down production costs. This is the reason for the supplier to transfer production to the countries that allow lower production costs. So the US multinational companies the chance to export the products back to the US market. In brief, we can see, FDI began to appear in the second phase of a business cycle. The products not improved

The unique advantage of multinational companies: According to (Dunning, Lundan 2008), multinational corporations that have the particular advantage that allowed them to overcome the obstacles of cost abroad, are ready for direct investment abroad. When they chose the placement location, the multinational company will select those countries with the conditions (labor, land, political...etc) and allowed them to develop the particular advantages.

Market access and reduce trade conflicts: FDI was a measure of a conflict of bilateral trade. For example, Japan often gets complaints from the US and Western European countries because Japan has a trade surplus, while the other countries were trading deficit in bilateral relations. To handle with the above problem, Japan has enhanced direct investments on the market; they had manufactured and sold cars, computers in America and Europe.

Exploited expert resources and technology is not FDI from developed countries to less developed countries than. In contrast even more powerful, Japan is actively invested directly in the US to exploit America's team of experts in the field of automobile manufactured and computer.

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Access to natural resources: to have the raw material sources, many multinational companies seeking to invest in the country with abundant resources. The wave of foreign direct investment of Japan's first major in the 1950s is because of this purpose and China today like that.

### 3 THE POSITIVE AND ADVERSE IMPACT OF FOREIGN DIRECT INVESTMENT TO THE ENVIRONMENT IN VIETNAM

#### 3.1 Postive Impact

In addition to the economic benefits that FDI brings as Reduce financial risk, FDI is less risky before the market fluctuation; the receiving countries can learn and study about the science – technology, join the global production network, Create more employment opportunities...etc from the FDI companies. Besides a lot of benefit from FDI, we can mention the advantages of FDI on the development of the environment protecting in Vietnam as The Project medical wastewater treatment system at Cho Ray Hospital. That is one of the most models bigger in Vietnam with the Bio-waste water treatment technology according to AAO principle by Kubota Corporation (Japan) implementation. The project includes wastewater treatment system with the capacity of 163 m<sup>3</sup>/ hour, ensure hospital wastewater treatment (2500 m<sup>3</sup> /day). The advantages of this system are ease of use, affordable operating costs, space saving appropriately for small land fund of the hospital in a city.

Also, many FDI enterprises in Vietnam had to change new technology, enhanced the competitiveness of the product through waste treatment solutions. The FDI companies represented in this matter by Ford Motor company, Vietnam - Singapore Industrial Zone, Sonadezi company. We can see the contribution of other the FDI company in Vietnam through table 2.1.

The awareness of the environmental protection of FDI companies has spread to the domestic enterprises. Many companies belong to the government sector has applied the waste treatment technology and invested in new technology change in the production as PhaLai thermal power joint stock company was successful in the separation Mazut oil out of sewage. BenTre Seafood Joint Stock Company and Vietnam National Coal – Mineral Industries Holding Corporation Limited has actively improved new technology to minimize environmental pollution. Small, medium enterprises with the support from the government and international organizations have changed the way of production to protect the environment. The highlight is BatTrang pottery village with 70% household changed from kiln to gas, has been saving 30000-ton oil and reduce 12000-ton of Co<sub>2</sub> every year. Besides those products from gas furnaces with high quality and profit more 30% than the old model.

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**Tab.1** - The positive impact of FDI companies to protecting environment in Vietnam

ID	Name of company	Address	The idea of environment protecting
1	Phu My 3 Power company	Phu My 1 Industrial Zone – Tan Thanh District – Ba Ria Vung Tau province	Install the system find the leak gas detection automatically Plant 4,000 trees around the company
2	International SOS Vietnam LTD	Unit 708, 7 <sup>th</sup> Floor Centre Point Building 106 Nguyen Van Troi Street Ward 8, Phu Nhuan District Ho Chi Minh City	Construction of closed waste treatment system
3	Song Be Golf Resort	77 Binh Duong Boulevard, Binh Duong Province, Vietnam	Use dried leaves, duckweed (self-cultivation) to make fertilizer
4	Setia Becamex Company	37 Ton Duc Thang Street, Ben Nghe Ward, District 1, Ho Chi Minh City	Development of green urban area, Energy saving to reduce CO <sub>2</sub>
5	TCL Vietnam Corporation	983 Tran Hung Dao, Ward 5, District 5, Ho Chi Minh City	Published the TCL Heathy since 2008 with the target was limited the carbon and environment protect
6	Big C Vietnam supermarket system	222 Tran Duy Hung Street, Trung Hoa Ward, Cau Giay District, Ha Noi Capital	Implementation of the project to reduce the use of plastic bags in the supermarket system.
7	Mitsubishi Vietnam	An Binh Ward, Di An Town, Binh Duong Province	Regularly check wastewater quality, plant the tree around the factory.
8	Philips Company	Floor 12 <sup>th</sup> , A&B Tower, 76 Le Lai, District 1, Ho Chi Minh City	Give some ideas about energy saving product compared to the same products
9	Caravelle Hotel	19-23 Lam Son Square, District 1 Ho Chi Minh City	Green Initiatives program began from 2008 with the target reduced amount of Co2 discharged from the hotel.
10	PricewaterhouseCooper	Level 4, Saigon Tower, 29 Le Duan Street, District 1, Ho Chi Minh City	Encourage staff to plant trees at work
11	Unilever Vietnam	156 Nguyen Luong Bang Avenue, Tan Phu Ward, District 7, Ho Chi Minh City	Improved the product packaging process with the target reduced waste after using.
12	Renaissance Riverside Hotel	8-15 Ton Duc Thang Street, District 1, Ho Chi Minh City	The sponsor for environment protect programs
13	HSBC Vietnam	The Metropolitan, 235 Dong Khoi Street, District 1, Ho Chi Minh City	Program implementation " HSBC green week.", have a budget support the environmental protection programs.

Source: Author's research

Thus the FDI flows had a positive impact on the economy and environment in Vietnam such as: attract labor from the FDI project has helped the people of Vietnam reduce the natural resource sabotage; a living environment of the people had improved when the infrastructure attract FDI be upgraded. On the positive side, The FDI companies invest in Vietnam has brought new technology protect the environment. Thereby creating a spread of consciousness to the enterprises in Vietnam. The businesses in Vietnam have awareness and application the system according to international standard such as FCS, ISO...etc

### **3.2 Negative impact**

Along with the economic benefits from the FDI companies, it still has a lot of adverse effects on the environment of Vietnam such as FDI influences the ecosystem diversity, exploit exhausted the natural resources. One of the factors that make FDI into Vietnam is environmental standards are low. The government policies of Vietnam attraction FDI still had a lot of shortcomings. Therefore the FDI companies invest in Vietnam with the target is exploited cheap natural resources. The nature resources maybe are water, land, air. The typical in this problem is Formosa company. Formosa is an FDI company invested in Vietnam and was informed 2008 to establish a large iron and steelmaking plant at a deepwater port in Vietnam. Accordingly, Formosa enjoys many incentives from the Vietnam government such as the corporate income tax is 10 percent (the domestic companies are 22 percent), tax exemption with import machines and exploit the natural resource.

Offering foreign investors low taxes and land-use fees has only allowed foreign companies to exploit cheap resources while doing little to help Vietnam increase its technological capacity, Economist Pham Chi Lan said. Tuyen (2016) explained the export trend of pollution from developed countries through FDI increased, and Vietnam will become the national has a high level of contamination import.

According to PanNature center (2016), 80 percent of the industrial zones violate regulations on environmental pollution, and 23 percent of FDI companies have exceeded the regulations from five to twelve times. Vedan Vietnam and Formosa Ha Tinh are typical of this issue.

The Thi Vai River belong in South Vietnam. The Thi Vai catchment, located in the provinces Dong Nai, Ba Ria-Vung Tau and Ho-ChiMinh City with an area of 625 km<sup>2</sup>. According to Karen et al. (2014), in September 2008, the company Vedan discharging of untreated wastewater directly into the Thi Vai River. The wastewater was transport through an 800-meter long underground system. The investigator concluded that Vedan Vietnam discharged untreated wastewater for 14 years (1994-2008) at a rate of 105,600 cubic meters per month. Consequently, the Vedan factory killed all forms of life in the Thi Vai River. The river used to be clean and full of fish, but it soon became dirty, narrow, and shallow, so it no longer had fish or aquatic life. Moreover, shrimps and fish raised by farmers were decimating, all ostensibly due to the pollution. Therefore Vedan was mainly responsible for the contamination of the Thi Vai River. Therefore Vedan was primarily responsible for the pollution of the Thi Vai River. By the end of that year, Vedan had to pay a compensation of VND1.8 billion (US\$107,000 at today's exchange rates) to the farmers.

Formosa Ha Tinh Steel Corporation was informed 2008 to establish a large iron and steelmaking plant at a deepwater port in Vietnam. The company estimated a \$15 billion development cost to install 7.5 million tons pa steel capacity. According to Vietnam News (2012), employment due to the project was expected to be c. 10,000 person; with a second phase increasing production to 22 MT pa, and creating c. 30,000 jobs. The 2016 Vietnam

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marine life disaster was a water pollution crisis affecting Ha Tinh, Quang Binh, Quang Tri and Thua Thien Hue provinces in central Vietnam. According to Christopher (2016), the Formosa steel plant is suspected to be the source of the toxic chemical waste. The company admitted that there was a sewage pipe connecting the plant and the ocean and it informed that several days before the incident, 300 tons (300 long tons; 330 short tons) of chemicals were imported by Formosa to clean the pipe (Thanh Nien News, 2016). Approximately 80 tons (79 long tons; 88 short tons) of fish carcasses had been found on the shores of four central provinces of Vietnam from Hà Tĩnh to Thua Thien Hue.

The negative impact of FDI flows very diversity, but the main reason is the government policies of Vietnam ineffective. Suggest the solutions for the Vietnamese government include: No investment license for the projects have the old machinery and effect to the environment. Need to cut the investment projects for the golf course because it helps to save the land for other fields. Give the specific regulations for the protection of forest resources; the wood gathering must comply with state regulations.

The FDI attraction must be consistent with the sector development and economic sector. Set the criteria for the proper FDI project evaluation. Use the policy tools of government such as inspection and monitoring to activities of FDI companies. Encourage businesses to invest and research technology in waste disposal and protecting the environment.

### 4 CONCLUSION

The FDI flows have significantly contributed to the economic development of the Vietnamese's economy and the environment protection in Vietnam. Despite the authorities' efforts, there are still foreign companies that produce pollution as a byproduct and thus deteriorated the quality of living conditions in Vietnam. The Vietnamese's officials need regular monitoring and supervising the FDI inflows, but at the same time should analyze their impact on the economy as a whole, including the environment. In line with this, the Vietnamese's authorities are committed to creating the environmentally friendly activities and set up as top priorities for the future development.

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## Corporate Social Responsibility and Corruption from The Perspective of Rationality

*Jana Soukupová*

### ABSTRACT

*The core assumption of the traditional economic theory that the result of the individual's effort to achieve maximal benefit is at the same time the growth of social well-being has its limits not only due to market failures but it is also problematic in connection with such phenomena as corporate social responsibility (CSR) and corruption. The first part of the contribution deals with CSR. The core question is how firms, respectively decision-makers are motivated to implement the CSR into companies' behaviour. The second part of the paper examines corruption, the causes, and consequences of corruption, and attention is here given to subjects' motivation to accept or actively participate in corrupt practices. In both cases, institutions are essential in order to influence positively ethical and responsible behaviour.*

**Keywords:** *Rationality, Corporate Social Responsibility, Corruption*

**JEL Classification:** D01, D21, L29

### 1 INTRODUCTION

Economic theory is based on the assumption of rationally acting subjects which are seeking to maximize the target function (usually benefit or profit). Their effort is complicated by the uncertainty of the economic environment and the asymmetry of information. To do this, the rationality of subjects is limited, and even the attempt to maximize one variable or function of multiple variables is not accepted as a universal explanation of the behaviour of individuals and their economic decision-making (Simon, 1991). The aim of this paper is to investigate two phenomena of the current economy in terms of rationality. Firstly, it is a positive example of socially responsible behaviour. Secondly, it is a negative example of corruption. These two phenomena are related, since ethical and therefore non-corrupt behaviour is a part of Corporate Social Responsibility (CSR) in some concepts (for example, see Carrol, 1991, Soukupová, Dušková, 2008).

### 2 CORPORATE SOCIAL RESPONSIBILITY

In the first place, let us mention a concept of (Carroll, 1991) which differentiates the economic, legal, ethical and optional aspect of the social responsibility. The approach of Carroll is interesting because it seeks the CSR elements already in the actions that are natural to a firm, i.e. in the economic responsibility of the firms toward their owners and also in the area that delimits the frame in which the firms may realize their actions (legal responsibility). Only the third and fourth groups (ethical responsibility and optional responsibility) represent the actions the justifiability of which we may discuss from the viewpoint of the rational behaviour.

Actions under CSR may be divided into three groups as follows:

1. The actions conditioned by the legislation – here we have to deal with the actual delimitation of CSR. In a broad sense of CSR, certain elements of the socially responsible conduct are forced on the firms by the legislation {refer to the legal side of Carroll}; therefore, here the consideration of the motivation is impossible. Disobeying the legal duties puts a firm, its owners or its managers in the risk of sanctions being imposed. The element of the optional action is entirely missing here. Examples of the actions belonging to this group are the occupational health and safety or the environmental ecology – both controlled by the legislation and simultaneously belonging to the concept of CSR.

2. Other actions under CSR are the reactions to the requirements of the surroundings of the firm or of the interest groups {vide infra}, especially the customers. Here belong the mutually interconnected economic and ethical elements. Successfully outlined actions of a firm in the area of CSR lead to the improvement of its competitive standing, image and overall perception by the customers and the public. It essentially applies that these actions may be considered as a part of the marketing mix and public relations. In this area, the economic motivation unanimously plays a fundamental role; however, exactly here is possibly the best illustration of the potential different assessment of the CSR effects on the immediate economic results of a firm and on the long-term consequences of the socially responsible behaviour on the standing of a firm on the market. This group may include for instance the product quality and certain actions in the area of the care for the employees and human resource management.

3. Within the scope of CSR, there are also actions based exclusively on the concept of optional choice. In the case when the social behaviour is exclusively based on the voluntary choice, an issue of motivation is the most interesting one. This group contains, for example, the volunteerism and philanthropy. The impact on the image of a firm is indisputable in this case as well; however, a question arises here whether in this area such is solely the marketing or public relations, or the motives for CSR are present in a much deeper concept.

### **3 CORPORATE MOTIVATION TOWARD CSR**

For a traditional profit-maximizing firm<sup>26</sup>, socially responsible behaviour would be rational only if marginal revenue exceeds marginal costs associated with socially responsible behaviour. This elementary statement implicitly assumes that socially responsible behaviour has a positive impact on the firm's image and goodwill. Then socially responsible behaviour contributes to the positive perception of the company by customers and from the theoretical point of view, CSR is a factor increasing the demand for the company's production and so the rising firm's income. It is obvious that it is difficult to measure the positive effects of a socially responsible behaviour on demand. The socially responsible behaviour usually increases costs and its positive impact on revenue is not always obvious. Therefore, it can be said in principle that classical orientation to the maximizing (especially) short-term profit does not exclude socially responsible behaviour but CSR is not necessarily an organic part of the company's behaviour and strategy.

Studying the theoretical reflection of socially responsible behaviour, we have to solve question whether or not at all instruments of traditional economics theory can monitor and explain CSR. Traditional neoclassical economics explains the firm's behaviour on the basis of the profit motive and individuals' behaviour on the basis of utility maximizing. Now we

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<sup>26</sup> Traditional profit-maximizing firm is understood in a simple neoclassical approach.

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will analyze socially responsible behaviour in terms of maximizing profits in more detail. As it was already mentioned, the easiest way is to take account the corporate social responsibility as a factor which positively influences the demand for company production. The enforcing of higher corporate social responsibility usually increases company costs. Then, the traditional marginalist approach can be implemented into the analyses of costs which are related to corporate social responsibility. This approach allows to assess the effect of funds spent on socially responsible behaviour or to compare marginal revenue and marginal costs. In this basic approach, the company, after including socially responsible activities, should earn the same profit as a company without these activities. CSR increases both costs and revenues and the optimal solution presumes equalization marginal income and marginal costs associated with CSR (McWilliams, Siegel, 2001).

The above-described approach is certainly well founded and can contribute to the assessment of the effectiveness of socially responsible behaviour. But because of the complexity of assessment and measuring of effects in socially responsible behaviour, this approach has its limits.

Whenever we talk about the motivation toward the corporate social responsibility, it shall be suitable to consider that the actions of a firm are significantly influenced by the interest groups, the so-called "stakeholders". Actually, the corporate social responsibility is one of the aspects of the corporate behaviour; it is fundamentally related to the behaviour of the interest groups. The corporate social responsibility may be directly the result of the decision-making and acting of the interest group(s) controlling the firm; nevertheless, it can be simultaneously the reaction to the requirements and pressure of the external interest groups. McWilliams and Siegel (McWilliams, Siegel, 2001) argue that there are two major sources of demand for CSR:

1. consumer demand and
2. other stakeholders' demand.

The engagement of the interest groups in the actions and behaviour of a firm is not unilateral but mutual. In general, the basic division of the stakeholders has been known; they are particularly the owners, investors, employees, customers, suppliers, local offices, and communities. The firms must, however, consider the other groups as well, like the government, competition, environment, various pressure groups, lobbying associations, interest associations, trade associations, etc. It is therefore evident that from the viewpoint of the social responsibility, each firm is subject to the fundamental issue of determining the importance of the individual stakeholders. The important factors during such decision-making are different, e.g. according to the specifications of the individual industries and development phases of the given firm. Such decisions are ultimately the part of the strategy of each firm which behaves rationally.

The motivation of the firms toward the corporate social responsibility behaviour may be therefore derived from the motivation of the interest groups and their influence on the decision making of a firm. The corporate social responsibility behaviour shall reflect itself not only in the relation of a firm and its surroundings but also within its internal processes.

According to Simon, the fundamental methods of motivating people in organizations are based on the following elements:

- authority
- compensation

- loyalty<sup>27</sup>

It is evident that the corporate social responsibility behaviour is closely interconnected with the loyalty toward a firm and identification with it. In the case of the employees, the significance of the loyalty to a firm and identification with it is the undisputable factor in the final consequences that positively influence the productivity of the employees and therefore the economic results of a firm as well. Thus, it has become evident that the "care" for employees, adherence to ethical principles and other elements of CSR may be entirely legitimate from the viewpoint of the economic rationality. That applies especially whenever we do not concentrate solely on the short-term effect but also on the long-term strategy of a firm. Simultaneously, by far the loyalty might not only concern the employees but to a smaller or larger degree the other stakeholders, too.

The rational behaviour assumes the possibility of measuring the efficiency. With respect to the fact that the corporate social responsibility behaviour includes various actions, the measuring of the CSR effects on the results of a firm is connected to certain complications, and it is even impossible in some cases. It is not only difficult to measure the real impacts of the corporate social responsibility behaviour but simultaneously some actions under CSR are not connected to the significant immediate increase in costs. For the reasons mentioned above the firms often do consider the elements of the corporate social responsibility behaviour as a means of caring for the image; however, the firms have no ambitions to measure the effects of the CSR behaviour.

A more comprehensive assessment of CSR and, in particular, the motivation of people who make a decision whether to involve (or not) CSR into activities in the company strategy would be possible, for example, by introducing a target function of the company derived from the utility of the most important stakeholders. In addition to profit, one additional variable will be implanted into the goal function: for example, utility derived from socially responsible behaviour. Decision-making would then be based on the concept of a satisfactory level of indicators rather than from the maximization of the target function.

It is evident from the above-mentioned examples that the traditional economics apparatus is undoubtedly also applicable for analysis of some aspects of corporate social responsibility. However, in my opinion, standard economic theory based on neoclassical methodology has only limited possibilities to take these phenomena into account. There are a number of effects of corporate social responsibility which are difficult to measure. In addition, the results of strengthening corporate social responsibility will generally manifest in a long-run horizon.

#### **4 CORRUPTION**

Let us start from the Tanzi's concept of corruption (Tanzi, Davoodi, 1997). According to Tanzi, "corruption can be defined in different ways. However, the most common definition is that it is the abuse of public power to promote private benefits. Thus, a public employee who abuses his/her public position to derive benefits for oneself or friends, relatives or political associates is engaging in an act of corruption. Not all cases of corruption involve the payment of bribes".

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<sup>27</sup> Simon also states the coordination that secures the mentioned motivational mechanisms (Simon, 1991).

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Corruption affects many aspects of society and, of course, the extent of corruption has also an impact on the country's economic performance.

The corruption can be considered as one of the factors that influence the business environment. And the business environment affects transaction cost and in some cases also another cost. From point of view of firms, for example, bribes can affect cost and prices. Influence on transaction cost is maybe more important than an influence on direct cost. Good law enforcement and the ethical behaviour of people in the public administration as in the private sector can reduce the cost of monitoring and enforcement of economic contracts. On the contrary bad law enforcement and the unethical behaviour is an important reason of bounded rationality. It is possible to say that corruption could increase uncertainty because if the level of corruption is high, conditions for business are not very transparent. From the macroeconomic point of view, the corruption can influence the foreign investments, the size and the quality of the public procurement (Aid, 2003, Rajasekharan, 2011).

Foreign investments depend of course on more circumstances, for example, economic freedom and regulation (Hanousek, Kočenda, 2011), availability, quality and price of labour and other production factors and resources. But favourable economic and business environment is an important condition for increasing foreign investments as for domestic investments. The economic and business environment influences not the only amount but also the character of investments, mainly share of long term investments.

The corruption affects the size and the quality of the public procurement fairly directly. Some public expenditure is productive and has a direct impact on the growth rate and economic performance but some are non-productive (Izák, 2011). Overall, however, public expenditure affects economic growth and economic performance in general.

Corruption affects the efficiency at the macro level as well as at the micro level. Perhaps more important is that, the level of corruption is one of the indicators of the nature of economic and business environment, its meaning is deeper and more complex than can be expressed through measurable indicators (Soukupová, 2011).

After summarizing the consequences of corruption, we sum up its causes. The basic questions which are solved by economics theory and which we can read at the beginning of most of the economics textbooks are “What”, “How”, “For Whom” to produce. In the case of corruption, questions can be substituted by similar questions: “Who”, “Why” and “When” bribes.

Who gives and who receives a bribe? There is a person who can decide for the benefit or disadvantage of another subject, and that decision is made without economic, legal or other legitimate reasons. And there is a subject who is trying to get this advantage over others.

Why do people bribe? Because they have an opportunity to extract rent or get some benefit by bribing.

When does corruption appear? When people who have the motive and opportunity to bribe or be bribed live in conditions favourable to corruption. This means a weak institutional, legal and ethical environment. Historical and cultural traditions and habits have considerable influence on corruption (Soukupová, 2013).

## 5 CORRUPTION AND RATIONALITY

The rationality of corruption can be regarded from two different positions: we have to regard the position of a giver and position of a recipient.

***The position of a giver.*** If apart from the ethical aspects, giver's behaviour can be considered as essentially rational because the economic subject tries to maximize its benefit. In the case of corruption, however, this effort often conflicts with the law. From a purely pragmatic point of view, the decision whether to provide a bribe depends on a comparison of the benefits obtained on the one hand and the level and the likelihood of sanctions resulting from public control. However, it is quite obvious that the decision whether to offer a bribe is fundamentally influenced by the ethical and value attitudes of the particular individuals.

***The position of a recipient.*** Recipient's behaviour is, in a certain sense, very similar to giver's conduct. He (she) compares the advantage, in this case, the amount of the bribe, with costs and likelihood of punishment. The ethical and value attitude of a particular individual is also very important in this case and seems to be even more important than in the case of a giver. Individuals receiving a bribe are typically in a specific position. Corruption is usually taken into account when recipients decide on the allocation of most of the public sources without bearing the immediate consequences of their decisions.

Corruption concerns not only to the public sector but may also occur in the private sector, for example when one employee selects suppliers of products or services for the firm. Of course, this kind of corruption is not as important as corruption in the public sector. It may redistribute private resources. But corruption in the private sector can decrease efficiency. The presence of corruption in the private sector worsens the business environment and destroys the cleanliness of the competition.

It is necessary to note that according to some authors, from a purely economic point of view, corruption might even help to increase efficiency because only economically strong companies can offer a sufficient amount of the bribe.

It is possible to mention another aspect of corruption within the context of using the principal agent approach. Corruption can be understood in a broader sense, and not only as a corruption of government or other public officials. Corruption can also arise when:

1. The principal delegates decision-making to the agent.
2. Information asymmetry exists and it is impossible or costly to monitor the activity of the agent.
3. The agent enters into contracts with other competing economic subjects.
4. Results of contracts affect a principal's utility (income or wealth); an agent's utility is not directly dependent on the outcome of a contract, and bribes can increase the utility of the agent (Soukupová, 2013).

The motivation of economic subjects to give or receive bribes is significantly influenced by the economic environment, as has been said, depends on the opportunity to extract rent or get some benefit by bribing and mainly on the institutional, legal and ethical environment and also on historical and cultural traditions and habits. Activity can be considered in one country as ethically and legally unacceptable corrupt behaviour but the same activity can be regarded as normal and at least tolerated in another country.

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## 6 CONCLUSION

Socially responsible behaviour and corruption are an example of situations where it is debatable whether the effort of each individual to maximize their benefits leads simultaneously to maximum social well-being. In the case of CSR, there is a problem whether companies are motivated to socially responsible behaviour increasing social well-being. Corruption is a factor that adversely affects economic performance and therefore social well-being. Both CSR (positively) and corruption (negatively) affect not only the economic environment but the overall social climate, too.

Socially responsible behaviour and corrupt practices can be explained as an outcome of the simple rational behaviour of economic agents but, in both cases, the ethical norms and values of particular people play an important role. In both cases, institutions are essential in order to influence positively ethical and responsible behaviour. The economic and social environment favourable to CSR is not generally favourable to corruption.

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## The Impact of Innovation on Competitiveness and Economic Growth in EU Countries

*Jindřich Soukup*

### ABSTRACT

*In macroeconomics models, we can observe the key role of technological progress for competitiveness and economic growth. The first part of the paper discussed the relationship between innovation capability of European countries and their level of competitiveness. The innovation capability is expressed by the selected aggregate innovation indices (the Summary Innovation Index of the European Commission and independently developed the FBA Innovation Index), competitiveness is expressed by the Global Competitiveness Index of the World Economic Forum (WEF). According to WEF, competitiveness is defined as “the set of institutions, policies, and factors that determine the level of productivity of a country”. But the total factor productivity is an important or a key factor for economic growth. For this reason, the second part of the contribution deals with the relationship between innovation capability of European countries and their economic growth which is measured by the growth rate of their gross domestic products.*

**Keywords:** *knowledge economy, innovation, competitiveness, economic growth*

**JEL Classification:** O30, O40

### 1 INTRODUCTION

The new economy, the knowledge economy, knowledge driven economy, the digital economy, industry 4.0, the fourth industrial revolution, the second machine age are all concepts which are trying to describe – at various levels of abstraction - the technological progress that occurs in the last several decades, however, but first since the seventies of the twentieth century. About ten years ago, the category "new economy" was very widespread but currently, the political concept of "Industry 4.0" occupied this position.

The concept „new economy" is rather journalist shortcut describing the transition from heavy industry to a technology based economy (see: Alexander, 1983).

Similarly, “digital economy” refers to an economy that is based on digital computing technologies. The digital economy is also called the Internet Economy or Web Economy and it is also synonymous for the New Economy. The term “Digital Economy” was coined in (Tapscott, 1997).

Alike, the term "Industry 4.0" is linked to the current economic policy rather than on economics theory. The Czech government's National Initiative Industry 4.0 (MPO, 2015) - which was formed under the influence of the German national initiative Industrie 4.0 - illustrates this statement.

This assertion is also evidenced by the results of a literature survey on the topic Industry / Industrie 4.0 dated September 2016. The survey shows a minimum coverage of the topic Industry 4.0 in scientific journals (less than 1% of identified articles are relevant to this

topic). Moreover, existing articles are focused on technology and IT aspects and they neglect managerial, economic and organizational aspects of this process (see Jirsák et al., 2016).

Category of "new economy", "digital economy" or "Industry 4.0" so correspond rather to the examination of the technological progress in applied research than in basic research. In the proposed project, we are concerned about the effects of technological progress in terms of theory. For this reason, we rather avoid to these concepts and we prefer to use the category of the knowledge economy.

The category is also more frequently observable in theoretical articles or monographs. The idea "knowledge economy" or "knowledge-managed economy" comes from American – Austrian economist Fritz Machlup (see Machlup, 1962). This category was developed and broadly popularized by Peter Ferdinand Drucker (see Drucker, 1969). Machlup's study gave rise to a whole literature on the knowledge economy, its measurement, and economic policy recommendation. The contribution (Soukup, 2015) provides the overview of literature devoted to issues of the knowledge economy.

## **2 KNOWLEDGE ECONOMY, INNOVATION, COMPETITIVENESS**

In this part of the contribution, we try to verify whether the relation between the level of competitiveness and knowledge economy exists in the EU economies. We attempt to quantify this relation.

We express the level of development of the EU countries by the indicator of competitiveness. For the analysis, we will apply the Global Competitiveness Index which is published regularly each year by the World Economic Forum (WEF) in its Global Competitiveness Report.

We have also to identify the level of development in the knowledge economy. For this purpose, we apply aggregate innovation indices (or knowledge economy indices). A relatively high number of these indices are available, these include, for example, the Global Innovative-Based Competitiveness Index of the American Information Technology and Innovation Foundation (ITIF, 2011), Knowledge Index of World Bank (World Bank Institute, 2016), the Global Innovation Index of the INSEAD (INSEAD & WIPO, 2012), Global Innovation Quotient of Bloomberg (Bloomberg, 2013), Global Innovation Index of Boston Consulting Group (Boston Consulting Group, 2009) or the Summary Innovation Index from the European Innovation Scoreboard of the European Commission (UNU-MERIT, 2016).

The analysis based on the Kendall coefficient of concordance and the Spearman correlation coefficient and published in (Soukup J. and alt., 2015) confirms that the explanatory power of all these rankings (aggregate innovation indices) is virtually the same and that it is not necessary to consider all of them in the next analysis. For this reason, we apply only the Summary Innovation Index of the European Commission.

As a feedback, we will apply our FBA Innovation Index which is used for more than 10 years. The detailed description of the FBA Innovation Index is published, for example, in the monograph (Soukup, Rathouský 2013). Here, let's just stress that the index is based on 16 sub-indicators, which are divided into five groups (modules). The structure of the modules and the whole aggregate index, including the weight of the individual sub-indicators, is shown in Tab.1.

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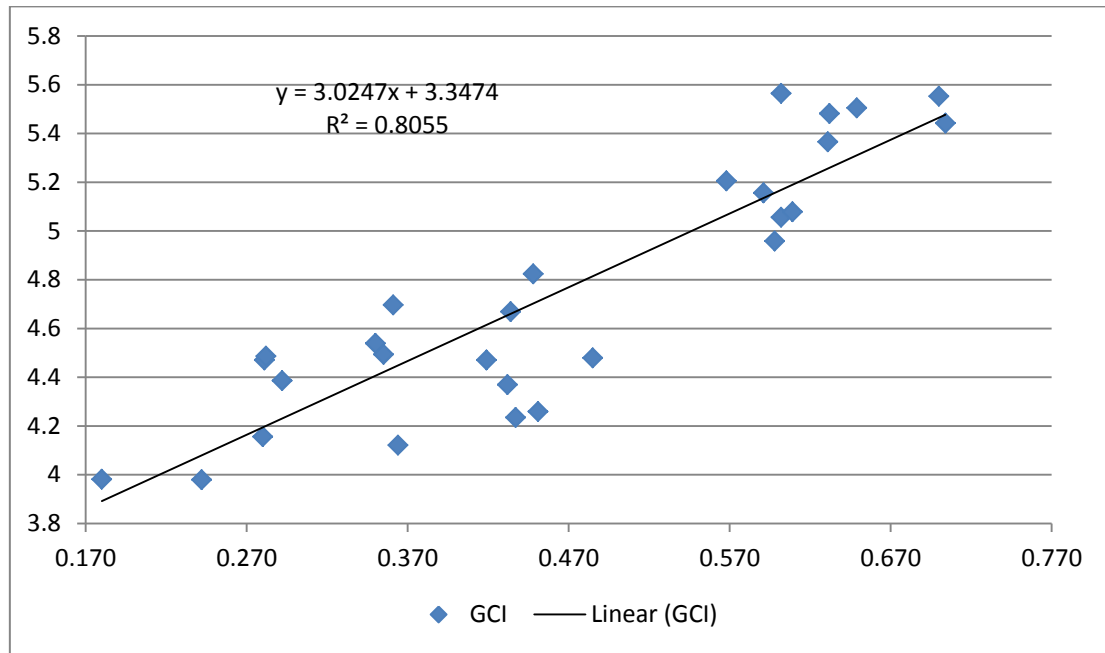
**Tab.1** - Structure of the FBA Innovation Index

<b>Indicator</b>	<b>Weight</b>
<b>Module A. Knowledge jobs</b>	<b>2,50</b>
Enterprises that employed ICT/IT specialists (NACE Rev. 2), Percentage of enterprises, all enterprises, without financial sector, 10 persons employed or more	0,75
Workforce education	1,00
Gross value added per employee FTE	0,75
<b>Module B. Globalization</b>	<b>1,00</b>
Share of the high-tech products export in the total export	0,75
FDI intensity (FDI divided by GDP)	0,25
<b>Module C. Innovation dynamism</b>	<b>2,00</b>
Number of patents granted by the American USPTO	1,00
A number of European patent applications (EPO) per 1 mil. Inhabitants	0,5
Contribution of electricity from renewables to total electricity consumption	0,5
<b>Module D. Digital economy</b>	<b>1,75</b>
Level of Internet access – households (%)	0,50
The use of e-government by individuals	0,50
Share of households with broadband access lines in total number of households	0,50
Share of individuals using the Internet to seek health information in total population	0,25
<b>Module E. Innovation capacity</b>	<b>2,75</b>
Share of the employment in technology and knowledge – intensive sectors in the total employment	0,75
Human resources in science and technology as a share of active population – total	0,75
Share of business enterprises' gross domestic expenditure on R&D in GDP	0,75
Share of government and universities' gross domestic expenditure on R&D in GDP	0,50
<b>TOTAL</b>	<b>10</b>

Source: Soukup, Rathouský (2013)

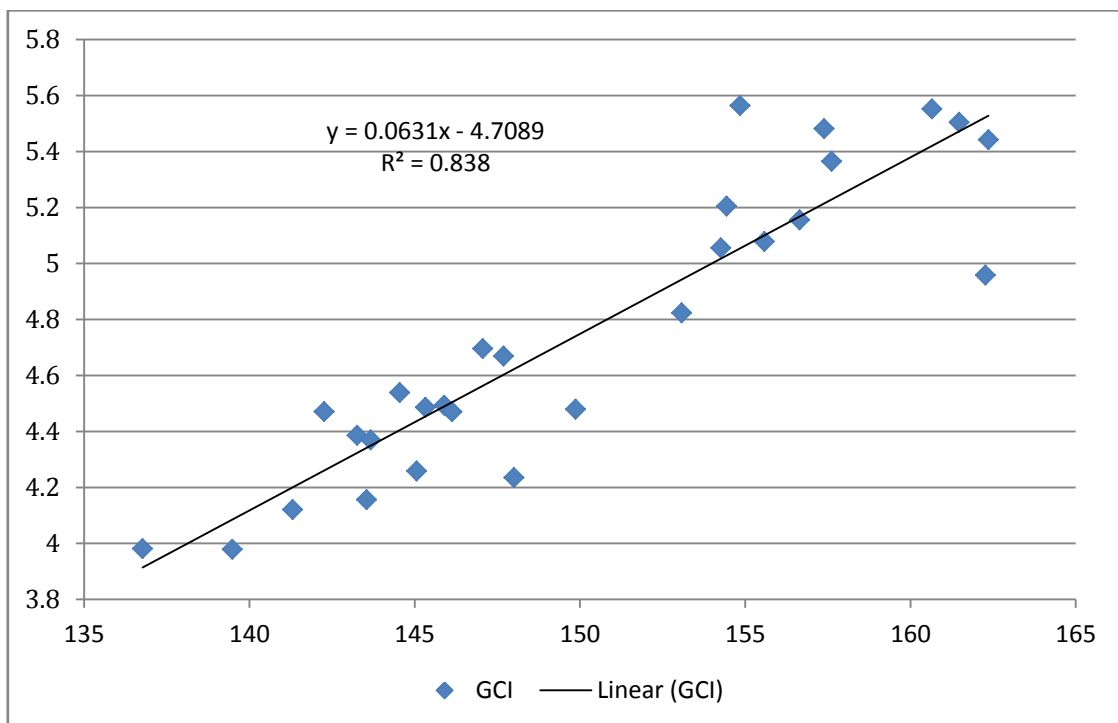
As has been said, the aim is to analyze the relationship between the level of competitiveness and knowledge economy.

We analyzed this relationship in 27 EU countries in years 2007 and 2013 and in data for 28 countries (newly Croatia has become a member state) in 2015. For exploration, we used the two above mentioned aggregated indices (the Summary Innovation Index of the European Commission and the FBA Innovation Index) for the innovation performance of the countries surveyed. Overall, we had 164 measurements available. Both indices, describing the country's innovation performance, have been linked to the Global Competitiveness Index (GCI).



**Fig.1 - The Summary Innovation Index (SII) and the Global Competitiveness Index (GCI)(2015)**

*Note: the SII is an independent variable x and the GCI is a dependent variable y on the vertical axe.  
Source: own computation*



**Fig.2 - The FBA Innovation Index and the Global Competitiveness Index (2015)**

*Note: the FBA Innovation Index is an independent variable x and the GCI is a dependent variable y on the vertical axe.*

*Source: own computation*

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Figure 1 illustrates the relationship between the Summary Innovation Index and the Global Competitiveness Index in the year 2015. Analogously, Figure 2 illustrates the relationship between the FBA Innovation Index and the Global Competitiveness Index for the same year. It is evident from the both figures there is a positive correlation between the capability to innovate and the achieved level of the competitiveness in the surveyed countries. The states with a higher level of innovation performance have also a higher level of competitiveness. It is possible to monitor similar results if we prepare figures with the same variables for both remaining analyzed years (2007 and 2011). For this reason, it is not necessary to publish the figures for these two years in this contribution.

In Table 2, there are published the regression functions with competitiveness (the Global Competitiveness Index, GCI) as a dependent variable and with the aggregate innovation indices (the Summary Innovation Index, SII or the FBA Innovation Index) as independent variables. The table also contains determination coefficients  $R^2$  and their squares - correlation coefficients R.

It is necessary to stress values of the correlation coefficients themselves indicate only a strong linear dependence between the mentioned variables. The coefficients themselves do not indicate that the capability to innovate is the reason of the country's higher competitiveness or on the contrary, only higher competitiveness creates economic conditions for the development of a knowledge-based economy and for an ability to innovate.

Determination coefficients from the Table No. 2 confirm the relatively strong dependence on the ability of EU economies to innovate and their competitiveness.

**Tab.2** - The relationship between the Global Competitiveness Index and selected aggregate innovation indices

Indices	Year	Regression function	Determination coefficient $R^2$	Correlation coefficient R
SII and GCI	2007	$y = 3,5543 + 2,6733 x$	0,7406	0,860579
	2013	$y = 3,3491 + 2,9777 x$	0,841	0,917058
	2015	$y = 3,3474 + 3,0247 x$	0,8055	0,897482
FBA Index and GCI	2007	$y = - 2,1258 + 0,0583 x$	0,7584	0,870872
	2013	$y = - 4,3566 + 0,0668 x$	0,8326	0,912443
	2015	$y = - 4,7089 + 0,0631 x$	0,838	0,915412

*Note: in equations, a corresponding innovation index (the SII or the FBA Innovation Index) is always independent variable x and the Global Competitiveness Index is always dependent variable y.*

*Source: own computation*

The equations in Table 2 can be written in the general form  $y = a + b x$ . The interpretation of regression coefficients b can be interested. These coefficients inform what increase of the mean value of the variable y (i.e. competitiveness) corresponds to the unit increase of the value of the variable x (i.e. the relevant innovation index). For example, in 2015, the unit increment of the FBA Innovation Index has resulted in the increase in competitiveness of 0.0631 units (in the value of the Global Competitiveness Index).

Naturally, the aim is not to calculate with a precision of several decimal places, the goal is to realize the qualitative analysis here. And the conclusion of the qualitative analysis is

relatively clear: the development of knowledge economy (expressed as the ability to innovate here) contributes to the growth of a country's competitiveness.

### 3 KNOWLEDGE ECONOMY, INNOVATION, AND ECONOMIC GROWTH

Until now we have investigated the relationship between competitiveness (the Global Competitiveness Index, GCI) and the aggregate innovation indices (the Summary Innovation Index, SII or the FBA Innovation Index).

But what is competitiveness? There are actually a number of definitions out there. The World Economic Forum, which has been measuring the Global Competitiveness Index, defines it as “the set of institutions, policies, and factors that determine the level of productivity of a country”. Others definitions are subtly different but all generally use the word “productivity”.

The economic growth is normally measured by the change in gross national product (GNP) or gross domestic product (GDP). There are three main factors that drive economic growth: accumulation of capital stock, increases in labour inputs, such as workers or hours worked, and technological progress (represented usually by total factor productivity, TFP).

Having regard to the above definitions, it is clear there is quite a close relationship between economic growth and competitiveness. The innovation capability has got the strong relationship to the competitiveness (or productivity). But what is a relationship between economic growth and the ability to innovate?

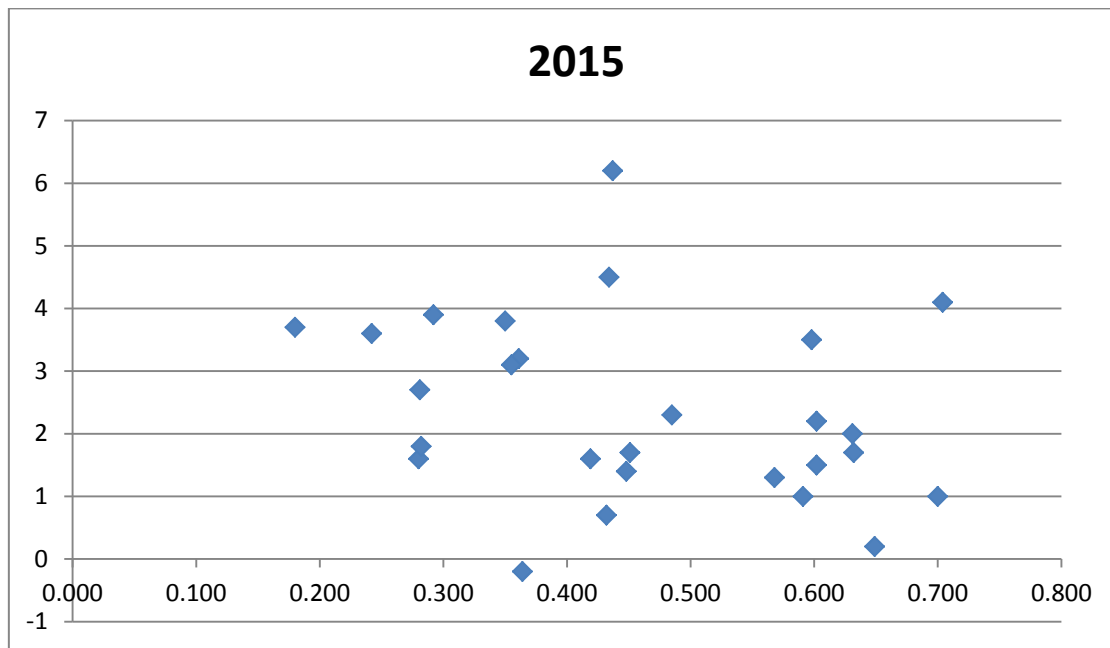
To solve this question, we studied the relationship between Summary Innovation Index (SII) of the European Commission and growth rate of real gross domestic products of all EU countries. Again, we analyzed this relationship for years 2007, 2011 and 2015. Altogether, we disposed of by 84 measurements.

**Tab.3** - Relationship between the Summary Innovation Index and real GDP growth rate

Year	Regression function	Determination coefficient R <sup>2</sup>	Correlation coefficient R
2007	$y = 8,6945 - 8,4301 x$	0,2113	-0,45971
2013	$y = 1,532 - 2,2553 x$	0,024	-0,1549
2015	$y = 3,6156 - 2,71 x$	0,0786	-0,280363

*Note: in equations, the Summary Innovation Index (SII) is always independent variable x and the growth rate of real GDP is always dependent variable y.*

*Source: own computation*



**Fig.3** - The Summary Innovation Index (SII) and growth rate of real GDP (2015)

*Note: the SII is an independent variable x and growth rate of real GDP is a dependent variable y on the vertical axe.*

*Source: own computation based on (Eurostat, 2016) data*

The regression analysis results are shown in Table 3. It is evident that only a very weak link between the level of the knowledge economy and the economic growth can be observed for EU countries.

To illustrate this situation, Figure 3 is inserted in the contribution. The Figure illustrates the relationship between the two variables examined. It also shows that it is virtually impossible to outline the link between economic growth and the innovation performance of the EU economies. Figures for years 2007 and 2013 are very similar to Figure 3 (for the year 2015) and so they are not published here.

#### 4 CONCLUSIONS

The first part of the paper discussed the relationship between innovation capability of European countries and their level of competitiveness. The analysis presented in the contribution confirms there is a relatively strong dependence on the ability of EU economies to innovate and their competitiveness.

The statistical analysis themselves do not indicate that the capability to innovate is the reason of the country's higher competitiveness or on the contrary, only higher competitiveness creates economic conditions for the development of a knowledge-based economy and for an ability to innovate.

But if we accept the conclusions of macroeconomics models of economic growth, for example, Solow – Swan model (Solow, 1956) or AK models (Romer, 1986), we can conclude that the capability to innovate is the reason of the country's higher competitiveness.



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Competitiveness is regarded in the contribution as the set of institutions, policies, and factors that determine the level of productivity of a country. The total factor productivity is a key factor for economic growth in macroeconomics theory. The second part of the contribution deals with the relationship between innovation capability of European countries and their economic growth which is measured by the growth rate of their real gross domestic products.

The link between economic growth and the innovation performance of the EU economies is quite weak. From our point of view, it does not mean that the total factor productivity is not an important factor of economic growth. It only indicates that applied innovation indices (their structure) are not appropriate instruments to measure the impact of total factor productivity on economic growth.

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## Does Gender Inequality Reduce National Innovation Output? Evidence from Developing Countries

*DonVito Valle*

### ABSTRACT

*Gender inequalities is a persistent problem in developing countries and has been the subject of interdisciplinary research and policy intervention. Whereas much of the economic research sought to explain its impact on a nation's economic growth and development, this paper examines the extent to which gender inequality affect its innovation performance. Specifically, it provides evidence that gender inequalities exacerbated by variation in per capita income levels reduce the innovation output of developing countries.*

**Keywords:** *gender inequality, innovation, developing countries*

**JEL Classification:** J16, O15, O30

### 1 INTRODUCTION

There has been a strong consensus that sustainable economic growth is hinged on a nation's competitive strength by which innovation plays a key role (Freeman, 2002; Van Stel, Carree, and Thurik, 2005; Hasan and Tucci, 2010). Globalization, market competition, and economic integration motivated countries to bolster support for research and development. For many countries, this meant expanding the institutional framework and structuring their economies around innovation systems to facilitate knowledge diffusion and stakeholder cooperation.

With much of the enthusiasm fixated on developing innovation ecosystems, often absent in the discussion of advancing national innovation performance is the likely impact of improving one of the many dimensions of human development that need policy intervention. One such dimension concerns gender equality which requires equal opportunities for different genders to access resources and participate in public spheres. It may be argued that eliminating structural barriers to human well-being could provide opportunities for innovation, especially for developing countries. However, this assertion had remained largely unsubstantiated.

This paper investigates the relationship between gender inequalities and national innovation performance. Specifically, it examines how the innovation outputs of developing countries are affected directly by incidences of gender inequalities and indirectly by variation in per capita income levels through gender inequalities. To investigate this causation, cross-country data is compiled from the Global Innovation Index reports and the UNDP Human Development reports from 2013 to 2016. The paper focuses on developing countries which incidentally lag in initiatives to eradicate gender disparity.

The paper contributes to the burgeoning discourse on gender and innovation in two ways. First, it addresses the dearth in literature by examining the nexus between gender inequalities and innovation output. Second, the study contributes to the econometric understanding of this nexus by analysing the endogeneity issue of 'gender inequalities' as a predictor variable.

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The paper is structured as follows. Section 2 provides an overview of studies on the economic consequences of gender inequalities. Section 3 discusses the methodology and data. Section 4 examines the econometric results, and finally, section 5 concludes the paper.

## 2 LITERATURE REVIEW

One of the many areas of research on gender economics is the intersectionality of gender and economic development, with particular focus on macro-oriented research. Summarised below are some of the important literature on economic consequences of gender inequalities.

A common manifestation of gender disparities is the unequal access of different genders to education and literacy. Klasen (2002), Klasen and Lamanna (2009), and Balamoune- Lutz and McGillivray (2009) find evidence that education-related gender disparities adversely affect the economic growth of developing countries. Busse and Spielmann (2006) likewise note that manifestation of gender disparity is negatively associated with trade flows of both developed and developing countries while Knowles, Lorgelly, and Owen (2002) estimated its impact on labour productivity. Klasen and Minasyan (2017) extend their study to European countries but finds no relationship between gender gap and economic growth.

In terms of labor participation, Mitra, Bang, and Biswas (2015) observe that improved access of different genders to employment increased economic growth. Additionally, Klasen and Minasyan (2017) report that gender gaps in employment have an adverse impact on economic growth while Busse and Spielmann (2006) conclude that trade flows regressed with gender inequalities in labor participation. As regards to gender wage, Seguino (2000a; 2000b) argues that economic growth benefited from the wage gap inequality although Schober and Winter-Ebmer (2011) disagree and find evidence to the contrary. Busse and Spielmann (2006) extend their observation on trade flows and note a positive relationship between the wage gap inequality and trade flows.

Overall, there is a consensus on the findings of these research. This literature review however finds no existing literature linking gender inequalities to innovation output. Motivated by this, the paper investigates this nexus and empirically tests the causation.

## 3 DATA AND EMPIRICAL METHODS

### 3.1 The Data

The study uses annual observations of developing countries for the period 2013 to 2016. The data were compiled from two sources: (1) the Global Innovation Index reports published by Cornell University, INSEAD, and the World Intellectual Property Organization and (2) the Human Development reports on gender inequality reports published by the United Nations Development Programme.

The Global Innovation Index measures the level of innovation performance of countries and can be computed by taking the ratio of the scores of two sub-indices, namely the (1) Innovation Input Index and (2) the Innovation Output Index. The Innovation Input Index consists of five components, namely (1) institutions, (2) human capital and research, (3) infrastructure, (4) market sophistication, and (5) business sophistication. Meanwhile, The Innovation Output Index can be decomposed into two components, namely (1) knowledge and technology outputs and (2) creative outputs. These five components of the Innovation Input Index and two components of the Innovation Output Index are composite statistics

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consisting at sub-components which in turn could be decomposed into at least two individual indicators. The score obtained for the sub-indices as well as the components, sub-components, and individual indicators ranges from 0 to 100, with 0 representing the absence of an individual indicator and 100 representing the maximum value. For this paper, only the Innovation Output Index and the five components of the Innovation Input Index are used.

The Gender Inequality Index published in the UNDP Human Development reports measures the level of gender inequalities experienced within a country. It is a composite statistic based on five indicators of gender inequalities, namely (1) maternal mortality ratio, (2) adolescent birth rate, (3) share of seats in parliament, (4) population of men and women with at least some secondary education, and (5) labour force participation rate of men and women. The score obtained for the Gender Inequality Index ranges from 0 to 1 with 0 representing the absence of gender inequalities and 1 representing the strong presence of gender inequalities. Meanwhile, the indicators report either absolute figures or percentages. For this paper, the only Gender Inequality Index is used.

After dropping observations with missing variables, the study uses a pooled sample of 367 observations from 98 countries. Table 1 provides the summary statistics of the variables.

**Tab.1** - Descriptive Statistics

Variables	Mean	Standard deviation	Minimum	Maximum
Innovation Outputs	25.760	7.496	2.100	48.000
Gender Inequality	0.426	0.138	0.137	0.767
Institutions	55.420	11.550	16.000	80.900
Human Capital and Research	25.350	9.354	0.700	62.100
Infrastructure	32.810	9.932	6.200	60.500
Market Sophistication	43.850	7.609	25.800	66.000
Business Sophistication	29.910	7.593	8.600	57.500

*Source: Own computation based on Cornell University, INSEAD, and the World Intellectual Property Organization (2013, 2014, 2015, and 2016) and United Nations Development Programme (2013, 2014, 2015, and 2016).*

## 3.2 Econometric Model

To estimate the influence of gender inequality on innovation output, the following equation is used:

$$\text{Outputs}_k = \alpha + \beta_1 * \text{Gender Inequality}_k + \beta_2 * \text{Inputs}_k + \varepsilon_k \quad (1)$$

where  $k$  denotes the number of countries and  $\varepsilon$  represents the error term.

The response variable  $\text{Outputs}_k$  represents the level of outputs of each country as given in the Global Innovation Index reports. It is the simple average of composite statistics representing knowledge and technology outputs and creative outputs. Knowledge and technology outputs accounts for knowledge creation, knowledge impact, and knowledge diffusion while creative outputs accounts for intangible assets, creative goods and services, and online creativity.

The explanatory variable  $\text{Gender Inequality}_k$  represents the Gender Inequality Index number of each country as given in the UNDP Human Development reports. The coefficient of this

variable is expected to be negative. It is hypothesised that as incidences of gender inequalities in a country increase, its innovation output decreases.

The other explanatory variable  $Inputs_k$  is a vector of control variables that represent the level of innovation inputs of each country as given in the Global Innovation Index reports. These variables are (1) institutions, which accounts for a country's political environment, regulatory environment, and business environment, (2) human capital and research, which accounts for a country's statistics in terms of education, tertiary education, and, research and development, (3) infrastructure, which accounts for a country's standing in terms of information and communication technologies, general infrastructure, and ecological sustainability, (4) market sophistication, which accounts for a country's system of credit, investment, and trade, competition, and market scale, and (5) business sophistication, which accounts for a country's knowledge workers, innovation linkages, and knowledge absorption. The coefficient of these variables is expected to be positive. It is hypothesised that as the level of innovation input of a country increases, its innovation output likewise increases.

This study also considers the problem of endogeneity, in particular since gender inequalities themselves are partly rooted in economic disparities (Dollar and Gatti, 1999; Tzannatos, 1999; Jayachandran, 2015). For this reason, the study adopts a two-stage regression analysis, using gross national income per capita as instrumental variable. In the first stage, the level of gender inequalities is estimated by the model using the following equation:

$$\text{Gender Inequality}_k = \pi + \gamma_1 * \ln \text{GNIPC}_k + \varepsilon_k \quad (2)$$

In the second stage, the fitted values derived from the equation (2) is used as explanatory variable for equation (1).  $\ln \text{GNIPC}_k$  is assumed to be negatively correlated with the Gender Inequality and is not correlated with the error term  $\varepsilon_k$ . The gross national income per capita of each country is provided in the Human Development reports and is deflated using the 2011 purchasing power parity as indicated in the reports.

To account for variation on the composite statistics because of the size of the individual countries, the study uses the heteroskedasticity-corrected regression analysis provided by the software GRETLL.

#### 4 RESULTS AND DISCUSSIONS

Table 2 provides the regression results. Using the base model, the coefficients of all the explanatory variables, except Institutions, are found to be statistically significant and follow the expected signs. Posttests reveals that all the variables have a variance inflation of less than 2.5, indicating that the model does not have a multicollinearity problem. Because the model uses the heteroskedasticity-corrected regression analysis, the model likewise does not suffer from heteroskedasticity. Based on this model, the results confirm the negative impact of gender inequalities on innovation outputs when controlling for innovation inputs.

To test the endogenous properties of the Gender Inequality variable, that is the indirect effect of income levels on innovation performance partly through gender inequalities,  $\ln \text{GNIPC}_k$  is used to estimate Gender Inequality which is then plugged into the explanatory model. Prior correlation tests report that the moderately negative relationship between  $\ln \text{GNIPC}_k$  and Gender Inequality is statistically significant while  $\ln \text{GNIPC}_k$  bears no correlation with the error term estimated in the base model. The findings lend credibility to the suitability of gross national income per capita as an instrumental variable. Based on the results of the two-stage regression analysis, the signs and the statistical significance of all the variables, except for

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Institutions, are consistent with those reported for the base model. As regards specifically to Gender Inequality, the coefficient estimated in the 2SLS model is larger the coefficient estimated in the base model; however, the results maintain that it is still negatively related to innovation output and the coefficient is statistically significant. Overall, these findings suggest that the incidences of gender inequalities exacerbated by variation in income levels adversely affects the innovation performance of developing countries.

**Tab.2 - Regression Results**

Variables	Base Model	2SLS Model
Constant	6.990* (3.130)	9.849* (4.182)
Gender Inequality	-8.508** (2.796)	-12.584* (5.460)
Institutions	0.083** (0.031)	0.074* (0.033)
Human Capital and Research	0.224** (0.049)	0.207** (0.046)
Infrastructure	-0.021 (0.042)	-0.013 (0.052)
Market Sophistication	0.137** (0.042)	0.124** (0.040)
Business Sophistication	0.227** (0.044)	0.229** (0.043)
Observations	367	367
Adjusted R-squared	0.427	0.390

Source: Own computation. Note: Standard errors in parentheses, \*\*  $p < 0.01$ , \*  $p < 0.05$ .

## 5 CONCLUSIONS

The paper examines the extent to which gender inequality affect the innovation performance of developing countries. Using weighted least square regression analysis, the findings indicate that gender inequality is negatively associated with innovation output. To further analyse the endogeneity problem of 'gender inequalities' as a predictor variable, a two-stage analysis is employed to estimate the level of gender inequalities, the predicted values of which is then used to estimate the coefficient in relation to its impact on national innovation output. Results suggest that innovation outputs of developing countries are affected directly by incidences of gender inequalities and indirectly by variation in per capita income levels through gender inequalities. For developing countries, this implies that gender development is strongly linked with innovation capacity. Any innovation policy should go hand in hand with enacting social policies that close the gender gap as well as the income gap.

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## Company Classification Using Machine Learning Models

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### ABSTRACT

*The current information age is flooded with data, much of which is complicated and difficult to interpret. It has therefore become necessary to create computational tools that allow for the processing and analysis of large datasets. Main goal of this contribution is to examine the effectiveness of fifteen different machine learning algorithms for classifying a business from the Forbes 2000 ranking of the world's largest companies, based on their market value statistics. Used algorithms cover also simple models such as Logistic Regression, Naive Bayes, k-nearest neighbour, Generalized Linear Models and computationally challenging models such as tree based algorithms, ensemble methods and neural networks. Contribution shows that k-nearest neighbour algorithm and ensemble methods give better results of classifying banking and non-banking companies based on market value statistics than traditional tree based methods or neural networks for this dataset in terms of classification accuracy, sensitivity and specificity.*

**Keywords:** *Classification Models, Rule-Based Models, Ensemble Methods, Supervised Machine Learning*

**JEL Classification:** O16, O10, C15, C38

### 1 INTRODUCTION

The task of classification occurs in a wide range of human activity. At its broadest, the term could cover any context in which some decision or forecast is made on the basis of currently available information, and a classification procedure is then some formal method for repeatedly making such judgments in new situations. The construction of a classification procedure from a set of data for which the true classes are known has also been variously termed pattern recognition, discrimination, or supervised learning (in order to distinguish it from unsupervised learning or clustering in which the classes are inferred from the data).

Contexts in which a classification task is fundamental include, for example, mechanical procedures for sorting letters on the basis of machine-read postcodes, assigning individuals to credit status on the basis of financial and other personal information, and the preliminary diagnosis of a patient's disease in order to select immediate treatment while awaiting definitive test results. In fact, some of the most urgent problems arising in science, industry and commerce can be regarded as classification or decision problems using complex and often very extensive data.

A wide variety of approaches has been taken towards classification task. Three main historical strands of research can be identified: *statistical*, *machine learning* and *neural network*. These have largely involved different professional and academic groups, and emphasised different issues. All groups have, however, had some objectives in common. They have all attempted to derive procedures that would be able (Fulkerson et al., 1995):

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- if not exceed, a human decision-maker's behaviour, but have the advantage of consistency and, to a variable extent, explicitness,
- to handle a wide variety of problems and, given enough data, to be extremely general,
- to be used in practical settings with proven success (Fulkerson et al., 1995).

## 1.1 Statistical approaches

Two main phases of work on classification can be identified within the statistical community. The first, "classical" phase concentrated on derivatives of Fisher's early work on linear discrimination. The second, "modern" phase exploits more flexible classes of models, many of which attempt to provide an estimate of the joint distribution of the features within each class, which can in turn provide a classification rule.

Statistical approaches are generally characterised by having an explicit underlying probability model, which provides a probability of being in each class rather than simply a classification. In addition, it is usually assumed that the techniques will be used by statisticians, and hence some human intervention is assumed with regard to variable selection and transformation, and overall structuring of the problem (Fulkerson et al., 1995).

## 1.2 Machine Learning

Machine Learning is generally taken to encompass automatic computing procedures based on logical or binary operations, that learn a task from a series of examples. Here we are just concerned with classification, and it is arguable what should come under the Machine Learning umbrella. Attention has focussed on decision-tree approaches, in which classification results from a sequence of logical steps. These are capable of representing the most complex problem given sufficient data (but this may mean an enormous amount!). Other techniques, such as genetic algorithms and inductive logic procedures (ILP), are currently under active development and in principle would allow us to deal with more general types of data, including cases where the number and type of attributes may vary, and where additional layers of learning are superimposed, with hierarchical structure of attributes and classes and so on.

Machine Learning aims to generate classifying expressions simple enough to be understood easily by the human. They must mimic human reasoning sufficiently to provide insight into the decision process. Like statistical approaches, background knowledge may be exploited in development, but operation is assumed without human intervention (Fulkerson et al., 1995).

## 1.3 Neural Networks

The field of Neural Networks has arisen from diverse sources, ranging from the fascination of mankind with understanding and emulating the human brain, to broader issues of copying human abilities such as speech and the use of language, to the practical commercial, scientific, and engineering disciplines of pattern recognition, modelling, and prediction. The pursuit of technology is a strong driving force for researchers, both in academia and industry, in many fields of science and engineering. In neural networks, as in Machine Learning, the excitement of technological progress is supplemented by the challenge of reproducing intelligence itself.

Abroad class of techniques can come under this heading, but, generally, neural networks consist of layers of interconnected nodes, each node producing a non-linear function of its input. The input to a node may come from other nodes or directly from the input data. Also, some nodes are identified with the output of the network. The complete network therefore represents a very complex set of interdependencies which may incorporate any degree of nonlinearity, allowing very general functions to be modelled.

In the simplest networks, the output from one node is fed into another node in such a way as to propagate “messages” through layers of interconnecting nodes. More complex behaviour may be modelled by networks in which the final output nodes are connected with earlier nodes, and then the system has the characteristics of a highly nonlinear system with feedback. It has been argued that neural networks mirror to a certain extent the behavior of networks of neurons in the brain.

Neural network approaches combine the complexity of some of the statistical techniques with the machine learning objective of imitating human intelligence: however, this is done at a more “unconscious” level and hence there is no accompanying ability to make learned concepts transparent to the user.

The correspondence between type of technique and professional background is inexact: for example, techniques that use decision trees have been developed in parallel both within the machine learning community, motivated by psychological research or knowledge acquisition for expert systems, and within the statistical profession as a response to the perceived limitations of classical discrimination techniques based on linear functions. Similarly strong parallels may be drawn between advanced regression techniques developed in statistics, and neural network models with a background in psychology, computer science and artificial intelligence.

Main goal of this contribution is to examine the effectiveness of fifteen different machine learning algorithms for classifying a business from the Forbes 2000 ranking of the world’s largest companies, based on their market value statistics. Used algorithms cover also simple models such as Logistic Regression, Naive Bayes,  $k$ -nearest neighbour, Generalized Linear Models and computationally challenging models such as tree based algorithms, ensemble methods and neural networks. Best selected model should be able to predict whether the company is banking or not based on market value statistics (Fulkerson et al., 1995).

## **2 LITERATURE REVIEW**

There are several applications for Machine Learning (ML), the most significant of which is data mining. People are often prone to making mistakes during analyses or, possibly, when trying to establish relationships between multiple features. This makes it difficult for them to find solutions to certain problems. Machine learning can often be successfully applied to these problems, improving the efficiency of systems and the designs of machines. Every instance in any dataset used by machine learning algorithms is represented using the same set of features. The features may be continuous, categorical or binary. If instances are given with known labels (the corresponding correct outputs) then the learning is called supervised, in contrast to unsupervised learning, where instances are unlabeled. By applying these unsupervised (clustering) algorithms, researchers hope to discover unknown, but useful, classes of items (Jain et al., 1999). Another kind of machine learning is reinforcement learning (Barto & Sutton, 1997). The training information provided to the learning system by the environment (external trainer) is in the form of a scalar reinforcement signal that

constitutes a measure of how well the system operates. The learner is not told which actions to take, but rather must discover which actions yield the best reward, by trying each action in turn.

Numerous ML applications involve tasks that can be set up as supervised. In the present paper, author has concentrated on the techniques necessary to do this. In particular, this work is concerned with classification problems in which the output of instances admits only discrete, unordered values. The author has limited references to recent refereed journals, published books and conferences. In addition, author has added some references regarding the original work that started the particular line of research under discussion. A brief review of what ML includes can be found in (Dutton & Conroy, 1996). De Mantaras and Armengol (1998) also presented a historical survey of logic and instance based learning classifiers. The reader should be cautioned that a single article cannot be a comprehensive review of all classification learning algorithms. Instead, our goal has been to provide a representative sample of existing lines of research in each learning technique. In each of our listed areas, there are many other papers that more comprehensively detail relevant work.

### **3 METHODOLOGY**

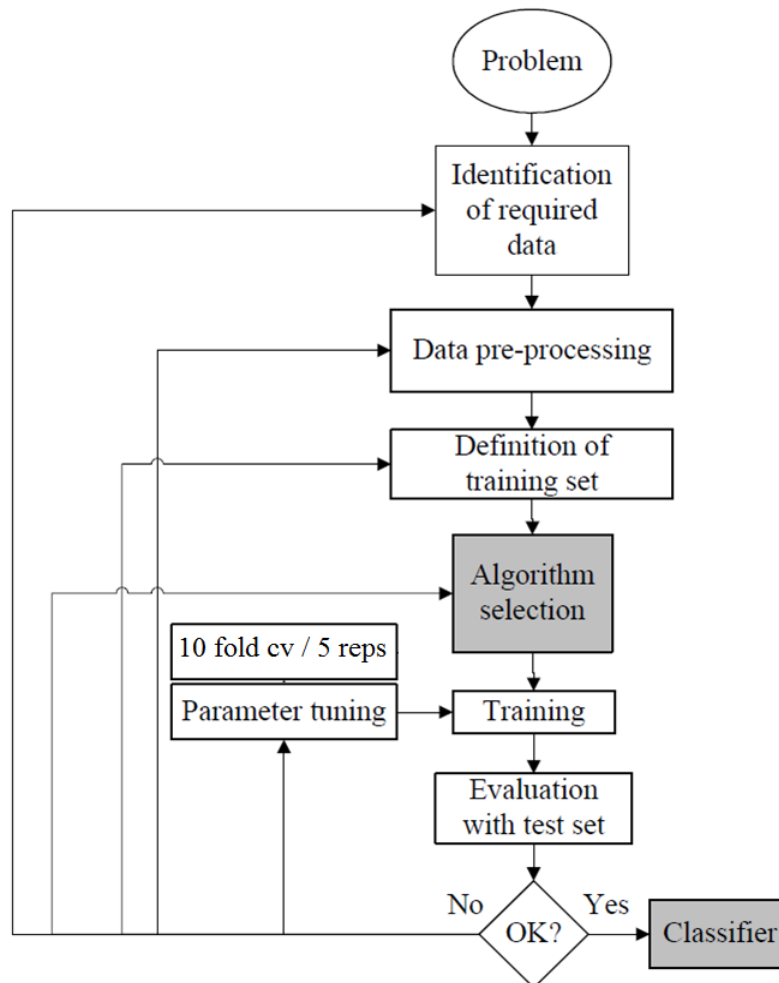
Inductive machine learning is the process of learning a set of rules from instances (examples in a training set), or more generally speaking, creating a classifier that can be used to generalize from new instances. The process of applying supervised ML to a real-world problem is described in Figure 1.

The first step is collecting the dataset. If a requisite expert is available, then she/he could suggest which fields (attributes, features) are the most informative. If not, then the simplest method is that of “brute-force,” which means measuring everything available in the hope that the right (informative, relevant) features can be isolated. However, a dataset collected by the “brute-force” method is not directly suitable for induction. It contains in most cases noise and missing feature values, and therefore requires significant pre-processing (Zhang et al., 2002).

The second step is the data preparation and data preprocessing. Depending on the circumstances, researchers have a number of methods to choose from to handle missing data (Batista & Monard, 2003). Hodge & Austin (2004) have recently introduced a survey of contemporary techniques for outlier (noise) detection. These researchers have identified the techniques’ advantages and disadvantages. Instance selection is not only used to handle noise but to cope with the infeasibility of learning from very large datasets. Instance selection in these datasets is an optimization problem that attempts to maintain the mining quality while minimizing the sample size (Liu and Motoda, 2001). It reduces data and enables a data mining algorithm to function and work effectively with very large datasets. There is a variety of procedures for sampling instances from a large dataset (Reinartz, 2002). Feature subset selection is the process of identifying and removing as many irrelevant and redundant features as possible (Yu & Liu, 2004). This reduces the dimensionality of the data and enables data mining algorithms to operate faster and more effectively. The fact that many features depend on one another often unduly influences the accuracy of supervised ML classification models. This problem can be addressed by constructing new features from the basic feature set (Markovitch & Rosenstein, 2002).

This technique is called feature construction/transformation. These newly generated features may lead to the creation of more concise and accurate classifiers. In addition, the discovery of

meaningful features contributes to better comprehensibility of the produced classifier, and a better understanding of the learned concept.



**Fig.1** - The process of supervised machine learning

*Source: Own processing*

### 3.1 Algorithm selection

The choice of which specific learning algorithm we should use is a critical step. Once preliminary testing is judged to be satisfactory, the classifier (mapping from unlabeled instances to classes) is available for routine use. The classifier’s evaluation is most often based on prediction accuracy (the percentage of correct prediction divided by the total number of predictions). There are at least three techniques which are used to calculate a classifier’s accuracy. One technique is to split the training set by using two-thirds for training and the other third for estimating performance. In another technique, known as cross-validation, the training set is divided into mutually exclusive and equal-sized subsets and for each subset the classifier is trained on the union of all the other subsets. The average of the error rate of each subset is therefore an estimate of the error rate of the classifier. Leave-one-out validation is a special case of cross validation. All test subsets consist of a single instance. This type of validation is, of course, more expensive computationally, but useful when the most accurate estimate of a classifier’s error rate is required. If the error rate evaluation is unsatisfactory, we must return to a previous stage of the supervised ML process (as detailed

in Figure 1). A variety of factors must be examined: perhaps relevant features for the problem are not being used, a larger training set is needed, the dimensionality of the problem is too high, the selected algorithm is inappropriate or parameter tuning is needed. Another problem could be that the dataset is imbalanced (Japkowicz & Stephen, 2002).

A common method for comparing supervised ML algorithms is to perform statistical comparisons of the accuracies of trained classifiers on specific datasets. If we have sufficient supply of data, we can sample a number of training sets of size  $N$ , run the two learning algorithms on each of them, and estimate the difference in accuracy for each pair of classifiers on a large test set. The average of these differences is an estimate of the expected difference in generalization error across all possible training sets of size  $N$ , and their variance is an estimate of the variance of the classifier in the total set. Our next step is to perform paired t-test to check the null hypothesis that the mean difference between the classifiers is zero. This test can produce two types of errors. Type I error is the probability that the test rejects the null hypothesis incorrectly (i.e. it finds a “significant” difference although there is none). Type II error is the probability that the null hypothesis is not rejected, when there actually is a difference. The test’s Type I error will be close to the chosen significance level.

In practice, however, we often have only one dataset of size  $N$  and all estimates must be obtained from this sole dataset. Different training sets are obtained by subsampling, and the instances not sampled for training are used for testing. Unfortunately this violates the independence assumption necessary for proper significance testing. The consequence of this is that Type I errors exceed the significance level. This is problematic because it is important for the researcher to be able to control Type I errors and know the probability of incorrectly rejecting the null hypothesis. Several heuristic versions of the t-test have been developed to alleviate this problem (Dietterich, 1998), (Nadeau and Bengio, 2003).

Ideally, we would like the test’s outcome to be independent of the particular partitioning resulting from the randomization process, because this would make it much easier to replicate experimental results published in the literature. However, in practice there is always certain sensitivity to the partitioning used. To measure replicability we need to repeat the same test several times on the same data with different random partitionings - usually ten repetitions - and count how often the outcome is the same (Bouckaert, 2003).

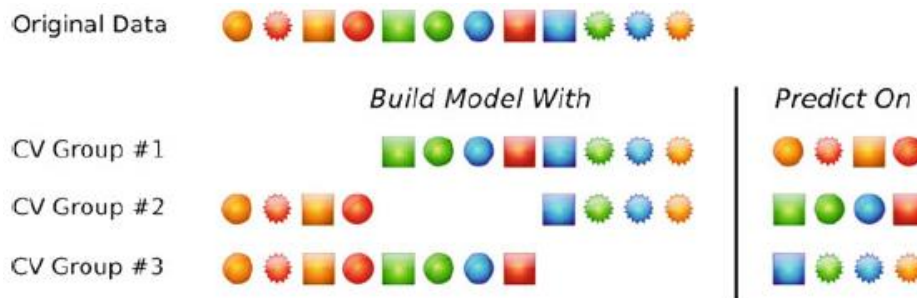
Supervised classification is one of the tasks most frequently carried out by so-called Intelligent Systems. Thus, a large number of techniques have been developed based on Artificial Intelligence (Logical/Symbolic techniques), Perceptron-based techniques and Statistics (Bayesian Networks, Instance-based techniques). In next sections, we will focus on the most important supervised machine learning techniques, starting with logical/symbolic algorithms.

#### **4 USED METHODS**

Quantitative and simulation methods was used for the issue solution. When solving these research problems methods are adequate to issues and objectives – a combination of quantitative and simulation methods of research. Machine learning models with 10-fold cross-validation repeated 5 times used in processing the results are based on the experience of the author. Below is shown table with used models and tuned parameters in simulation study.

**4.1 k-Fold Cross-Validation**

The samples are randomly partitioned into *k* sets of roughly equal size. A model is fit using the all samples except the first subset (called the first *fold*). The held-out samples are predicted by this model and used to estimate performance measures. The first subset is returned to the training set and procedure repeats with the second subset held out, and so on. The *k* resampled estimates of performance are summarized (usually with the mean and standard error) and used to understand the relationship between the tuning parameter(s) and model utility. The cross-validation process with *k* = 3 is depicted in figure 3 (Kuhn and Johnson, 2013).



**Fig.2** - A schematic of threefold cross-validation. Twelve training set samples are represented as symbols and are allocated to three groups. These groups are left out in turn as models are fit. Performance estimates, such as the error rate or  $R^2$  are calculated from each set of held-out samples. The average of the three performance estimates would be the cross-validation estimate of model performance.

Source: Kuhn and Johnson, 2013.

**Tab.1** - Used models in simulation with tuned parameters by 5 rep 10-fold CV

Model	Tunning Parameters	Optim	Model	Tunning Parameters	Optim
XGB	# Boosting Iterations	10	Naive Bayes	Laplace Correction	1
	Max Tree Depth	10		Distribution Type	TRUE
	Shrinkage	0.4		Bandwidth Adjustment	1
	Minimum Loss Reduction	2	Knn	# Neighbors	17
	Subsample Ratio of Columns	1	SVM Radial	Sigma	0.2
	Minimum Sum of Instance Weight	0.5		Cost	1.25
	Subsample Percentage	0.8	Neural Networks	# Hidden Units	2
	# Trees	150		Weight Decay	0.1
AdaBoost	Max Tree Depth	3	Gradient Boosting	# Boosting Iterations	100
	Learning Rate	0.1		Max Tree Depth	9
Bagged Tree	None	None		Shrinkage	0.1
Recursive Partitioning	Complexity Parameter	0.05		Min. Terminal Node Size	20
C5.0	# Boosting Iterations	90	GLM	Mixing Percentage	0
	Model Type	Rules		Regularization Parameter	0.04897
		Winnow	FALSE	Logistic Regression	None
Random Forest	# Randomly Selected Predictors	TRUE	MDA	# Subclasses Per Class	1
			PLS	# Components	2

Source: Own processing



#### 4.2 Two Class Problem

For two classes, there are additional statistics that may be relevant when one class is interpreted as the event of interest (such as Down syndrome in the previous example). The sensitivity of the model is the rate that the event of interest is predicted correctly for all samples having the event, or

$$Sensitivity = \frac{\# \text{ Samples with the event and predicted to have the event}}{\# \text{ Samples having the event}} \quad (1)$$

The sensitivity is sometimes considered the true positive rate since it measures the accuracy in the event population. Conversely, the specificity is defined as the rate that nonevent samples are predicted as nonevents, or

$$Specificity = \frac{\# \text{ Samples without the event and predicted as nonevents}}{\# \text{ Samples without the event}}$$

(2)

The false-positive rate is defined as one minus the specificity. Assuming a fixed level of accuracy for the model, there is typically a trade-off to be made between the sensitivity and specificity. Intuitively, increasing the sensitivity of a model is likely to incur a loss of specificity, since more samples are being predicted as events. Potential trade-offs between sensitivity and specificity may be appropriate when there are different penalties associated with each type of error. The receiver operating characteristic (ROC) curve is one technique for evaluating this trade-off.

#### 5 DATA

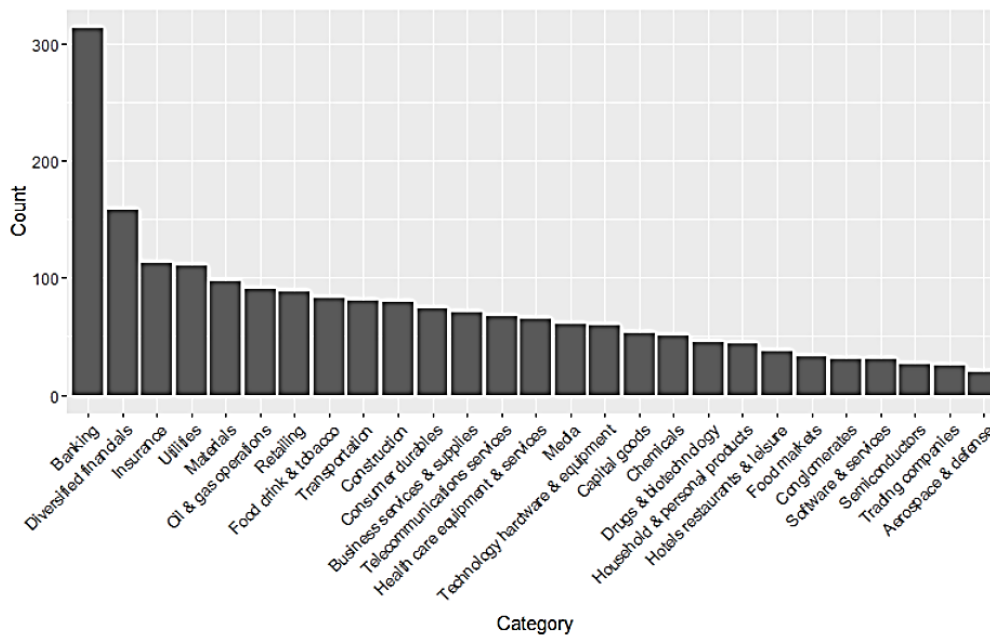
The Forbes 2000 list is a ranking of the world's biggest companies, measured by sales, profits, assets and market value. A data frame in R language was used, containing the following information for each business:

**Tab.2** - Description of the Forbes data set

Factor	Description
Rank	Ranking of the company
Name	Name of the company
Country	Location of company headquarters
Category	Products the company produces
Sales	Total sales of the company in billion USD
Profits	Profit of the company in billion USD
Assets	Assets of the company in billion USD
Market Value	Market value in billion USD

Source: HSAUR R package available at: <https://cran.rproject.org/web/packages/HSAUR/HSAUR.pdf>

Figure below shows the number of businesses in each category. The most common category is Banking Services, with 313 members, which Aerospace with just 19, is the least common category.



**Fig.3** - The Forbes 2000 ranking of the world’s biggest companies, separated by company type

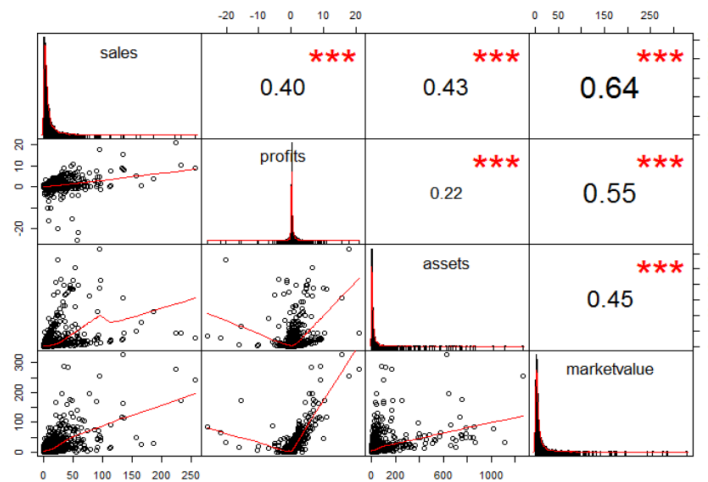
Source: Own processing by R language

Table below shows basic descriptive statistics of banking and other companies group. Skewness is mostly positive, the data are positively skewed or skewed right, meaning that the right tail of the distribution is longer than the left. Skewness is negative only for profits variable, the data are negatively skewed or skewed left, meaning that the left tail is longer. Kurtosis is greater than 3 for all variables which indicates leptokurtic distribution. Compared to a normal distribution, its tails are longer and fatter, and often its central peak is higher and sharper.

**Tab.3** - Descriptive statistics for banking ( $n = 313$ ) and others ( $n = 1682$ ) companies

Variable	Class	Min	1st Quartile	Mean	Median	3rd Quartile	Max	Skewness	Kurtosis
Sales	Banking	0.30	0.70	5.31	1.44	4.48	94.71	4.13	27.56
	Others	0.01	2.52	10.53	4.80	10.13	256.33	5.99	54.56
Profits	Banking	-20.11	0.04	0.42	0.14	0.47	17.85	-0.74	57.71
	Others	-25.83	0.10	0.37	0.20	0.44	20.96	-2.15	81.42
Assets	Banking	6.19	15.83	94.74	28.65	66.12	1264.03	3.46	16.14
	Others	0.27	3.57	22.78	7.37	16.09	1019.17	8.50	88.95
Market value	Banking	0.16	1.52	10.35	3.13	8.10	255.30	6.17	54.45
	Others	0.02	3.03	12.19	5.35	10.97	328.54	6.46	59.00

Source: Own computation in R language



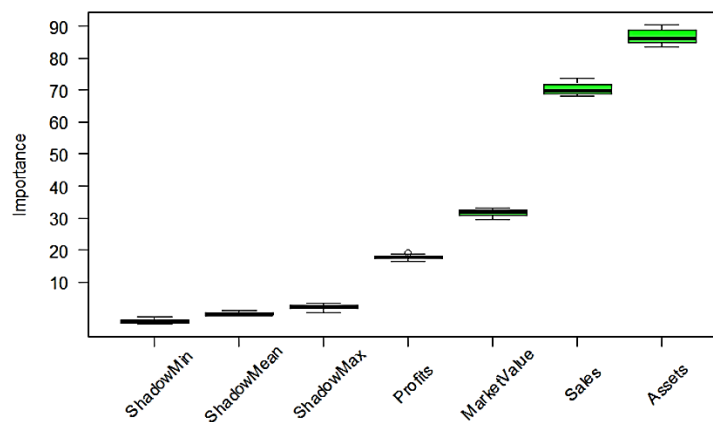
**Fig.4** - The correlation between pairs of variables used in modelling

*Source: Own processing by R language*

The correlation between pairs of variables gives a measure of the strength of their relationship. Here we see that all factors have a positive correlation, implying that an increase in one generally increases all the others. The largest correlation is seen between Sales and Market Value (0.64), while the smallest is seen between Profits and Assets (0.22).

## 6 RESULTS AND DISCUSSIONS

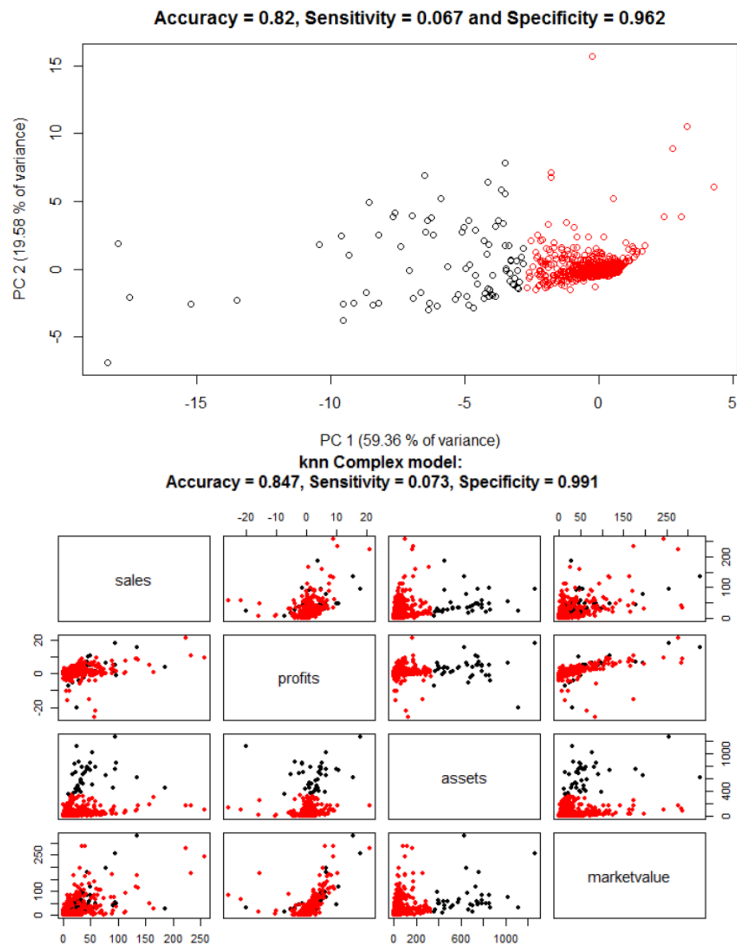
The results of simulation are presented in this part of the contribution. We can also compute variable importance before doing simulation to imagine how tree structure algorithms are splitted based on variable importance from top to down. Variable importance evaluation functions can be separated into two groups: those that use the model information and those that do not. The advantage of using a model-based approach is that is more closely tied to the model performance and that it may be able to incorporate the correlation structure between the predictors into the importance calculation. For most classification models, each predictor will have a separate variable importance for each class (the exceptions are classification trees, bagged trees and boosted trees).



**Fig.5** - Variable importance chart by R Boruta package

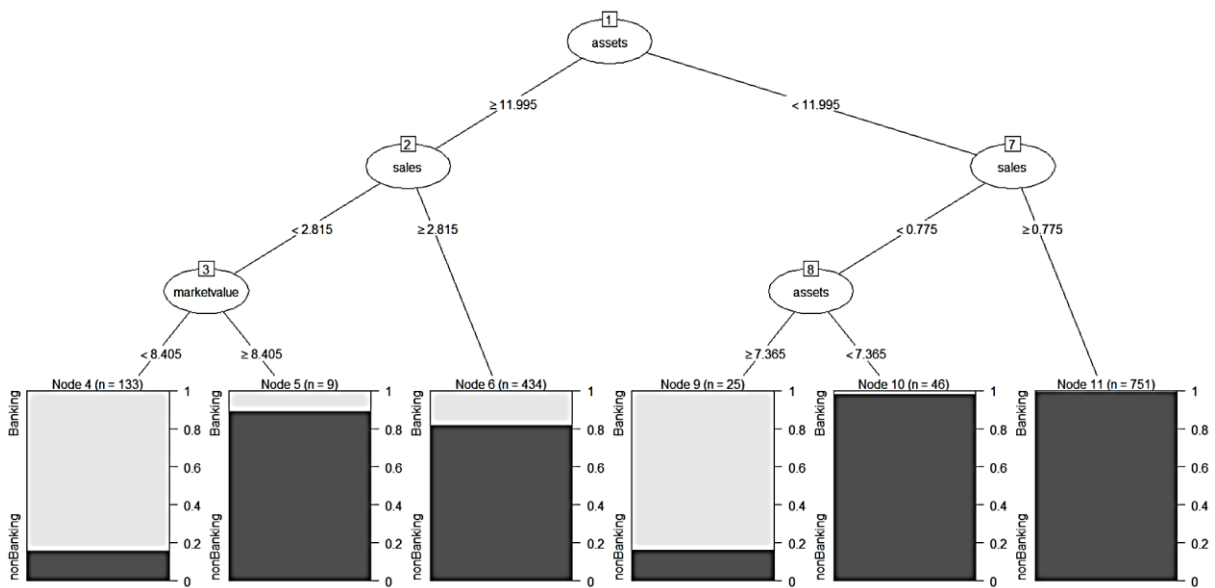
*Source: Own processing by R language*

It is also important to see how the most frequent used machine learning models with great results in terms of prediction and classification and computational time such as *k*-means and recursive partitioning algorithms.



**Fig.6** - *K*-means after PCA for complex model (all variables included) and for combination of variables

*Source: Own processing by R language*



**Fig.7** - Graphical presentation of recursive partitioning algorithm in R *rpart* package

Source: Own processing by R language

Both models provide excellent results in terms of classification accuracy. Recursive partition algorithm (predefined parameters:  $\text{minsplit} = 5$ ,  $\text{maxdepth} = 3$ ) seems to have much better performance (Sensitivity = 61.29 and Specificity = 96.03, Accuracy = 90.61) than not tuned  $k$ -nearest neighbors.  $K$ -nearest neighbors algorithm was used for complex model with all variables included and also in combination with PCA. For the both approaches seems to classify correctly only non-banking companies (sensitivity is very poor – around 0.06).

Let see the results of simulation below where fifteen different machine learning algorithms for classification were examined and plotted in two charts. The first one represents results of training data set (Banking:  $n = 220$ , Others:  $n = 1178$ ) and the second one represents results of test data set (Banking:  $n = 93$ , Others:  $n = 504$ ).

Simulation on training data set shows the best models such as  $k$ -nearest neighbors (tuned parameter  $k = 17$ ), ensemble methods, tree structure methods and neural networks. Algorithms with poor performance in terms of sensitivity seem to be GLM, PLS, Nonlinear discriminant analysis (MDA), Naive Bayes and Logistic regression. These models don't classify banking companies correctly.

Very similar situation seems for test data set. Models such as GLM, PLS, Nonlinear discriminant analysis (MDA), Naive Bayes and Logistic regression are slightly overfitted and have bad performance in terms of sensitivity. It is obvious that  $k$ -nearest neighbour and ensemble methods give best results. It is also interesting how five times repeated 10-fold cross validation for optimizing a tuning parameters handles overfitting for most of used algorithms.

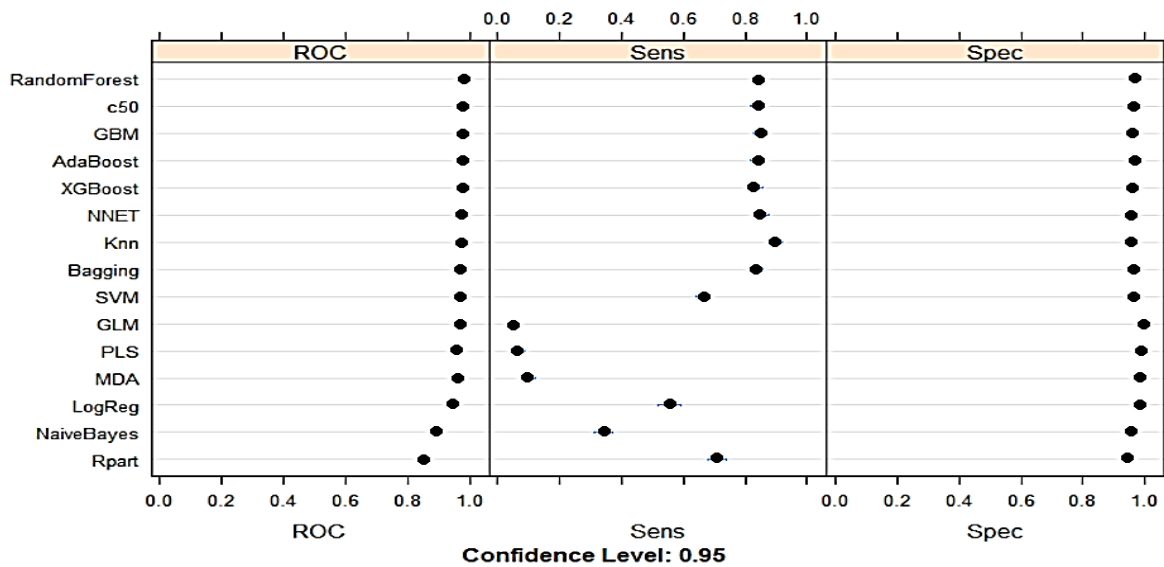


Fig.8 - Variable importance chart

Source: Own processing by R language

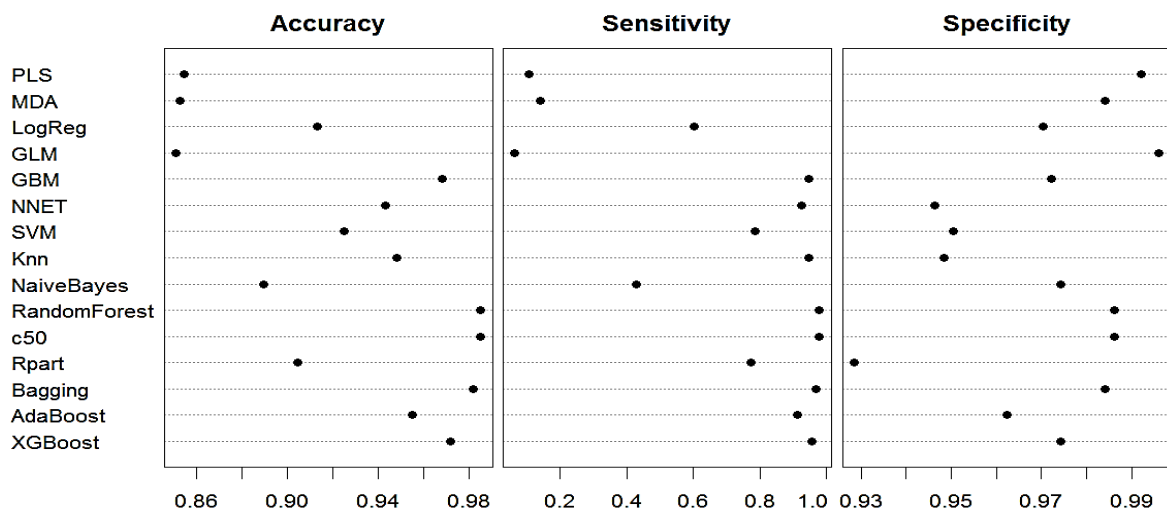


Fig.9 - Variable importance chart

Source: Own processing by R language

## 7 CONCLUSIONS

The field has made substantial progress in the last decade. Learning methods such as boosting, random forests, bagging, and SVMs achieve excellent performance that would have been difficult to obtain just 15 years ago. Of the earlier learning methods, feedforward neural nets have the best performance and are competitive with some of the newer methods, particularly if models will not be calibrated after training.

Simulation on training data set shows the best models such as  $k$ -nearest neighbors (tuned parameter  $k = 17$ ), ensemble methods, tree structure methods and neural networks. Algorithms with poor performance in terms of sensitivity seem to be GLM, PLS, Nonlinear discriminant analysis (MDA), Naive Bayes and Logistic regression. These models don't

classify banking companies correctly. Models such as GLM, PLS, Nonlinear discriminant analysis (MDA), Naive Bayes and Logistic regression are slightly overfitted and have bad performance in terms of sensitivity on test data set. It is obvious that  $k$ -nearest neighbour and ensemble methods give best results from above mentioned results of simulation.

There now exist many techniques that can learn the structure of a set of data so well that when the model is applied to the data on which the model was built, it correctly predicts every sample. In addition to learning the general patterns in the data, the model has also learned the characteristics of each sample's unique noise. This type of model is said to be over-fit and will usually have poor accuracy when predicting a new sample. Five times repeated 10-fold cross validation for optimizing a tuning parameters handles overfitting for most of used algorithms very well. Performance evaluation according to these principles requires repeated training of models using different sets of hyper-parameter values on different samples of the available data, and so is also well-suited to parallel implementation. Given the recent trend in processor design towards multi-core designs, rather than faster processor speeds, rigorous performance evaluation is likely to become less and less time-consuming, and so there is little justification for the continued use of potentially biased protocols.

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## Comparison of Option Pricing Approaches to Major World Indices

*Martin Kovářik*

### ABSTRACT

*The goal of this paper is to define models for option assessing and to test their effectiveness or their exactness using real market data. We demonstrated the application of option assessing theory on options emitted on the American Dow Jones Index, German DAX Index and Japanese Nikkei 225 Index. Using these important indicators of economical conditions of world's leading and closely linked economics and therefore using options derived from these indexes, We will determine universal conclusion about reliability of most widely known models for assessing. We have to point out that the tracking period for this paper was one month. The examination of this subject would have to take much longer to fully prove the reliability of chosen models for assessing. Therefore, the conclusion of this paper is supposed to have rather probability nature.*

**Keywords:** *Underlying asset, index, option, option pricing approaches*

**JEL Classification:** O16, E22, G11, G24

### 1 INTRODUCTION

Option pricing models can be categorized in 2 classes:

- (1) Equilibrium models with hypotheses regarding the development of stock prices.
- (2) Statistical models.

Equilibrium models with hypotheses regarding the development of stock prices can be classed into partial equilibrium models and complete equilibrium models. Complete equilibrium models include the binomial (discrete) model and the Black-Scholes (continuous) model. Partial equilibrium models include, e.g., the model of parity of the call and put options. Equilibrium models with hypotheses on the development of stock prices have deep statistical-probabilistic grounds, or rather probabilistic grounds, which are mostly mirrored in the use of mean values. Hence, it is the theoretical distribution of a random quantity rather than the random quantity itself that is handled. Theoretical distributions are then reflected in the relation describing the calculation of the theoretically correct price. At the beginning the theoretical ground is considerably more complex. For instance, parabolic-type differential equations must be solved in the first phase of the Black-Scholes model (Hull, 1997).

Purely statistical models include, at the starting stage, empirical treatment of the price and empirical distribution of the frequencies, and suitable theoretical distributions are only sought subsequently. The theoretical distributions, e.g. in the Black-Scholes model and in the binomial model, are given beforehand. In order to work with statistical models, one must first learn non-parametric testing, which helps replace the empirical distribution with an appropriate theoretical distribution. Basically this means that statistical models follow from

the theory of theoretical distribution, which is obtained during non-parametric testing by adopting the zero hypothesis (Merton, 1998), (Cipra, 2008).

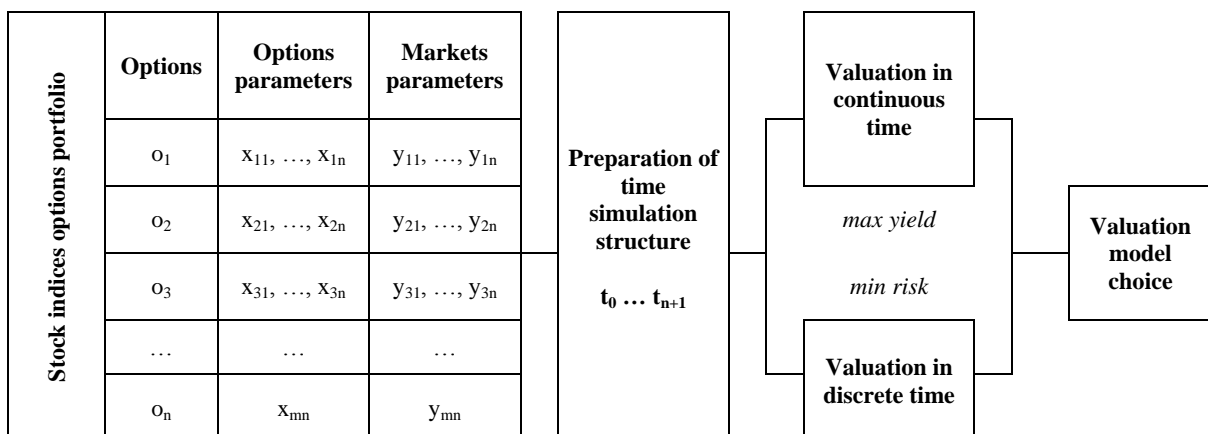
## 2 LITERATURE REVIEW

The growing role of technological change and innovation for the development of all economies are projected not only in the indicated qualitative changes but also in theoretical growth models. Simultaneously, new categories that reflect these ongoing processes appear in economics: it is mainly the concepts of knowledge (or knowledge-driven) economy.

The concept of a knowledge economy comes from Fritz Machlup. F. Machlup's study *The Production and Distribution of Knowledge in the United States* (1962) grew out of five lectures he gave in 1959 and 1960.

## 3 METHODOLOGY

There are due risks connected to financial portfolio management that come up in connection with assets which are the part of the portfolio. In this paper we will deal with questions of options emitted at the American stock index DJI, German DAX and Japanese Nikkei 225 and questions of management of the portfolio composed of options of those indices.



**Fig.1** - General scheme of solved optimization problem

Source: Own processing

Figure 1 represents the logical sequence of steps that will lead us to the conclusive choice of appropriate option pricing model for call options of DJ, DAX and Nikkei 225. Which process is chosen for pricing options depends on whether the options are priced on a continuous time scale or on a discrete time scale. The former variant includes, in particular, the Black-Scholes (B-S) model as well as its many modifications, such as Merton's model and its derivatives – the Jump Diffusion (J-D) model and the Stochastic Volatility (S-V) model. The latter variant uses the binomial model (also for stocks which give dividends), including convergence to the B-S model. The present contributions aims is to value DJ, DAX and Nikkei 225 options indices by selected option pricing models as mentioned above and to subject the models to validity / accuracy testing on real market data.

### 3.1 Binomial Model

The binomial model is based on the following four assumptions:

- (1) Market players cannot affect the price, they are rational (should an option trader behave sensibly, whether he is a reinsurer, a stag or a specialist, he has to know the real option price or its estimation and its trend; the price is accurately assigned only in two moments: in the  $T$  time i. e. the day of option subscription and in the  $0$  time i. e. the day of option expiration), and no transaction costs or taxes exist.
- (2) The risk-free interest rate  $r$  is constant in time.
- (3) The underlying asset does not pay dividends.
- (4) The price of the underlying asset  $S$  follows the binomial process, i.e. the probability  $q$  of increase in  $S$  by  $U$  percent and the probability  $(1 - q)$  of decrease in  $S$  by  $D$  percent are given in any time. The parameters  $q$ ,  $U$  and  $D$  are constant in time (Husek & Pelikan, 2003).

Option valuation using this method is, as described, a three step process:

- (1) Price tree generation,
- (2) calculation of option value at each final node,
- (3) progressive calculation of option value at each earlier node; the value at the first node is the value of the option (Husek, 2007), (Tompkins, 1994).

Furthermore, the binomial model performs option pricing by using the trinomial, quadrinomial and even quintonomial models, the two latter being based on the binomial and trinomial models. These mutations of the binomial model, as the derivation formulas, are not the subject of this work because of scope of this paper.

### 3.2 Black-Scholes Model

The Black-Scholes model is, speaking with some simplification, a limiting case of the binomial model. The transition from the discrete binomial process to the continuous model is explained, e.g., in (Merton, 1998). The authors of the model assumed “ideal” conditions on the stock and option market. Ideal conditions include:

- (1) A known short-time interest rate which is constant in time.
- (2) The underlying asset – equity does not pay dividends.
- (3) European options.
- (4) Zero transaction costs on the two markets, which are nil and taxes.
- (5) Continuous trade.
- (6) Short sale is permitted, lending and borrowing are possible without limitation at the same interest rate  $r$ , and the stock price follows geometric Brownian motion, from which it follows that the stock price has a lognormal distribution function.
- (7) The variance of the stock yield is constant in time.

The Black-Scholes formula is used for obtaining the price of European put and call options. It is obtained by solving the Black-Scholes PDE – see derivation below. Via this formula, the value of a call option in terms of the Black-Scholes parameters is:

$$C(S, t) = S N(d_1) - Ke^{-r(T-t)}N(d_2) \quad (1)$$

$$d_1 = \frac{\ln\left(\frac{S}{K}\right) + \left(r + \frac{\sigma^2}{2}\right) \cdot (T-t)}{\sigma \cdot \sqrt{T-t}}, \quad (2)$$

$$d_2 = d_1 - \sigma \cdot \sqrt{T-t} \quad (3)$$

The price of a put option is:

$$P(S, t) = Ke^{-r(T-t)}N(-d_2) - S N(-d_1). \quad (4)$$

For both, as above:

- $N(d_1, d_2)$  is the cumulative distribution function of the standard normal distribution
- $(T-t)$  is the time to maturity
- $S$  is the spot price of the underlying asset
- $K$  is the strike price
- $r$  is the risk free rate (annual rate, expressed in terms of continuous compounding)
- $\sigma$  is the volatility in the log-returns of the underlying (Taylor, 2000), (Tompkins, 1994)

As early as 1973 the Black-Scholes model was improved by Robert Merton, a close coworker of the two authors.

### 3.3 Merton's Model

The Merton model refers to a model proposed by Robert C. Merton in 1974 for assessing the credit risk of a company by characterizing the company's equity as a call option on its assets. Put-call parity is then used to price the value of a put and this is treated as an analogous representation of the firm's credit risk (Rubinstein, 1985).

Merton's model abandons the assumptions of a constant interest rate and a constant variance of the return on the underlying asset, and augments the stock market and the risk-free assets market with a third market, viz. the bond market, and uses the Itô process to describe the behaviour of the prices of assets. Formally, assumptions in Merton's model can be described as follows. There are no transaction costs or taxes in the markets. Trading is continuous, borrowing and lending are possible without limitation at the same interest rate  $r$ . The stock yield dynamics is described by a stochastic differential equation (deriving this equation is beyond the scope of this contribution). Merton model, which was published shortly after the BS model, differs only by taking into account the dividend.

$$C = S \cdot e^{(-q \cdot t)} \cdot N(d_1) - K \cdot e^{(-r \cdot t)} \cdot N(d_2), \quad (5)$$

$$d_1 = \frac{\ln\left(\frac{S}{K}\right) + \left(r - q + \frac{\sigma^2}{2}\right) \cdot t}{\sigma \cdot \sqrt{t}}, \quad (6)$$

$$d_2 = \frac{\ln \frac{S}{K} + \left( r - q - \frac{\sigma^2}{2} \right) \cdot t}{\sigma \cdot \sqrt{t}}, \quad (7)$$

$$P = -S \cdot e^{(-q \cdot t)} \cdot N(-d_1) + K \cdot e^{(-r \cdot t)} \cdot N(-d_2). \quad (8)$$

For both, as above:

→  $q$  is continuous dividend yield (Kohout, 1997)

The Merton model has been shown to be empirically accurate for non-financial firms, especially manufacturing entities. The highly leveraged nature of financial firms produces CDS spreads which are significantly higher than observed in the market due to the asset diffusion process (Siroky, 2007), (Soltes, 2002), (Zaskodny et al., 2007).

Both Merton (1974) and Black and Scholes (1973) propose a simple model of the firm that provides a way of relating credit risk to the capital structure of the firm. In this model the value of the firm's assets is assumed to obey a lognormal diffusion process with a constant volatility. The firm has issued two classes of securities: equity and debt. The equity receives no dividends. The debt is a pure discount bond where a payment of  $D$  is promised at time  $T$ . If at time  $T$  the firm's asset value exceeds the promised payment,  $D$ , the lenders are paid the promised amount and the shareholders receive the residual asset value. If the asset value is less than the promised payment the firm defaults, the lenders receive a payment equal to the asset value, and the shareholders get nothing.

### 3.4 Jump Diffusion Model

The jump diffusion model releases a next assumption of the Black-Scholes model, viz, the assumption of continuous trade of the underlying asset. If the underlying asset is not traded continuously in time, then the dynamics of its price is discontinuous. Brownian motion is insufficient to describe such price dynamics and a more complex model must be included. The jump stochastic model appeared to suit better. This model makes for discontinuous dynamics of the underlying asset; in other words; a positive probability of an exceedingly large deviation in the underlying asset price exists in any arbitrarily short time segment.

In the jump diffusion model, the stock price  $S_t$  follows the random process  $dS_t / S_t = \mu dt + \sigma dW_t + (J - 1) dN(t)$ . The first two terms are familiar from the Black-Scholes model: drift rate  $\mu$ , volatility  $\sigma$ , and random walk (Wiener process)  $W_t$ . The last term represents the jumps:  $J$  is the jump size as a multiple of stock price while  $N(t)$  is the number of jump events that have occurred up to time  $t$ .  $N(t)$  is assumed to follow the Poisson process  $P(N(t) = k) = ((\lambda t)^k / k!) \cdot e^{-\lambda t}$ , where  $\lambda$  is the average number of jumps per unit time. The jump size may follow any distribution, but a common choice is a log-normal distribution  $J \sim m \exp(-v^2/2 + v N(0, 1))$ , where  $N(0, 1)$  is the standard normal distribution,  $m$  is the average jump size, and  $v$  is the volatility of jump size. The three parameters  $\lambda, m, v$  characterize the jump diffusion model.

For European call and put options, closed-form solutions for the price can be found within the jump diffusion model in terms of Black-Scholes prices. If we write  $P_{BS}(S, K, \sigma, r, T)$  as the Black-Scholes price of a call or put option with spot  $S$ , strike  $K$ , volatility  $\sigma$ , interest rate  $r$  (assumed constant for simplicity), and time to expiry  $T$ , then the corresponding price within the jump diffusion model can be written as:

$$P_{JD}(S, K, \sigma, r, T, \lambda, m, v) = \sum_{k=0}^{\infty} \frac{\exp(-m \lambda T) (m \lambda T)^k}{k!} P_{BS}(S, K, \sigma_k, r_k, T), \quad (9)$$

where  $\sigma_k = \sqrt{(\sigma^2 + k v^2 / T)}$  and  $r_k = r - \lambda (m - 1) + k \log(m) / T$ . The  $k^{\text{th}}$  term in this series corresponds to the scenario where  $k$  jumps occur during the life of the option. It can be shown that for all derivatives with convex payoff (which includes regular call and put options) the price always increases when jumps are present (i. e., when  $\lambda > 0$ ) — regardless of the average jump direction. Thus, holding other parameters constant, the option price is a minimum for  $m = 1$  (i. e., the Black-Scholes case) and increases both for  $m < 1$  and  $m > 1$ . This increase in price can be interpreted as compensation for the extra risk taken by the option writer due to the presence of jumps, since this risk cannot be eliminated by delta hedging (see Joshi 2003, Section 15.5) (Joshi, 2003), (Rubinstein, 1985).

### 3.5 Stochastic Volatility Model

The outline of the derivation of the jump diffusion model (“J-D model”) presented below is in the spirit of the paper (Merton, 1976) in which the full derivation procedure is given. The 1980’s saw a further progress in the development of the option pricing formula. In the context of the fall of the global stock exchanges in 1987 it was recognized that the underlying asset volatility is not constant in time; on the contrary, it is a function of time. Moreover, empiric research by many authors gave evidence that volatility is a stochastic rather than deterministic function of time. The first scientists in economy to study this problem comprehensively were John Hull and Alan White, who presented a general solution of the differential equation describing the price of option where the underlying asset volatility follows stochastic patterns. Starting from a constant volatility approach, assume that the derivative's underlying price follows a standard model for geometric Brownian motion:

Stochastic volatility (S-V) denotes a class of models where the stock price is modelled as

$$dS_t = r_t S_t dt + \sigma_t S_t dW_t,$$

(10)

where  $\sigma$  is by itself a stochastic process and satisfies a SDE

$$d\sigma_t = \lambda_t dt + \zeta_t dW_t^\sigma. \quad (11)$$

$W$  and  $W^\sigma$  have correlation  $\rho$ . The integrands  $\lambda$  and  $\zeta$  are typically determined by a set  $\sigma$  of model parameters. These parameters are obtained via calibration (Siroky, 2007), (Soltes, 2002), (Zaskodny et al., 2007).

## 5 RESULTS AND DISCUSSIONS

From the general point of view it is the binomial model that is burdened by assumptions most, especially by the assumption that price  $S$  follows a binomial process with constant parameters. In the light of the nonrealistic nature of this assumption, the impact of the remaining assumptions adopted for the binomial model (constant interest rate, non-existence of transaction costs, non-existence of dividends) on the validity of the results appears to be of minor importance. The above non-realistic assumption of the binomial model is eliminated by the B-S model, where it is replaced by a more general Brownian motion whose variance is constant in time. The remaining assumptions of the binomial model, however, remain in place. Since the B-S model is a generalization of the binomial model, it will provide better

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option pricing estimates. Deviation of the binomial model from the B-S model will be the error of the binomial approximation of the dynamics of  $S$ .

Merton's model – in view of the fact that the assumption of a constant interest rate and volatility is released and replaced by deterministic functions of time – should provide option pricing estimates approaching the actual market prices better than the estimates provided by the B-S model. The jump diffusion (J-D) model retains, in fact, the assumptions of a constant interest rate and constant volatility but releases the assumption of a continuous dynamics of  $S$ , allowing  $S$  to follow Wiener's process and Poisson's process at a time. Like Merton's model, this model should also provide a more accurate option pricing estimate than the B-S model. The necessity of estimating the rate of new incoming information in the future and the impact of that new information on the option pricing is a considerable drawback of the J-D model.

The stochastic volatility (S-V) model abandons the assumption of volatility being a deterministic function of time and instead, allows volatility to follow stochastic patterns. Hence, the S-V model is a generalization of Merton's model.

According to the resource (Filacek, 1998), it is necessary to determine the premise of option market effectiveness before testing the effectiveness of all option pricing models mentioned above. We will suppose the confirmation of given option markets effectiveness, although overwhelming majority of accomplished statistical tests strongly denies this hypothesis. Therefore we explicitly assume an option efficient market as a source (Siroky, 2007). For example, just as Macbeth and Merville (1979) and (1980).

The validity of all the models was tested on daily prices of call options based on the DJ index, DAX index and Nikkei 225 index. Dow Jones index options are traded on the American bourse Chicago Board of Exchange (CBOE), DAX index options are traded on the German bourse in Stuttgart (EUWAX) and Nikkei 225 index options are traded on the Japanese bourse Tokyo Stock Exchanges (TSE). Reference period was the period from 01. 10. 2009 to 13. 11. 2009.

It is appropriate to clean the coarse data set of data which do not adequately mirror the situation in the market or are inappropriate to the pricing models (i.e. are estimated inaccurately by the models). From the total of 32 option price observations were selected, satisfying the requirements of daily volume of trade higher than 3, the  $S(t) / X$  ratio lying within the interval of (0.9, 1.1), and a minimum of 10 days remaining to the date of the option expiration.

The first exclusion criterion eliminates records suffering from low liquidity due to which information contained in the records may not appropriately mirror reality in the market. The second exclusion criterion eliminates records of trading options that are either deeply in the money or deeply out of the money. In fact, in such extreme cases the approximation embedded in the models can cause appreciable deviations in the option pricing estimates. The third exclusion criterion, which eliminates options approaching their call option expiry date, serve the same purpose.

Subsequent analysis will only cover that sorted data set. Test statistics must be used if the behaviour of the formulas assessed is to be tested. The first of the feasible statistics includes minimizing ( $Z_V$  type) criteria, i.e., the sum of absolute values of the percent deviations of the estimates from the actual prices,  $S_V$ , is minimized, mirroring the variance of the absolute values of the percent deviations. The next feasible statistics includes  $Z_Y$  criterion for the sum

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of currency deviations and  $S_Y$  for currency deviation variance. The last group of statistics includes  $R^2$  statistics, the Kolmogorov-Smirnov test and the Shapiro-Wilk test.

Theoretical values resulting from particular pricing models mentioned above were calculated from daily quotations of chosen index options parameters and markets parameters using the VOptions options pricing software. Resulting values of priced index options respectively calculation of consecutive criteria  $Z_V$ ,  $S_V$ ,  $Z_Y$ ,  $S_Y$  and statistical tests are listed in following tables.

**Tab.1** - Binomial pricing model

Index options / test	$Z_V$	$S_V$	$Z_Y$	$S_Y$	$R^2$ statistics	Kolmogoro-Smirnov $p$	Shapiro-Wilk $p$
DJ	200,63	0,1237	8589,33	101,52	0,999221	$p > 0,05$	$p > 0,05$
DAX	187,91	0,1725	6632,20	98,023	0,998888	$p > 0,05$	$p > 0,05$
Nikkei 225	100,44	0,2222	3277,02	55,788	0,999855	$p > 0,05$	$p > 0,05$

Source: Own processing

**Tab.2** - Black-Scholes pricing model

Index options / test	$Z_V$	$S_V$	$Z_Y$	$S_Y$	$R^2$ statistics	Kolmogoro-Smirnov $p$	Shapiro-Wilk $p$
DJ	103,02	0,0331	4652,62	22,13	0,999843	$p > 0,05$	$p > 0,05$
DAX	125,11	0,0553	5878,54	31,04	0,008751	$p > 0,05$	$p > 0,05$
Nikkei 225	177,43	0,0652	7433,33	25,43	0,855888	$p > 0,05$	$p > 0,05$

Source: Own processing

**Tab.3** - Merton's pricing model

Index options / test	$Z_V$	$S_V$	$Z_Y$	$S_Y$	$R^2$ statistics	Kolmogoro-Smirnov $p$	Shapiro-Wilk $p$
DJ	212,34	0,4553	4534,33	18,66	0,834144	$p > 0,05$	$p > 0,05$
DAX	255,33	0,3345	6434,24	22,23	0,998173	$p > 0,05$	$p > 0,05$
Nikkei 225	242,31	0,4333	7434,33	30,34	0,999982	$p > 0,05$	$p > 0,05$

Source: Own processing



**Tab.4** - Jump diffusion pricing model

Index options / test	$Z_V$	$S_V$	$Z_Y$	$S_Y$	$R^2$ statistics	Kolmogoro-Smirnov $p$	Shapiro-Wilk $p$
<b>DJ</b>	175,73	0,0437	5331,52	23,01	0,98367	$p > 0,05$	$p > 0,05$
<b>DAX</b>	212,88	0,0342	6345,43	20,23	0,89566	$p > 0,05$	$p > 0,05$
<b>Nikkei 225</b>	200,23	0,1001	4321,47	17,55	0,99983	$p > 0,05$	$p > 0,05$

Source: Own processing

**Tab.5** - Stochastic volatility pricing model

Index options / test	$Z_V$	$S_V$	$Z_Y$	$S_Y$	$R^2$ statistics	Kolmogoro-Smirnov $p$	Shapiro-Wilk $p$
<b>DJ</b>	184,44	0,1321	4221,54	15,32	0,99831	$p > 0,05$	$p > 0,05$
<b>DAX</b>	124,63	0,0323	5223,33	11,23	0,98887	$p > 0,05$	$p > 0,05$
<b>Nikkei 225</b>	135,23	0,1331	3643,34	16,16	0,99982	$p > 0,05$	$p > 0,05$

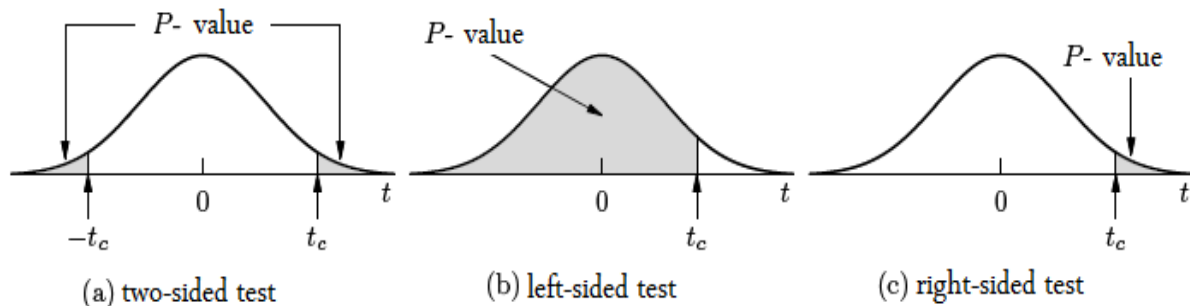
Source: Own processing

From this selected data set it is clear that in the majority of models (except for the Black Scholes model) the option prices are systematically underestimated in all the 3 indices during the time period. The theoretical prices converge to the market price with the shortening due term, except in Merton's model and in the Jump diffusion model. Tables 1 through 5 demonstrate that in general, criteria based on percent deviations lead to conclusions different from those derived from the criteria based on currency deviations. The difference in the results is particularly marked between the criteria  $S_V$  and  $S_Y$  in the binomial model. For graphic reasons, only the  $Z_V$  and  $S_V$  criteria based on percent deviations will be analyzed in this paper. Surprisingly enough, Merton's model emerges as less accurate than the binomial model, both with respect to the  $Z_V$  criterion and to the  $S_V$  criterion. The J-D model is the second worst model, followed by the binomial model. As a peculiarity of the J-D model, the sum of percent deviations is high while their variance is lowest of the models. In other words, the deviations are high but uniformly distributed. The B-S model provides both the lowest sum of deviations and the lowest variance. Hence, a different type of test must be resorted to.

The  $R^2$  statistics was chosen for further testing. Known as the determination factor, this statistics expresses the ratio of variability explained by the model in question to the total variability. Undoubtedly of interest are the high  $R^2$  statistics in nearly all the models except for the B-S model. However, it follows from a comparison of the statistics (determination factors  $R^2$ ) of the models that option pricing is actually best described by the S-V model in terms of all the 3 indices. The B-S model ranks second best and Merton's model emerges as the least suitable model.

The conclusions are borne out by the Kolmogorov-Smirnov and Shapiro-Wilk tests, providing high  $R^2$  statistics data. Both of the two tests accept normality of deviations at the 5% level of likelihood. The tests bear out the  $p$ -values (a  $p$ -value is the lowest level of significance at which the data normality hypothesis  $H_0$  is rejected). Invariably, the  $p$ -values are higher than the selected level of significance  $\alpha(0.05)$ , hence, the hypothesis  $H_0$  is not

rejected. This conclusion regarding the normality of data also contributes to the high values of the determination factors. The figure below (Fig. 2) only serves to provide a theoretical basis for the above testing of the p-values for each of the option pricing models.



**Fig.2** - Tests for determination of the  $p$ -values and their critical areas

Source: Own processing

Apparently, the stochastic volatility model emerges as the best (and best applicable in practice), followed by the B-S model and, left more behind, by the remaining models. As indicated in the abstract hereof, considerably more accurate and more interesting conclusions might be obtained by examining the validity of the models from the perspective of a longer time series. Such a series would provide a more extensive data sample, which would impart the results a higher statistical likelihood.

## 6 CONCLUSIONS

Contemporary world of financial derivatives offers investors opportunities to create diverse risk-revenue profiles with emphasis on the minimization of risks and maximization of the revenue deriving from the portfolio created. This requires knowledge of the limits of the standard deviations, or their likely profilation. It is here that the various option pricing models can be useful, both on the continuous time basis and on the discrete time basis. It was the aim of the present paper to identify a suitable option pricing approach for practical application to the optimization of the option portfolio on the DJI, DAX and Nikkei 225 stock indices. Thus, we used real market data to arrive at the conclusions following from this work.

The future trend will presumably consist in combining the various pricing methods with a view to arriving at optimum approaches to the different types of data set. Specifically speaking, genetic and neuron algorithms may be combined with some elements of the conventional pricing models, although combinations of the other methods mentioned in this contribution are certainly also feasible.

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## Personnel Policy in Military Unit: Case Study of Czech Army

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### ABSTRACT

*The goal of this paper is to analyse the current and future state personnel policy in the military service in relation to the objectives set HR strategy. For creation, the contribution was elected military unit 44. The light motorized battalion locater placing the crew in Jindřichův Hradec. The theoretical part of the paper was used data collection method. In the application of the public has used external sources, internal materials of the military unit, including the expertise of one of the authors of the paper. Another method used was open to talks with the chiefs of personnel and financial chiefs of the military unit. Furthermore, a survey was conducted by an internal survey, whose aim was to determine the opinion of professional soldiers in the current and future state personnel policy and action in relation to the objectives of the military unit's personnel strategy, which contributed to a state of satisfaction soldiers, where the main objective of personnel policy was to create a corporate culture of a modern army against new recruiter especially soldiers basic services and pursue the development of competencies in the field of education proficiency, growth of personal knowledge and language skills with the respect to the future.*

**Keywords:** *Human resources, Personnel strategy, Personnel policy, HR professional soldier, Military unit.*

**JEL Classification:** J28, J45

### 1 INTRODUCTION

In the past, the importance of human resources for many years underestimated put emphasis on manufacturing, technical and other resources. Currently, the 21st century becomes more effective human resources management and human resources, as a qualified selection and functional leadership and people management in a competitive environment, regional, local and international market determines success, sustainability, and stability of the organization, which human factor becomes full potential wealth and successful organizations. It can, therefore, conclude that human labour is the most precious asset an organization that contributes to the achievement of the objectives set (Šikýř, 2014, Lajčín, Korn, 2016). It is very important that the organization has a sufficient number of qualified ([Salami, Alijani, 2017](#)), committed and motivated people (Lorincová, 2015), which is suitable to maintain, develop and utilize their employment potential, skills (Vodák, 2010) and social personality traits ([Chen, 2017](#)). Given the importance and significance of human resources which each organizational unit should define the HR strategy and personnel policy, including personnel actions arising from it.

The goal of this paper is to analyse the current and future state personnel policy in the military service in relation to the objectives set HR strategy. For creation, the contribution was elected military unit 44. The light motorized battalion locater placing the crew in Jindřichův Hradec. The essential is to determine the opinion of professional soldiers in the

current and future state personnel policy and action in relation to the objectives of the military unit's personnel strategy, which contributed to a state of satisfaction soldiers, where the main objective of personnel policy was to create a corporate culture of a modern army against new recruiter especially soldiers basic services and pursue the development of competencies in the field of education proficiency, growth of personal knowledge and language skills with the respect to the future.

## **2 LITERATURE REVIEW**

Human resources management focused on loyalty and reciprocity is associated with a model called a flexible approach which is based on communication, motivation and leadership (Belás, Ključnikov, Vojtovič, et al. 2015, Doktorov, Jakúbek, Sláviková, 2012). Workers are seen as so valuable company assets which are an integral part of competitive advantage and quality of work in the sense of loyalty of employees against their employer (Holland, Cooper, Hecker, 2016).

In connection with the management of human resource-oriented quantitative, measurable and strategic aspect (Bellairs, Halbesleben, Leon, 2014) talking about the so-called a tough approach where the emphasis is on human resources management which helps to create added value and competitive advantage to formulate the company ([Woo, O'Boyle, Spector, 2017](#)). Workers are seen as human capital ([Butler, Muir, 2017](#)), which is a necessary investment for the development of the company's expected benefits ([Aklamanu, Degbey, Tarba, 2016](#)). This model is attractive to managers who are forced to seek a competitive advantage for the organization and at the same time are aware that to achieve the stated objectives, it is necessary to invest not only in technology but also in human resources.

Personnel policy can be defined as a set of rules, principles, methods and tools through which are the aims and objectives of HR strategies implemented. Containing personnel policy may be policy of work activities of employees, e. g. work organization, working conditions, employment policy, e. g. requirements on workers, personnel selection, training and development policy, remuneration policy, information policy, social policy and deployment of personnel. In formulating human resources policy it is necessary to understand the corporate culture and its shared values.

For success in fulfilling the personnel policy and strategy must be defined specific goals which we want to achieve (Hitka, Hajduková, Balážová, 2014). These goals:

Have to be stated between personal goals people's wealth, which has great importance for creating competitive advantages of enterprise (Schoenbaum, 2015),

Must connect policies in the area of human resource management with business policies and corporate strategies,

Have to keep the consistency between policies, procedures and systems in the area of human resources management,

Have to make able quickly and flexibly respond to changes in corporate governance and business environment ([Compton, Meier, 2016](#)),

Promote teamwork and cooperation among organizational units ([Kundu, Gahlawat, 2016](#)),

Present suitable and effective philosophy towards satisfying of needs and wishes of the client (customer) ([Drydakís, 2017](#)),

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Support and strengthen the powers of workers to the development and continuous education, suitable concept of remuneration strategy (Jouza, 2014),

Improve worker involvement in internal communication,

Build greater loyalty, responsibility of line managers for human resources policy and ultimately create a desirable role of managers (leaders) ([Balwant](#), 2016) who could facilitate ways of assignment and control of their work and create optimal conditions for working life and care for employees ([Aringhieri, Bruni, Khodaparasti, Van Essen](#), 2017).

Government e. g. through personnel policy contributes policy and program of economic management, labor legislation and regulations on the employment of people legislation, the trade union movement, the establishment of services, executive bodies, commissions and agencies, employment offices, Work Inspectorate of state union education and networking schools, counseling and educational institutions as an employer, which provides employment to the public and public sectors, social benefits, early retirement pension, education and other employee benefits.

Given that human resources policy is subject to legislation in the field of employing people and other legal regulations, it is advisable to build in the formulation of personnel policy, the analysis of external influences with regard to directives and regulations of the European Union. Internationally, the socio-economic rights of citizens are defined in The Universal Declaration of Human Rights, where the rights of employees are governed by the European Social Charter, adopted by the Council of Europe in 1961, which includes the right to collective bargaining, the right of employed women to protection of motherhood, the right to consultancy services in the choice of occupation, the right of disabled people in the context of integration into society, the right to higher pay for overtime and others. Legislative amendments in the Czech Republic are enshrined in the Charter of fundamental rights and freedoms (promulgated as a constitutional law of the Czech Republic 1991). Rights, obligations, conditions and roles of employees and employers on labour and employment of citizens in the Czech Republic are legislatively regulated by Act no. 262/2006 Coll., The Labour Code.

### 3 METHODOLOGY

The theoretical part of the paper, the authors used data collection method. In the application of the public has used external sources, internal materials of the military unit, including the expertise of one of the authors of the paper.

Another method used was to talk with the chief of personnel and financial chief of the military unit. Boths interviews were made in February 2016 in Jindřichův Hradec by one of the paper's authors and lasted 90 minutes. It was a semi-structured interview with 15 prepared open-ended questions. The goal of job interviews was to obtain information on ongoing activities in personnel policy, but also about the activities and relationships that are newly introduced or amended in the personnel policy of the military unit.

Furthermore, a survey was conducted by an internal survey, whose aim was to determine the opinion of professional soldiers in the current and future state personnel policy and action in relation to the objectives of the military unit's personnel strategy, which contributed to a state of satisfaction soldiers. These questionnaires contained 25 questions, of which 15 were open-ended and 10 close - ended. The total time for the fulfilling of questionnaire was 20 minutes. Questionnaires were personally distributed in written form during the period of February and

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March 2016 to 468 professional soldiers with a return of 75 % (351 respondents). Respondents consisted mainly men (95 %) aged 26-35 years (43 %) with the highest secondary school graduates (62 %). Current position held without subordinates as a basic function (66 % of respondents), with the length of service in the Army of the Czech Republic up to 5 years (44 %). Given the facts, when a similar survey was conducted, the results will contribute to the formulation of proposals and recommendations formulation of personnel policies and personnel activities in the environment of the military unit in line with the set targets.

## 4 DATA

For every successful organization, it is important to set goals and steps to achieve them. Objectives of the organization are already known, so the authors of this paper will focus on the formulation of proposals on how to achieve individual goals.

The overall attitude of soldiers to personnel policy is currently very positive (Mallick, Mitchell, Millikan-Bell et al., 2016), but the opinion of soldiers for future personnel policy is more or less pessimistic when negativistic (Threatts, 2013). With regard to future restrictions on how the introduction of the qualifying period, the period of service in any service classification will be limited in time, is not accepted by the soldiers and their attitude to the proposed measure is restrained (Pepper, Lada, Thomson et al., 2017). Staff assessment soldiers considered 79 % (195 soldiers) as an objective of 65 % (161 soldiers) but believe that the changes introduced by the new staff evaluation are needed and argue that the current form of service assessments troops should remain unchanged (see Tab. 1).

**Tab.1** - Development of actual numbers of persons within the Ministry of Defence in 2011-2015

Status of 1.1. given year	Generals	Senior officers	Junior officers	Corps cadets	Corps NCOs	Team	Preparatory choir	Disposition	Soldiers from the profession altogether	Defensive midfield	Total Regular soldiers, defensive midfield
2015	21	1942	3377	5944	6963	709	1266	642	20864	7487	28351
2014	20	1981	3315	5875	6894	789	955	1184	21011	7530	28541
2013	18	2091	3376	6052	7375	1078	1067	676	21733	8288	30021
2012	22	2140	3319	6049	7399	1160	965	697	21751	8248	29999
2011	22	2258	3255	6082	7637	1118	937	952	22261	8303	30564

Source: [mocr.army.cz](http://www.mocr.army.cz) [online]. 2015 [06/02/2015]. Available from: <http://www.mocr.army.cz/dokumenty-a-legislativa/fakta/vyvojskutechnychpocctu-osob-v-rezortu-mo-cr-v-letech-2011---1993-51566/>, adjusted authors.

In the above Tab. 1 is an obvious decrease in the number of employees in the Army of the Czech Republic in the last five years, when the number of troops has been decreasing continuously. From 1 January 2005, when the Army of the Czech Republic fully professionalized, they are professional soldiers, military service as a regular occupation, including pay for performance service through salary. Conscription, however, does not expire

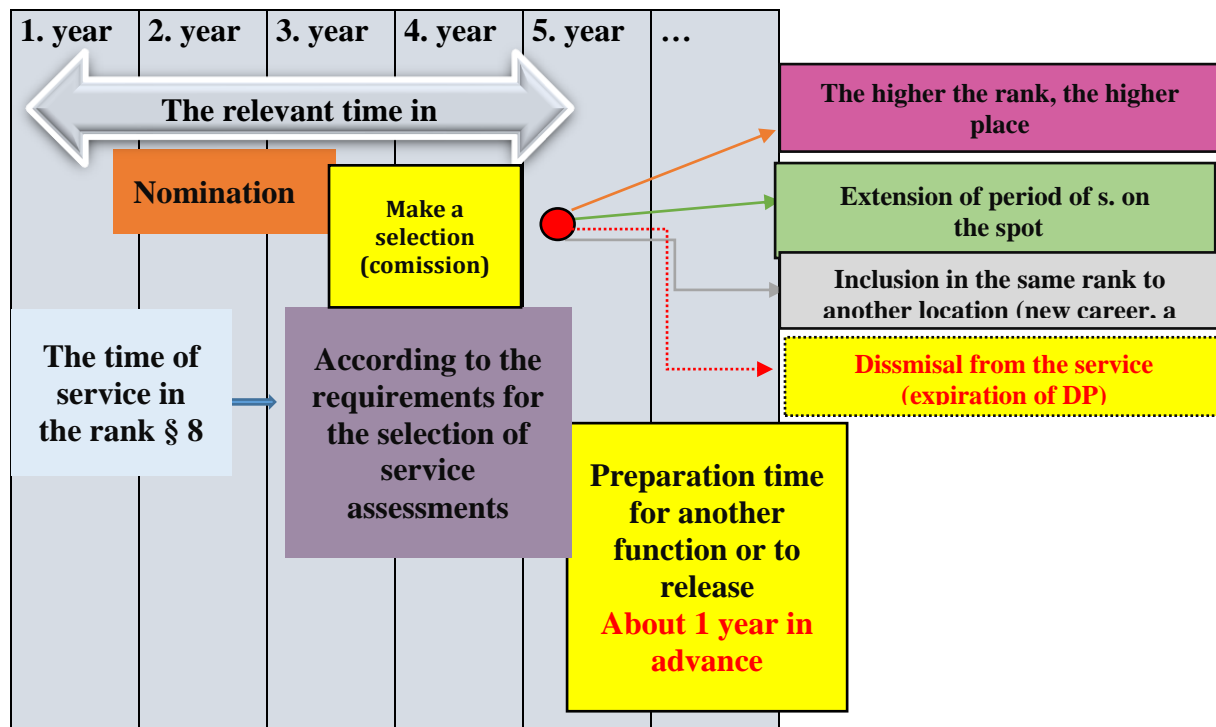


State may at any time summon a man, if CR at risk or may actively use backup Czech Armed Forces.

## 5 RESULTS AND DISCUSSIONS

Change occurs only in the context of granting financial contributions to housing, where the current post will be canceled and a new monthly allowance (Mitchell, Gallaway, Millikan et al., 2012). Soldiers financially worse off, from 10 100 CZK Housing Allowance will receive only 3000 CZK including the possibility surcharge designated for each family member.

Consider acceptable for soldiers to introduce a new qualification allowance, which is granted to every soldier ranked business in which it is set a higher level of education during service (Campbell, Riggs, 2015), the amount of which is equal to the recruitment contribution (Damirchi, Fayazi, Mohammadi, 2017). 66 % of soldiers (162 soldiers) evaluate provided financial compensation in the form of a qualification allowance granted positively to increase educational attainment (Blašková, Bizik, Jankal, 2015).



**Fig.1** - The progress at the time of inclusion in the service of professional soldiers (Source: Authors, 2016)

A professional soldier can no longer be, even with their consent, appointed to a lower rank function only when the call to duty or as a result of organizational changes, which means he cannot be within the movement and shifts ranked systemized position of lower rank in the case of consent. With regard to changes in personnel policy seems this fact as a limit when a professional soldier will be forced to stay in the military ranks or corps to limiting number of vacant systematized jobs or professional progress in the career of a professional soldier, which is both, expected and demanded Army CR. Another equally important complication is

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a condition where the vacant systemized positions with higher military rank or choir will have a career soldier, matching the highest level of education attained.

The introduction of a new performance-related allowance is the monthly percentage increase in service tariffs every soldier who is defined depending on the service evaluation of each soldier when the final evaluation of the service affects staff salary of a soldier. Expectations of soldiers are not optimistic, 71 % (174 soldiers) think that there will be a deliberate improvement or deterioration in the results of the service evaluation of soldiers. Most of the soldiers are afraid that the performance allowance will be misused with regard to positive or negative impact in relation to the official salary.

Introduction a new monthly housing allowance belongs to every soldier. For more soldiers' coexistence in a common household, the contribution is divided between soldiers equally. Given the consequences that this change brings cannot be expected from the soldier's positive reception. Few soldiers find a positive impact on the situation when it occurs in a reduction of his funds (Besterman-Dahan, Lind, Crocker, 2013). Dividing monthly housing allowance covers 20 % (46 soldiers) and 80 % (198 soldiers) considered dividing the allowance for unfavorable. Undesirable it does not consider only those soldiers who are currently live with another soldier (Beks, 2016).

75 % soldiers believe that they are salary evaluated on an average; 6 % (16 soldiers) expressed even an above-average evaluation. The survey also showed that 19 % (46 soldiers) think that they are evaluated below average. 24 % (60 soldiers) is of the opinion that they are financially better off; 57 % (141 soldiers) believe that they are evaluated without financial changes; 19 % (46 soldiers) believe that are financially worse off, which according to the opinions of the author raises some concerns for soldiers, tension or negative expectations. As a major problem, the authors of contribution consider a reduction of the pay scale for most soldiers, which is in terms of household income for soldiers adverse.

Even though it is satisfied with their job, 77 % (191 soldiers), cannot forget 23 % (56 soldiers) who express their dissatisfaction, by the way, the announced departure to another military unit. Reasons for their decisions are e.g. large distance from family or residence (Vaničková, Gabrhelová, 2015), different ideas about service soldier (Rossodivita, Faccincani, Losapio et al., 2012), bullying (Tucker, Sinclair, Mohr et al., 2009) or inappropriate access to subordinates or limited opportunity for career growth (Puntarič, Grgic, Bačun-Ivček, 2006), the feel up to 65 % (161 soldiers) and professional development 53 % (131 soldiers) do not see the real possibility of study at a military university. 16 %, i.e. 40 soldiers want to terminate the service employment and leave the civil service. The possibility of improving language skills through language courses has an interest 74 % (182 soldiers). 36 % (89 soldiers) are convinced that the specified tasks do not to support them in the professional growth and development. Hence they cannot be expected satisfaction.

One of the other reason of soldiers dissatisfaction is the fear of losing their jobs ([Pohl, Bertrand, Ergen, 2016](#)). When entering the service to the Army of the Republic, hereinafter referred to as AC ČR, job security experienced a 93 % (230 soldiers), currently on view of state employee early this state has not already been clear, 68 % (167 soldiers) change of the state fully perceived. The results show that Army ČR is gradually losing a key role in a stable state employer when soldiers confidence in this institution gradually decreases.

Certain discontent among soldiers evokes even the representation of women in the Army ČR, 39 % (95 soldiers) have a negative attitude to women working in the Army of the Czech

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Republic, which limits the fulfillment of the formulated objectives of personnel strategy in relation to promoting and ensuring equal treatment between men and women.

Also, the degree of importance that the soldiers feel at the individual offered benefits raises some dissatisfaction ([Pattnaik, Misra](#), 2016). Authors of the paper believe that for soldiers are important all forms provided benefits by the employer, but it turned out to be the least interesting advantage is for the soldiers possibility of drawing cash contributions from the Fund of cultural and social services, i.e. 28 % (70 soldiers) are not interested in this benefit; for 22 %, i.e. 54 soldiers are not the preferred option of preventive rehabilitation; 14 % (34 soldiers) do not perceive extra vacation as an above-standard service; 10 % (25 soldiers) did not interest too much the possibility of drawing on service pensions when leaving the civil service ([Berghaus](#), 2016).

Certain discontent among soldiers evokes the representation of women in Army CR, 39 % (95 soldiers) have a negative attitude to women working in the Czech Army, which limits the implementation of the formulated goals of HR strategy ([Jansson, Eduards](#), 2016) in relation to promoting and ensuring equal treatment between men and women (Sion, 2016).

The degree of importance that the soldiers felt the individual benefits offered raises some dissatisfaction ([Golenbock, Kazman, Krauss et al.](#), 2017). Authors of the paper believe that the troops are important to all forms provided benefits by the employer, but it turned out to be the least interesting possibility is for the soldiers pumping cash contributions from the cultural and social services, 28 % (70 soldiers) have not interested this benefit; for 22 % (54 soldiers) are not the preferred option advantage of preventive rehabilitation; 14 %, i.e., 34 soldiers perceive as optional extra vacation; 10% (25 soldiers) too did not address the possibility of drawing on service pensions when leaving the civil service.

Very pleasing is the state of the level of team spirit at work. 44 % (107 soldiers) think that the expectations of their superiors are unrealistic (Miller, Shattuck, Matsangas 2011), which is caused by high physical and mental demands imposed on the performance of the professional soldier work (Consenzo, Fatkin, Patton, 2007). 86 % (213 soldiers) believe that working opinions between colleagues are accepted optimally, even they valued it. From these results it is clear that labor relations at the military unit are at good level, working views of individual soldiers are by colleagues accepted and respected by the majority.

66 % (162 soldiers) said the possibility of obtaining a qualifying contribution as an incentive to increase educational attainment. The authors propose a contribution to ensure greater awareness and emphasize the significance of incentive allowance as an alternative remedy for self-study.

A survey of satisfaction soldiers revealed that troops are generally more satisfied with their jobs, but 37 % of soldiers still wants to go and serve in another military unit, 16 % of requests for termination of service means leaving the civil service. The main reasons for the planned retirement of the soldiers are especially distance from family, other ideas about the performance of services, but also low salaries. These reasons authors of this paper find serious, in most cases hardly affected. Other reasons for the planned retirement of the soldiers are eg., the limited opportunity for career growth and professional development, workplace bullying, inappropriate access child.

## 6 CONCLUSIONS

Personnel management, in which a personnel policy was formulated, began to appear before the Second World War. In the beginning it dealt only employing people and the management of labour. Over time, there has been a departure from the original concept in the sense of transformation in the scientific field of human resource management, which is focused on strategic concept with a view to the future expectations and trends.

Proposals for action arising from open talks with commanders of military units and conducted the survey. Authors of the contribution came to the conclusion that the personnel policy and actions arising from it with regard to future public-sector military unit appear to be unfavourable, less satisfactory. The main problems lie in changes in the amendment to Act no. 221/1999 Coll. on Professional Soldiers, as amended (Bělina, 2015), e.g., in the amount of the financial contribution granted to the detriment of new housing in the monthly allowance through which professional soldiers are losing considerable sums of money.

In connection with changes to the amendment of the above Act in relation to future personnel policy authors of this paper, we propose to focus on the way the filling of posts allocated through shifts and movements of the soldiers or further filling of posts attributed soldiers from other military units. Further promote the appropriate selection of a professional soldier on relevant systemized position where the soldier in a state of satisfaction with the function performed at optimal work performance, which was after the introduction of the qualifying period in service for prolonged residence time in the said function or a promotion or possible prevent termination of service. While maintaining objectivity on the part of line managers is achieved soldiers satisfaction in the performance of the function or achieve positive results service assessments, including financial rewards. At the same time, it also ensures appropriate salary soldier, according to qualifications selected systemized place through which occurs appointment to a higher military rank, including salary for each soldier in service.

The authors propose a contribution to ensure every soldier executing a management function proper training in management and leadership work with people, the open communication, the ability to work motivation and job performance. It is appropriate that recruiters military units ensure awareness of all the soldiers with regard to the functions performed. Furthermore, authors of this paper suggest that HR departments stressed the importance of the qualifying contribution with the possibility of continuing education for soldiers, make them aware and motivated to further education and professional development of their personality. In order to increase language skills appropriate to encourage the implementation of supply of language courses for the purpose of studying foreign languages especially English with a choice of an internal lecturer from the military unit ([Urun, Aksoy, Comez, 2017](#)). Upon successful completion of the language course and passing the exam in a foreign language according to STANAG 6001 soldiers would not have to wait to send the appropriate language course, which is accessible only to a limited number of troops with which the personnel department's intention to participate in the overseas military mission ([Levy, 2017](#)).

One of the objectives of personnel strategy is to ensure a comprehensive approach in the field of equal treatment of men and women in an environment of military service (Army names first unit to use Unit Manning Initiative 2003). It still seems very difficult to achieve equal status between men and women in the military environment ([Farwell, 2017](#)), where 39 % of soldiers occupy the scope of women in the Army a negative attitude. Due to the specialization of the individual departments particularly combat deployment with regard to the physical demands ([Zhang, Li, et al., 2017](#)), work disposition and resilience of women ([Smith, Lai,](#)

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[Almirall et al. 2017](#)); it is not appropriate to create an excessive number of posts attributed intended for women who are mostly included only in the case of transfers ([Crabtree-Nelson, Deyoung, 2017](#)).

The main objective of our personnel policy is to create a corporate culture of a modern army against new recruiter, especially soldiers of basic services, efforts to develop competencies especially in the field of education proficiency, growth of personal knowledge, language skills including achieving satisfaction, adequate appreciation and professionalism in the army.

Authors of the paper believe that for the purpose of personnel policy and activities in the environment of the military unit to have appropriate suggestions and recommendations for change or innovation measures and formulate conclusions in terms of applicability and usefulness with regard to the future.

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## Model of Biotic Organization

*Karel Slinták, Zuzana Jurigová*

### ABSTRACT

*The article deals with the creation of the model of biotic organization. Efforts to create this model reflects the growing contradictions in the theory of management. Theory and practise face two co-existing systems of management. Each of these systems prefers different management principles. The existence of these systems brings confusion to established ideas on management and reveals the fundamental dilemmas of management. These dilemmas are: to manage or lead, to divide or integrate, to control or trust, to make money or service society. This article is based on theoretical and empirical evidence. The main objective of this article is to create organizational model that takes into account management dilemmas in relation to two fundamental views of organizations – organization like machines or organization like organisms. It explains the relationship between the dilemmas and critically evaluates them in relation to this approaches and organizational dimensions. Premise of biotic model is that organizations are autopoietic systems. In this concept, organization may be defined as living systems that are able to adapt to the surrounding environment. This theoretical approach facilitates the seeking penetration between management dilemmas. It prefers forms of management that avoid artificial dependencies. It creates specific work environment that develops the potential of individuals through freedom and responsibility. The core of biotic organization is self-organizaton. Requirements that relate to this form of management, are confronted with the traditional management system. This comparison gives an answer to the question why dilemmas of management occur and how these dilemmas exhibit in the case of this model.*

**Keywords:** *autopoietic systems, dilemmas of management, systems of management, self-management, living systems*

**JEL Classification:** M12, M14, L25

### 1 INTRODUCTION

In the past, corporate organizations were strictly classified as economic systems. This concept is characterized by the effort of companies to satisfy only one group of stakeholders – owners. The aim of these companies was to maximize corporate profits. Later on, the concept of enterprise expanded to the next dimension. These dimensions reflected the fact that businesses are not only a part of economic reality but also social one. This awareness caused that now we can meet with organizational models that describe the businesses as economic, human or even social systems. In these three levels, we can find different objectives and different stakeholders which stands behind these goals. This also leads to a gradual reassessment of corporate performance. Moreover, the effort to define success is related to this reassessment. It is not enough to make money for businesses in order to be successful (Bris et al., 2013). Being successful means to earn more (shareholders), to preserve (employees), to develop (co-workers) and create (customers). If companies manage to meet the target, then we can talk about the social responsibility of the companies. This means they

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can serve to their own environment. This view means changes for businesses from a purely economic system to the social one.

The change from money-making machines to social organisms, that creates and satisfies the specific needs of the company, reflects two latent assumptions underlying the current management science. The first one says that businesses are mechanical systems, while the other one assumes that companies are living systems. The implication of these claims are obvious. The machines are completely dependent on their creators while living systems are based on self-creation (autopoiesis). Machines are repaired (external interference). Organisms are regenerated (internal renewal). Machines are able to adapt because they are not a natural part of their surroundings. Living organisms have a symbiotic relationship to its environment, they are an integral part of it and constantly adapt to it. Machines can be examined on the basis of an analysis which requires to fragment the whole to see its individual parts in the overall context. Machines are subjected to linear logic. Living organisms can work in a circle. Machines are constructed. Living organisms emerge. These differences suggest that businesses with the functioning as machines are subjected to sciences (mathematics, physics, engineering). Companies with the nature of living organisms fall into a biobase (scientific discipline dealing with living organisms such as biology and ecology).

According to Peter Senge, the contrast between these two views – machine for making money versus living being (organism) – illuminates a host of core assumptions about management and organizations (De Geus, 1997). Management theory usually comes from a scientific approach that reduces reality to inanimate world. Perception of businesses as machines formed management as economic discipline which seeks to ensure operating efficiency on the basis of internal order. These settled ideas about management has originated in the times of Industrial Revolution and progressively adapted to the conditions of industrial society. However, in practice, we can find examples that make dogmas of industrial management upside down. Examples of this rare practice often take form of non-traditional organizational models that seek to correct the current theory and its adaptation to the conditions that correspond to the features of post-industrial society. This company was firstly described as informational, later on it was knowledge. And today we are talking about creative society.

The change in terminology was caused by the fact that companies and society were started to be seen as a new source of wealth. In the 1990, the companies' effort was to have optimal information system which led to the creation of advanced information systems and their automation. However, information without context and application capabilities were losing its value. Therefore, a new concept of key competencies, potential of success, 7S concept and other concepts started to emerge. This shifted the emphasis from the information (what) to knowledge (how). However, today, information and knowledge are subjected to creativity. Creativity can not be automated. Creativity can not be forced. Creativity can not be planned and managed. Creativity emerges from suitable working conditions. These conditions are shaped by organizational model that is not based on traditional management assumptions. To be creative means to be unique in what I am doing, how I am doing it and for whom I am doing it.

This article is therefore aimed at creating a model of governance that will strengthen the initiative, creativity and passion instead of obedience, imitation and routine. Creation of this model will be preceded by a description of two basic approaches to organizations and the analysis of management dilemmas. This description will also analyse organizational models that try to eliminate these dilemmas. Because this is a theoretical study, the article will rely

on qualitative and quantitative findings of other authors and author's experience which are based on eight years of research of management systems.

## **2 METHODOLOGY**

This article is aimed at creating a model of biotic organization. This model will reflect significant changes in the concept of management as a scientific discipline which determines the nature of business organizations and their functions. Similarly, to others qualitative studies, this study is also based on analysis of assumptions that form the contours of existing theory and empirical evidence to validate this theory. In this case, it means to critically evaluate the management in time and space context and examine organizational models that symbolize the transformation of the governance model due to changing external conditions.

The core of this paper are two fundamental views that can be converted to this question: Are organizations considered as money-making machines or living beings? This question reflects two scientific approaches which are reductionism and holism. However, it must be noted that the basic opinion of this study and its conclusions are based on the principles of holism. This will make it possible to describe the contrast between traditional and non-traditional approach (reductionism vs. holism) and clarify a series of hidden assumptions about organizations and management. The ranking of these assumptions will be based on selected criteria (characteristics). Each characteristic will be described in a dialectic manner, i.e. in the form of confrontation of two contradictory opinions.

Firstly, this article is designed to clarify two basic ideological approaches (the concept of organization), pointed out the dilemmas of management on the background of these approaches (concept of management), evaluated the organizational models and proposed a model that takes into account the contradictions of management in relation to holism and increasing volatility of business environment.

## **3 TWO FUNDAMENTAL APPROACH: MACHINE, OR LIVING BEING**

Organization studies are based on two simultaneously applied theories. These are namely the theory of mechanistic systems (an organization is closed system) and the theory of living systems (an organization is open system). Based on these approaches, we can distinguish two views on companies. The first of them argues that company is a machine for making money. The second view postulates that company is a living being.

In theory and practice, we can find a prevailing view of the business as a money-making machine (Slinták, 2015). However, there are still authors who describe organizations as living systems. Košturiak (2016) and Zelený (2011) perceive organizations as autopoietic systems that continuously go through a cycle formation-connection-decomposition. Properties of these organizations are: (1) Enterprises have the shape of a circle, cycle or spiral, (2) Enterprises are cyclical systems, (3) Enterprises consists of autonomous subsystems (amoebas) that resemble the whole, (4) Enterprises are symbiotic systems in relation to its environment. The last point is related to the interdependence between business and the environment, difficult separation of these two elements from each other and at the same time with the ability to adapt and evolve with regard to changes in external environment. This happens because of internal energy that is just another name for the ability to learn. The importance of this feature is further expanded by Senge (2011) who perceives organizations as learning systems. According to Senge (2011), learning becomes a tool for creating your

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own future. Hock (1995, 1999, 2009) agrees with this view and moreover, he gives a specific form to a learning organization. His view sees organizations as those which balance between order and chaos. Hock (1995) named this model chaordic organization. Also, the practice of some companies suggests that not all businesses are treated as money-making machines. These examples could include turquoise organizations. Laloux (2016) examined twelve turquoise organizations that were very similar to the concept of a learning organization. A clear view on the practice of living organizations was also provided by empirical study of Brazilian company Semco (Semler, 2001, 2004). From the words of the author talking about the transformation of the company from a traditional model to participatory model, we can guess which approach influenced the management philosophy of the company (Semler, 2001, 240): *“I appreciate my share in Semco, however in reality this is not my company anymore. I am not Semco. Semco is simply Semco.”*

**Tab.1** - Contrast between two fundamental views on organizations

Features	Machine (M)	Organism (O)
Conception	Thing	Living being
Ownership	It is owned by someone (owner).	Owning a living beings is immoral.
Purpose	It exists for a purpose conceived by builders (defined goal)	They have their own purpose (emerging goal)
Effectiveness	It must be controllable by operators (external control).	They are not controllable. They are “influenceable” (interaction).
Origin	Systems and processes are created by someone outside (heteropoietic system).	They create their own systems and processes (autopoietic system).
Adaption	It can change only if someone changes it (external intervention).	They evolve naturally (spontaneous change).
Identity	It has no identity (without “raison d’etre”)	The identity gradually emerges (own personhood)
Autonomy	It totally depends on external program (reaction to goals a decisions made by management)	They find their own goals and their own way to achieve them (autonomous action).
Restoration	Repair and maintenance are carried out externally (reconstruction).	They are capable of regenerating themselves (self-renewal and self-reproduction)
People	People are factors of production (employees or human recourses).	People are members of community (human work communities).
Intelligence	It can’t learn as an entity. Learning is possible only in individuals (individual intelligence).	They can learn as an entity and through all its parts (collective intelligence).

From a philosophical point of view, it is clear that there are fundamental differences between machines and living creatures. The basic distinction between the machine (M) and organism (O) is confirmed by Peter Senge in his book *The living company* by De Geus (1997). The reflection of this distinction within organizations is seen in the following table.

#### 4 DILEMMAS OF MANAGEMENT

When we examine the basic assumptions of management in the context of the present days, we can find out that many of them are no longer valid (see e.g. Hamel 2008, Handy 2016, Slinták 2013). Critics of management such as Hamel (2008, 2011, 2013), Hamer and Champy (2009), Handy (2016) and Semler (1989) point out that management creates organizations that meet the need of the industrial era. In this era, it was assumed that there must be one proper organizational form (see Drucker, 2007). This form reflected the concept of the company as a money-making machine. Organizations have a fixed structure and are subjected to hierarchical control. This management principle was based on the principle of directive and control power. As a by-product of these management practices were considered bureaucracy, form of management based on a set of rules and strict compliance with these rules that was in 1922 marked by Max Weber (2009) as the optimal organizational form (Slinták, 2013). While in the past the social and economic theories considered bureaucracy as an ideal situation, today it becomes synonym for inefficiency and malfunction.

Change of context, which is the result of ideological conflict (machine vs. organism), reveals a huge gap that is located in the very foundations of management. According to Charles Handy (2016), it is necessary to change the managerial thinking and to create a new model that takes into account the features of the new reality. This requires to review management form and adapt this form to new conditions. In a business environment we can already find such situations. When searching for competitive advantage, the experts are concerned with the issues such as whether to (1) Strive for stability (status quo) or dynamics (change), (2) bureaucracy (corporation) or community (start-up), (3) a large or small organisation, (4) internal or external organization. Organizational practice is then based on four contradictions which have their roots in management theory. These differences are: (1) Management vs. Leadership, (2) Hierarchy vs. Network, (3) Control vs. Trust, (4) Profit vs. Service.

#### 4.1 Management vs. leadership

The theory has been struggling with the resolution of the conflict between management and leadership over 40 years. The diversity of these approaches is explained by many authors (see for example Bennis 1990, Covey 1991, 2013, Drucker 2007, Kotter 1990, 2014, Kouzes a Posner 2006, Zaleznik 1977). Each of these styles has different goals, perspective, usage and success criteria. Management essentially relies on the power and function (hierarchy of powers). Its aim is to ensure efficiency. In contrast, leadership prefers influence and abilities (competence hierarchy). Their aim is to create the future. The basic differences between these principles are seen in the following table.

**Tab.2** - Management vs. leadership

Characteristics	Management	Leadership
Goal	Order	Chaos
Perspectives	Short-term	Long-term
Use	Things	People
Human capability	diligence	creativity

#### 4.2 Hierarchy vs. network

Another dilemma is whether to create organizations based on hierarchy or networks. Since 1916, the theory is strongly influenced by the idea that organizations have to be centralized hierarchically (Fayol, 2016). However, these ideas merged at a time that was fundamentally different from today's world. At the beginning of the information era, the hierarchy has become the target of many attacks (Mills, 1991, Hamer and Champy, 2009, Hamel, 2011). According to Crainer (1996), hierarchical organizations lost contact with their surroundings. The common symptoms of hierarchy include a hierarchy of politics, reluctance of leading people to share information, forgoing of responsibility and also the destruction of initiative and creativity (Hamel, 2013). Some authors (see Hammer 2003, Mills 1991, Senge 2011) see hierarchy as a source of slowness, rigidity and cumbersome procedures. Therefore, they started to look for alternative ways of organizing. Interest in network organizations, the basic principles of which are described by Kelly (1995), has grown when the world started to be connected through a global information network. The internet has become fastest growing human organization despite the fact that it operates on entirely different principles compared to hierarchies. The networks are decentralized systems that are not bounded and have no centre. They do not have fixed structure. They consist of nodes that are generated, connected and then they disappear. Therefore, networks are taken as the fine structures which acquires a specific shape in relation to its surroundings (adhocracy). Differences between hierarchies and networks can be investigated in terms of principles, information flow and the form of organizations. The results of this comparison are seen in the following table.

**Tab.3** - Hierarchy vs. network

Characteristics	Hierarchy	Network
Principle	autocracy	democracy
Information	suppression	sharing
Change	Top to bottom	Emersion
Organization form	Bureaucracy	Community

#### 4.3 Control vs. trust

Traditional management is based on three pillars namely planning, organizing and control (Senge, 2006). Control has become an integral part of the corporate world. Firstly, it appeared in military institutions as a tool that was complementary to command principle (Drucker, 2002). Connection of commands and controls caused the creation of militaristic model that has persisted in various forms to these days. In system theory, control is referred to as feedback. Every technical system is therefore connected with control. This leads to a difference between these management principles.

Control is used for evaluation of the desirable state. It is a suitable tool for impersonal organization whose size does not allow people to know each other better and could not trust each other. In this sense, we can understand control as a compensation of trust. However, if the control system is applied to a large extent, they break down the personal initiative, commitment and the sense of belonging (Handy, 2016). Thanks to this, the control becomes very expensive management tool (the need for external stimulation), especially if it is carried out by human beings which leads to substantial overhead costs (Hamel 2011, Slinták and Jurigová, 2015). In the case of control, we can meet with paradox that growth often leads to a decrease in productivity (Zobrist, 2014).

Trust is the exact opposite. It legitimated leadership in the sense of participative model (Semler, 2001, 2004). It is a specific form of investment in human beings. Trust develops human potential and makes the space for others. This allows people to make mistakes, to learn from them and grow. Therefore, trust is seen as a suitable tool that strengthens initiative, creativity and reciprocity. Compared to control, trust is riskier but much cheaper. However, trust is limited by the size of the organization because as the number of people grows in the company, the importance of trust falls (Handy, 2008). Basic differences between control and trust are listed in the following table.

**Tab.4** - Control vs. trust

Characteristics	Control	Trust
Goal	Follow (rules)	Development (potential)
Orientation	Events	Relations
Mechanism	Fear	Responsibility
Size	Large unit (plant)	Small team (cell)

#### **4.4 Profit vs. service**

The contrast between machines and organisms is based on two basic views based on what is the corporate's purpose. For economic fields, it is typical that companies are seen as money-making machines (Slinták, 2016) This view can be seen in many comments that are summarized by Friedman (1970) statement that the only real social responsibility of the companies is to increase profit. From an economic point of view, the aim of the company is to gain profit. It is inserted to companies through the anticipation of owners (depositor of capital). This expectation is manifested in an effort to maximize shareholder value (Jensen and Meckling, 1976). Therefore, company as a machine do have its own goals. Its only purpose is to make money for designers. The behaviour of these systems is governed by a short-term financial perspective. This results in a profit-oriented behaviour. The profit motivation also affects the orientation of enterprises in relation to the market environment. Machine-oriented companies are internally oriented systems. This means that the success (profit) resides in optimal usage of production factors (everything is subordinated to efficiency). Thus, in this machine-oriented concept, profit, that is carried out of the market, is the main goal. It is built on an idea of optimal transformation factors.

The company as an organism defines the success in a completely different way. Organisms has a symbiotic relationship with their environment. In other words, they authorize themselves by the tasks that they perform for their environment. Therefore, the profit is not the main goal (internal goal) but it is the service (external goal). This goal causes to orient the behaviour of companies to its environment (market orientation). Organism-oriented enterprises find deeper meaning in the intersection of internal dispositions (existence, potential) and external needs (tasks). To serve means to fulfil the tasks of their surroundings in a way which presents the ability to create and satisfy (customer), make money (investor), maintain (employee) and develop (co-worker). Therefore, enterprises perceived as living organisms fulfil its commitment to its environment with regard to short-term and long-term perspective. In these perspectives, effort to preserve the existence (earnings) and the desire for utility (ongoing development and value creation) are taken into account. These enterprises satisfy various stakeholders. Fulfilment of four partial objectives can be understood as a prerequisite (tool) for enabling the company to benefit its surrounding. Comparison of both approaches to the central business objectives is seen in the following table.



**Tab.5** - Profit vs. service

Characteristics	Profit	Service
View	Egocentrism	Altruism
Action	Making (money)	Creating (value)
Success	Inside (saving)	Outside (satisfaction)
Stakeholder	Investor	Society

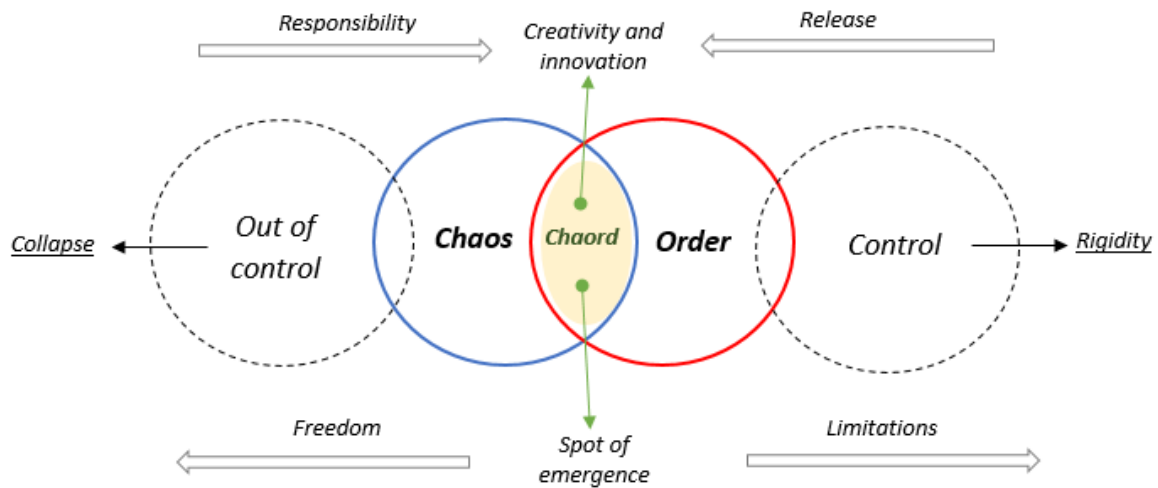
## 5 ORGANIZATIONAL MODEL

The effort to deal with the management dilemmas is evident in the organizational model that began to emerge in the second half of the 20<sup>th</sup> century. These models take into account two facts: (1) ideological approach that affects conceptual form of organization, (2) the configuration of organizations by various development levels of the companies and the environment that affects their development. The first group include models that solve the primary issue of this article – whether the organizations are mechanical or rather living systems. These ideas initially appeared in Gouldner (1959) who divides the organizations to rational and natural systems as well as in Burns and Stalker (1961,2000) who speaks about two basic organizational approaches, mechanical and organic. The conclusions of these authors in relation to changes in the external environment are seen in the following table.

**Tab.6** - Mechanical vs. organic system in context of environment

Static environment	Dynamic environment
Rational systems	Natural systems
Mechanical systems	Organic systems
Machine	Organism

The second group of authors then describe the basic characteristics of companies. This description is usually based on the assumption that the business environment is dynamic with highly complex character. According to Boulding (1956), organizations are open systems, characterized by a high level of complexity, reactivity and looseness of coupling among system components. Therefore, organizational models should meet the following requirements (Thomson, 1967): 1) They must be open to the environment; (2) all organizations must adopt to their environments by crafting appropriate structures; (3) organizations must be differentiated systems. There are also known models that seek to resolve the differences in organizational management practice. Colins and Porras (1994) describe the organizational concept that seeks a balance between preservation (stability) and change (dynamics). They argue that the long-term success of visionary companies is related to synergy of stability (core ideology) and change (envisioned future). Perhaps the most important work in this area introduces organizational model created by Hock (1995). This model is referred to as chaordic organization. The word “chaordic” refers to a system of organization that blends the characteristics of chaos and order. Chaord means any self-organizing, adaptive, nonlinear complex system, whether physical, biological, or social, in which its behaviour exhibits the characteristics of both order and chaos or loosely translated to business terminology, cooperation and competition (see following figure).



**Fig.1** - The Choardic path. (Own processing based on Hock, 1999)

## 6 MODEL OF BIOTIC ORGANIZATION

Model of biotic organization is built on chaordic organization and extends it through four consciousness spheres. When developing this model, it was necessary to consider the management dilemmas by two primary views (machine vs. organism) and four organizational dimensions (style, structure, culture, purpose). This approach made it possible to examine the applicability of contrasted management practices in relation to its assumptions (paradigms) and practical manifestations (quadrants). The following table describes the results of this examination including four principles of biotic organization that have emerged from these contradictions.

**Tab.7** - Dilemmas of management in context of two fundamental views

Dimension	Machine (M)	Organism (O)	Biotic model
Style	Management	Leadership	Chaord
Structure	Hierarchy	Network	Holarchy
Culture	Control	Trust	Discipline
Purpose	Making money	Service	Fulfilment

Biotic organization is a four-dimensional organizational model. This model consists of the following quadrants (consciousness spheres): emotional, physical, spiritual and intellectual. Each of them reflects one of four organizational dimensions (style, structure, culture and purpose). Individual dilemmas then fit to each quadrant. These contradictions are becoming outermost points of each dimension. The model itself then corresponds to the integral theory by Ken Wilber (1997) and its quadrants which take into account individual, collective, internal and external level. Left part of the following figure (intellectual and spiritual quadrant) corresponds to the collective level, while the right part of the figure (emotional and physical quadrant) refers to the individual level. Internal level (subjectivity) includes style (I) and culture (we). External level (objectivity) includes structure (it) and purpose (its).

The model also takes into account the theory of vitality (see Plamínek, 2006) which balance between stability and dynamics, efficiency and utility. Factors of dynamics and efficiency are

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connected to operating practice which is the source of growth and development. These include style and structure. Stability and utility factors are linked to organizational ideology that is a source of stability and continuity. These factors shape culture and purpose of existence. Combination of structure and culture creates a corporate background, while the combination of purpose and style shapes corporate worldview.

The core of this model is penetration between management dilemmas which is connected with the development of new management practices. These practices are based on the assumption that organizations are living systems made of people and things (production resources, systems, processes etc.). The current control system should be thus adapted to this fact. Contradictions often emerge as a result of incorrect application of management practices, both in terms of space and time. An illustrative example is management applied to human beings. This management leads to suppression of their activity and potential. The opposite extreme is the management principle applied to management systems and processes. It causes failure, inefficiency and in extreme cases, it may even cause collapse. The solution is hidden between these two principles. Namely, it is the higher form of control (self-control) which appropriately combines two approaches, i.e. in relation to the objectives (control of chaos), perspectives (short-term results based on priorities), applications (systems adapted to humans) and human characteristics (systemic creativity).

Biotic model sees organizations as autopoietic systems. The main feature of these systems is self-creation. These properties are reflected by chaord (balancing the inconsistency between performance and adaptability), holarchy (balancing the inconsistency between centralization and decentralization), discipline (balancing the inconsistency between paternalism and liberalism) and fulfilling the needs (balancing the inconsistency between short-term and long-term liabilities). As it can be seen, balancing is a key concept of this model. Individual principles of biotic organizations do not reach a balance between two opposite forces but they rather oscillate between two extremes and expresses such forms of control which are derived from the prefix “self- “. There is no need to artificially intervene in these systems. The organizations are modified and they change themselves due to the conditions that allows them randomisation and a reasonable level of volatility. Therefore, the aim is not equilibrium. This occurs at the moment of death of any living system. In this model, organizations evolve in terms of persistent imbalance that is present inside and outside these systems. The imbalance is the source of life ad living organizations obviously benefit from it.

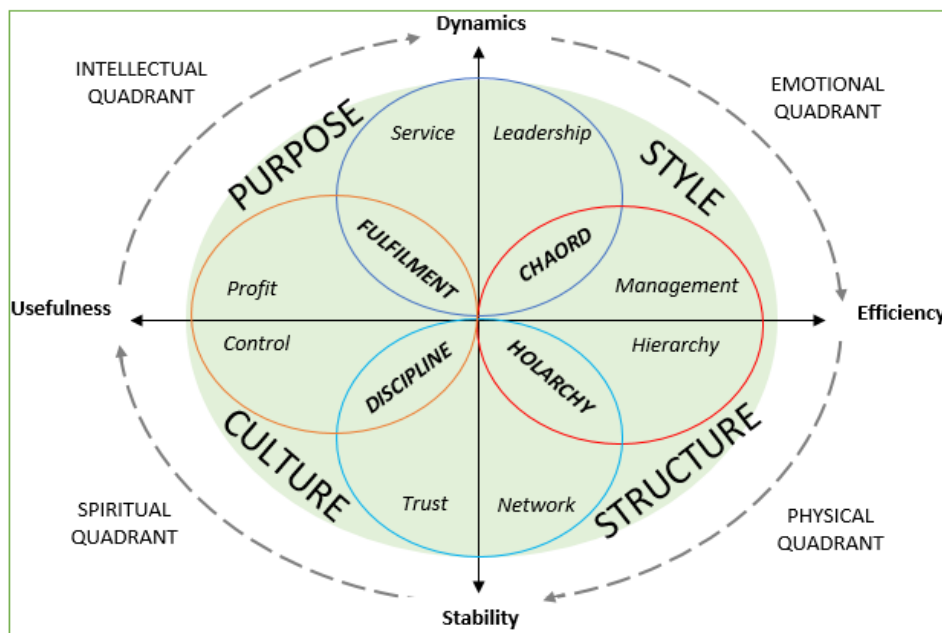


Fig.2 - Model of biotic organization

## 6 CONCLUSIONS

This paper allowed a closer look at the organizations as a living beings through biotic model. This model contains four principles that arise from the contradictions of existing management concepts. These contradictions are captured by chaordic model of continuous balance of opposites that develop in two extremes. Excess of freedom (unfounded trust) is beyond any control and it leads to collapse. In contrast, excess of rules and constraints (lack of confidence) ensures order and stability but at a price of rigidity and aging. Harsh management practices (leadership innovation) are amplified by the effort to mitigate the constant tension between freedom (leadership) and responsibility (management). The soft management practices (management innovations) are amplified by the attempt to reduce tensions between limits (management) and release (leadership). The intersection of these extremes (chaos and order) opens a special space which is a source of vitality. At this point, it also hides the principles of biotic organizations. These principles are not balanced but they are in a permanent state of imbalance.

Each of these principles concerns the idea of self-organization. This is reflected in the style (self-management), structure (amorphous structure), culture (self-discipline) and purpose (developing its own sense). All of these areas take into account the polarity of management practices that create current form of management. The basis for this model is not conformity but rather divergence in the spirit of the cybernetics law. Each organism need diversity and disorder in order to be able to adapt to its environment. Building on the conclusion from this article, further research should be aimed at practical description of these principles. In order to do this research, it will be necessary to find suitable organizations whose management systems comply with the biotic model. Even today, we can already find a number of companies that are similar to this model. This include for example French company Favi, American company Morning star, Sun Hydraulics, W.I. Gore, Patagonia, Visa, Brazilian company Semco or Chinese company Haier. Although these organizations are of different sites and different areas of specialization, their common feature is that they are something

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more than the sum of individual parts. Therefore, they fulfil one of the basic characteristics of living systems. In other words, they are not entities without “raison d'etre”.

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# Promoting Organizational Commitment and Organizational Citizenship Behaviors in Vietnamese Enterprises: The Influence of Corporate Reputation

*Trung Duc Nguyen, Vy Thuy Nguyen*

## ABSTRACT

*When an employee perceives a consistency between the values he perceives and the values company creates, he will want to be more engaged with the company and do organizational citizenship behavior (OCB). Therefore, the purpose of this article is to explore the impact of corporate reputation through corporate social responsibility and employee treatment to the level of OCB engagement and performance. The study was conducted through the analysis of 303 questionnaires. The results showed that the significance of investing in corporate social responsibility and employee treatment affects employee behavior. There is a motivation for companies to use long-term investment resources in the values that employees really care about.*

**Key words:** *Corporate social responsibility, organizational citizenship behaviour, employee treatment, organizational commitment.*

**JEL Code:** M14, M54

## 1 INTRODUCTION

In recent years, there has been an increasing interest in exploring performance-related behaviours that go beyond the assigned tasks and responsibilities for which employees are typically given in job description. Voluntary behavior that goes beyond the core tasks, is named as Extra role behaviour (ERB), a part of organizational citizenship behavior (OCB) (Bateman & Organ, 1983; Organ et al., 2006). Extra-role performance behaviours are not part of their formal job requirements as they cannot be prescribed or required in advance for a given job but they help in the smooth functioning of the organization as a social system. Companies use many methods to encourage employees to implement OCB such as leadership styles, managerial support, and organizational support, organization commitment (Organ et al., 2006).

Besides those prefixes, Fu et al., (2014) suggested that CSR activities affect employee behaviors such as engagement with organizations and OCB. According to Stakeholder theory (Freeman, 1984), CSR activities are one of the expectations that companies want to implement because these are the needs for companies to be judged trust and responsibility. Many studies have attempted to identify how CSR affects the overall organizational performance and provided empirical evidence on the relation between these corporate behaviors and reputation, competitiveness, and sustainability of the organizations (Johnson, 2003; Porter and Kramer, 2002; Snider et al., 2003). Although previous studies emphasized the relationship between CSR and organizational commitment (Brammer et al., 2007), the way in which CSR initiatives influence organizational citizenship behaviour is unclear.



In consideration of these issues, based on Learning social theory, Social identity theory and Self-categorization theory, this study investigates the relationship among CSR, employee treatment, employee commitment and OCB.

## **2 LITERATURE REVIEW**

### **2.1 Corporate reputation**

According to Fombrun et al., (2000) the corporate reputation concept is rooted in the stakeholders' stakeholder theory. Corporate reputation is defined as collective assessments of a corporation's past actions and the ability of the company to deliver improving business results to multiple stockholders over time. Corporate reputation is considered as a tool to minimize asymmetric information regarding firms. When customers face a lot of product choices, they will largely lack information about the companies. Therefore, customers will rely on corporate reputation to evaluate the product and decide to buy it or not (Schnietz & Epstein, 2005). Many researchers argued that corporate reputation is an intangible asset of the business (Melo & Garrido-Morgado, 2012) and bring sustainable benefits for companies (Roberts & Dowling, 2002). The majority of previous research has focused on the customer-oriented corporate reputation and the context-specific factors affect corporate reputation (Walsh and Beatty, 2007). However, corporate reputation can be evaluated based on the views of different stakeholders, depending on their approach to the company. There are two related parties: external stakeholders (shareholders) and internal stakeholders. While external stakeholders are interested in financial performance, the internal stakeholder (employees) concern about social responsibility and employee treatment (Bailey, 2005).

In this article, the object we are referring is employee. We will use the concept of corporate reputation from Bailey (2005) to measure with two components: social-responsibility reputation and employee - treatment reputation.

### **2.2 Corporate Social Responsibility Reputation (CRS)**

CSR dimensions can be divided into internal or external depending on the type of stakeholders that it intends to satisfy. The internal CSR activities involve employees' welfare and business ethics. The previous researches suggest that CSR initiatives can be broadly understood from an employee's perspective (Rodrigo and Arenas, 2008). The employee perspective on external CSR or corporate citizenship performances (Kim et al., 2010) referring to "the various forms of company involvement with charitable causes and the nonprofits" (Lichtenstein et al., 2004, p.16).

### **2.3 Employee treatment Reputation (ETR)**

Employee treatment represents the evaluation and judgment on how an organization treats the employees. According to Social exchange theory, Blau (1964) argues that the economic exchange has a marketplace character. Someone who receives such a gift is likely to feel some obligation to reciprocate, or to repay the "debt". Similarly, Fu et al., (2014) suggested that the employee treatment would affect the organization commitment and OCB. In addition, Bailey (2005) also suggests that different stakeholders have different concerns about the actions of the companies. The external stakeholders will be more concerned about the performance of the enterprises, and the internal stakeholders (employee) will be concerned

about how enterprises treat them. From there, it is believed that employee treatment will affect the employee's response to organization commitment and create OCB.

## **2.4 Organization citizenship behaviors (OCB)**

Many scholars have demonstrated linkages between OCB and important outcomes such as job performance or various forms of withdrawal (e.g., turnover intentions, absenteeism, and turnover) (Podsakoff et al., 2000). Organizational citizenship behaviour (OCB) has been defined as behaviour that contributes “to the maintenance and enhancement of the social and psychological context that supports task performance” (Organ, 1997, p.91).

## **2.5 Organizational commitment**

Meyer and Allen (1997) identified three kinds of organizational commitment: continuance (have to), normative (ought to) and affective (want to) commitment. Among them, the affective commitment is regarded as the most important and beneficial one because it could affect the other components in the long term (Allen and Meyer, 2011). The affectively committed employees have confidence in the firm's values, culture and goals. The recent researches suggested organizational commitment is important factor to enhance organization's effective and success (Eisenberger et al., 2010; Lub et al., 2012). In this study, we take the affective commitment to measure organizational commitment.

## **3 PROPOSED HYPOTHESIS**

### **3.1 Impact of corporate reputation on organizational citizenship behaviors**

When a company builds an altruism culture, employees are willing to help another. Altruism is one of CSR core values, which exceeds the profit target that companies are often interested in. In addition, it is one of the core elements of OCB, which is reflected in many OCB scales with “altruistic” concept (Farh, Earley, & Lin, 1997)

According to Learning social theory, new behaviors can be acquired by observing and imitating others. Most human behavior is learned observationally through modeling: from observing others, one forms an idea of how new behaviors are performed, and on later occasions this coded information serves as a guide for action. Morhart et al., (2009) suggested that if employees are aware of the values of the organization, they will tend to adapt themselves to those values with altruistic.

When companies implement CSR, employees, who are interested in CSR, will be more willing to sacrifice themselves to improve the performance of the company (Fu et al., 2014); or become active spokespersons (Morhart et al., 2009). These behaviors are compatible with OCB. Therefore, the hypothesis is:

*Hypothesis 1: Corporate social responsibility reputation (CSR) has a positive relationship with OCB.*

Along with corporate social responsibility reputation, employee treatment reputation (ETR) is a part of the corporate reputation concept, as measured by internal stakeholders, so we believe that this makes employees more and more involved in OCB behaviour. Therefore, the hypothesis is:

*Hypothesis 2: Employee treatment reputation (ETR) has a positive relationship with OCB.*

### 3.2 Impact of corporate reputation on organizational commitment

Lub et al., (2012) suggested that organizational commitment (OCM) is an important element in organizational behavioral research and it will motivate employees to be more willing to take organizational advocacy and help improve organizational performance. The Social identity theory and the Self-categorization theory suggest that a person will perceive collections of people (including themselves) as a group, as well as the consequences of perceiving people in group terms (Tajfel & Turner, 1979). Therefore, when people identify themselves as having the characteristics that fit the values of their companies, they will tend to engage with the companies.

Viswesvaran et al., (1998) suggested that CSR raises the organizational trust of employees. In addition, Riordan & Shore (1997) explores how CSR impacts on corporate image, employees' attitude and behavioral perceptions. Therefore, it is believed that when an employee considers his company as a good social citizenship and a moral employer, he will identify himself as being more compatible with the company.

The hypotheses are:

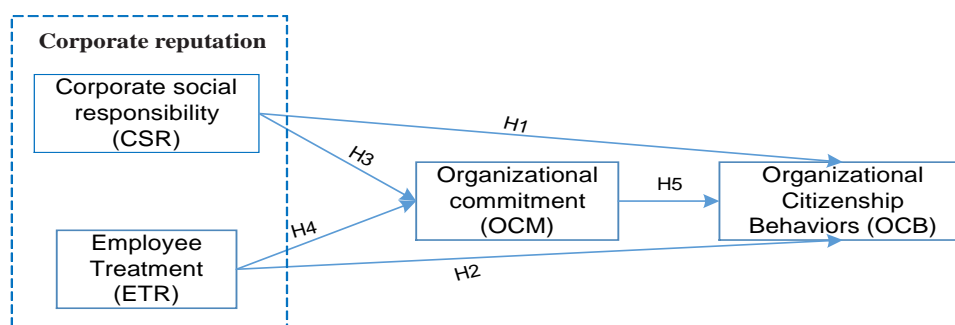
*Hypothesis 3: CSR has a positive relationship with OCM.*

*Hypothesis 4: ETR has a positive relationship with OCM.*

### 3.3 Impact of organizational commitment on organizational citizenship behaviors

Employees who commit with their organization will try to perform organizational citizenship behaviors (Meyer et al., 2006; Paulin et al., 2006; Foote et al., 2008). Specifically, Paulin et al., (2006) found that employees in the service industry perceived their organizational commitment, were more likely to perform OCB behavior. Therefore, the hypothesis is:

*Hypothesis 5: OCM has a positive relationship with OCB.*



**Fig.1** - Conceptual model

## 3. METHODOLOGY

### 3.1 Procedure

The research was conducted in two phases, a pilot study and a main survey in Ho Chi Minh City. The pilot study was conducted by face-to-face and focus group. Results of pilot study modified the measures which were mainly developed in advanced economies, to make them appropriate for the context of a transitioning market, Vietnam. The main survey was undertaken using face-to-face interviews.

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## 3.2 Measures

All constructs used in research base on prior researcher: CSR (Fombrun et al., 2000; Maignan., 200; and Tian et al., 2011); employee treatment (Bailey, 2005; Fu et al., 2014); organizational commitment (Meyer and Allen, 1997; Baker et al., 2006; Fu et al., 2014); OCB (Farh et al., 2004, 2007).

## 4. DATA

A total of 350 questionnaires were sent to ten managers in charge of CSR initiatives and distributed among 35 employees per firm. A total of 309 responses were collected, and 303 were used for the analysis. Each company submitted 24–30 responses. Nearly half (48.8%) of respondents were men. The median age of respondents was 26–35 years. Positions ranged from staff (57.7%), middle manager (39.0%) to general manager (3.3%). We focus on employees, not on top management, because typical employees are more likely to evaluate and react to firms' CSR initiatives (Rupp et al., 2006).

## 5. RESULTS AND DISCUSSIONS

### 5.1 Reliability and validation of the measures

Before testing the structural model, we confirmed the reliability and validity. Reliability analyses were evaluated by using two indices: Cronbach's alpha coefficient and composite construct reliability (CR). Using Cronbach's alpha coefficients, reliabilities of the items ranged from 0.79 to 0.938. All of the coefficients exceeded 0.7 indicating high reliability (Nunnally, 1978). CR statistics also showed high reliability for all the measures because all of the CRs were > 0.8 exceeding the threshold for CR of 0.6 (Bagozzi and Yi, 1988).

After the reliability analysis, confirmatory factor analysis was implemented to assess the validity of the measures and overall measurement. We examined discriminant validity through comparing the average variance extracted (AVE) with the squared correlation between constructs (Churchill, 1979; Fornell and Larcker, 1981). The results showed evidence of discriminant validity because the AVE for each construct was greater than the squared correlation with other constructs. Table 1 and 2 demonstrated that the measures in this study possessed high reliability and validity.

Therefore, maximum likelihood estimation was used (Muthen and Kaplan, 1985). The final CFA model received an acceptable fit to the data:  $\chi^2_{[210]} = 497.848$  ( $\rho = 0.000$ ), GFI=0.866, TLI=0.907; CFI=0.919, and RMSEA= 0.065. These findings indicate that the scales measuring CSR, OCB, OCM, ETR, CEV used in this study were unidimensional and the within-method convergent validity was achieved.

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**Tab.1** - Composite reliability, average variance extracted, and standardized CFA factor loading of items

	Indicator	Factor loading
<b>Corporate Social Responsibility (CSR):</b> composite reliability $\rho_c=0.835$ ; average variance extracted $\rho_{vc}=0.538$		
The organization supports philanthropy and health career	CSR03	0.725
I have an impression that the organization has a fair attitude toward competitors	CSR04	0.775
The organization candidly releases relevant information to the public	CSR05	0.735
The organization has socially responsible actions have a significant impact on society	CSR06	0.768
The organization took a lot of effort to be socially responsible	CSR07	0.659
<b>Employee-treatment reputation (ETR):</b> composite reliability $\rho_c=0.819$ ; average variance extracted $\rho_{vc}=0.477$		
Job decisions are made by organization in an unbiased manner	ETR06	0.648
The organization makes sure that all employee concerns are heard before job decisions are made	ETR07	0.768
To make job decisions, the organization collects accurate and complete information.	ETR08	0.761
The organization clarifies decisions and provides additional information when requested by employees.	ETR09	0.650
All job decisions are applied consistently across all affected employees.	ETR10	0.612
<b>Organizational commitment (OCM):</b> composite reliability $\rho_c=0.826$ ; average variance extracted $\rho_{vc}=0.494$		
I really feel the problem is mine	OCM01	0.847
I feel like “part of the family” at my organization	OCM07	0.814
At my work, I feel bursting with energy	OCM08	0.594
I am proud of the work that I do	OCM09	0.57
When I get up in the morning, I feel like going to work	OCM10	0.643
<b>Organizational citizenship behaviors (OCB):</b> composite reliability $\rho_c=0.938$ ; average variance extracted $\rho_{vc}=0.837$		
Actively raises suggestions to improve work procedures	OCB02	0.990
Takes initiative to work overtime to complete work whenever necessary	OCB03	0.756
Recommends the organization to people outside it	OCB04	0.979

**5.2 Hypotheses tests**

We test the proposed conceptual model (Fig. 1) using structural equation modelling. As shown in Figure 2, the results indicate that the data fit our conceptual model acceptably ( $\chi^2(129) = 346.373$  ( $p = 0.000$ ); GFI = 0.872; CFI = 0.914; TLI = 0.927; RMSEA = 0.075).

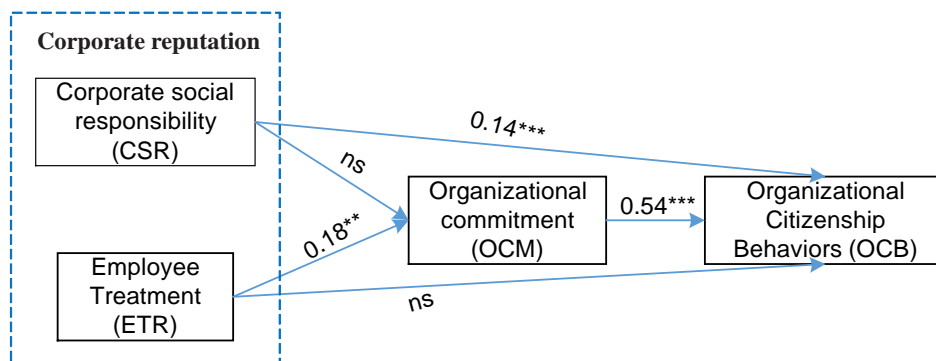
Based on the results, H1 is supported. The results show that CSR activities affect employees’ OCB. This is consisted with the point of social learning theory. Similarly, H4 is supported to show that when employees are treated well, they will have similar behavioural responses.

Finally, H5 is supported to show that employees who feel committed to the company will perform more OCB. The H2; H3 is not supported in this study.

**Tab.2** - Correlations of study variables

	CSR	ETR	OCM	OCB
CSR	1			
ETR	0.172**	1		
OCM	0.028	0.135*	1	
OCB	0.140*	0.134*	0.555*	1

\*\* $p < 0.01$ ; \* $p < 0.05$



**Fig.2** - Structural equation model result

ns: Not significance. \*\*\*:  $p < 0.01$ ; \*\* $p < 0.05$ ; \* $p < 0.1$ .

Hypotheses	Causal relationship	Sig	Contrast
H1	CSR → OCB	0.010	Supported
H2	ETR → OCB	0.489	Not supported
H3	CSR → OCM	0.869	Not supported
H4	ETR → OCM	0.012	Supported
H5	OCM → OCB	****	Supported

## 6. CONCLUSIONS

The benefits of CSR have been emphasizing (Perez et al., 2013; Marin and Ruiz, 2007). However, the benefits of CSR activities are not just from the outside but also from within them as employees. When an employee works in a reputable and responsible company, they will find that his or her company is willing to do more than just pursue a profit. This leads to the willing of employees to do more work than is required in the job description. The results have shown the direct benefits of CSR activities. Thus, when employees interact with social support behaviours of the company, they will also carry out such social support acts as their OCB.

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Finally, the element of OCB in this study is OCM showing that when employees commit with company, they tend to contribute more than what is required (OCB). In addition, employees who reciprocate to feel committed to the company should be treated well. Reciprocal tendency is a prevalent trend in human psychology and behaviour because they tend to respond to what they perceive. It is reflected in the results of this research when ETR affects OCM.

The result has shown that OCB is very necessary in today's fast-changing times so that enterprises must consider investing in CSR activities. These actions are not only responsive to the needs of customers, government and society, but also from employees in the enterprise. Those employees will find that the company is credible and responsible. In addition, companies build trust for their employees because of a moral environment that is ethical in which to build and declare all employees.

This study has several limitations that future research should overcome. Firstly, the OCB scale is used as the unidimensional scale. This does not fully represent OCB of an individual. Secondly, the study does not divide the companies into different fields. The different fields could bring different views on OCB, for example, taking initiative to work overtime to complete work whenever necessary will be different between manufacturing and service sector. Third, we have not considered the individual factors that affect OCB.

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## Application of Destination Management for Rožnov Brewery and Rožnov Beer Spa Productivity Increase

*Vratislav Kozák, Ottó Bartók, Iva Honzková*

### ABSTRACT

*This case study demonstrates results of a good practice for performance improvement of a brewery. After a demanding recondition, the Rožnov brewery and Rožnov beer spa were re-established in 2010. In terms of the bathing resort sector, a unique approach towards clients is provided. It is their goal to join components of alternative medicine based on methods used in ancient Egypt with common wellness and physiotherapeutic methods. On the premises there is a beer spa, a sea spa, and a children's spa. Though part of a former malt house has been converted into accommodations, its capacity is insufficient; to meet demand, they collaborate with five local hotels. Thanks to the brewery and spa's collaboration with a national transport carrier, their visitors are provided concessionary fare. Thus, Rožnov brewery and Rožnov beer spa are becoming the most important entity for destination management in the microregion. The network of tourist industry entities that is being created increases the performance rate not only of the brewery introduced, but of the whole microregion.*

*For this research, methods of observation, interviews with Rožnov brewery and Rožnov beer spa managers, and location field research during a number of stays in the beer spa were used. In the course of data collection, the marketing mix, competitor analysis, PEST and SWOT analyses, and guests' preferences were analyzed. After data processing, the methods of analysis, synthesis, induction, and deduction were used.*

*The location field research took place from 2011 to 2016; interviews with managers took place mainly in 2016..*

**Keywords:** *minibrewery, spa, restaurant, cooperation with tourism entities, destination management*

**JEL Classification:** R10, M39

### 1 INTRODUCTION

The Czech Republic is famous for its beer, the annual consumption of which amounts to 140 litres per person there. The next record the Czechs hold is the per capita amount of minibreweries. As of January 2017, there are more than 300 minibreweries operating. Some of them produce beer only: others offer, in the attempt to succeed better, culinary specialties as well (Kozák, 2012; Kozáková, 2012). A number of minibreweries provide accommodation and catering services. The widest range of services and leisure time activities is offered by Rožnov brewery and Rožnov beer spa. The brewery cooperates with other tourist industry entities, and has become the

leader in destination management of the region. This paper is an example of best practices in tourist industry development in the restaurant and destination sector.

## **2 LITERATURE REVIEW**

Destinations, as “new” market entities, have become the center of interest since the end of the 1980s, when theoretical approaches suitable for their marketing direction designated for practical application started to develop. Destinations are defined as regional, able to compete internationally (globally) or a strategically managed unit of the international market. Destinations offer clients appropriate products which satisfy their expectations. Destinations make efforts to achieve perfect and high-quality organization of the whole service chain. A relation of a service chain to a particular territory is a determinant for a client who perceives a service chain in a given region as a total entity. A region or an area represent a destination for a visitor (a client) which they perceive and where they buy and consume. Perceiving and defining on a client’s side could be essential for establishing which region (or area) is becoming the “real” tourist destination. It does not include only the existence of tourism development preconditions, but also secondary offers (infrastructure), its connection to primary offer (attractivity) and a “sale” of a given region or area in such a way that it is perceived as a “product.” In a simplified way, we can state that not every area or region is a “real” destination in a client’s perception of a “real” destination (Palatková, 2011).

Sheehan, Vargas-Sánchez, Presenza, & Abbate (2016) coin the term DMO (Destination Marketing Organization), a term which focuses on management (Destination Management Organization). Broadening the role of DMO lies in engaging each participant in increased destination marketing. The status of DMO in a region is crucial and unique, as it defines limits of both the internal environment and external competitive environment. In order for DMO to work correctly, high skills in knowledge management are required. Pearce (2015) lay stress on adding sustainability principles to tourist industry and its staying able to compete. The right implementation of destination management concept helps that. The concept includes four parts: approach, goals, functions and organization structure.

Fernández Tabales, Mercado Alonso, Villar Lama, & Bascarán Estévez (2015) established a diagnosis of problems which were caused by excessive growth of Spanish cities near investigated tourist destinations. The study focuses on application of time-proven destination management methods, while employing new approaches of regional management whose role is crucial in this process. Stalidis, Karapistolis, & Vafeiadis (2015) discuss utilization of information systems in destination management, which is based on knowledge; in difficult situations, the destination management will enable accepting decisions based on data. Decision making is based on advanced data analysis, utilization of a neural network and knowledge of technologies for intelligent information systems of marketing management of tourist destinations. What is presented are knowledge engineering methods for extraction and shaping of data from market factor investigation, networks and clusters; as well,

model patterns emerge which explain the market phenomenon or customer behavior. Pilot studies proved that an intelligent system is capable both of helping users who are not experts on data analysis and resolving selected target marketing problems.

Hart Robertson (2015) is interested in competition interfaces in tourist industry marketing. Market differentiation in relation with competing tourist areas has become more important than “branding.” Instead of branding, Roberts recommends to attract the attention of potential visitors by making use of competition marketing - to gain the customer’s loyalty by the use of such techniques as creating unique and unforgettable experiences. An unforgettable experience could cause repetitive visits and word-of-mouth effect, or active support on social media sites. Šauer (2015) is interested in cooperation in the field of distribution of marketing activities, towards the necessity of cooperative distribution between individual participants in a given locality. Also, the author analyzed microeconomic interventions which governments use to interfere with the marketing processes in a given destination.

Volgger & Pechlaner (2014) research was focused on DMO and its role in creating networks of tourism entities in a region for that region’s successful development. The key thought is that the impact of networks will make it possible for DMO to function, which will in turn coordinate the activity of entities in the tourist industry and take over responsibility of destination Ammirato, Felicetti, & Della Gala (2014) development. The necessity of creating networks is stressed by as well.

Innovation can be considered as key factor of sustainable growth across destinations and industries branch. The tourist industry is one of the largest in the world; lately, it has been a subject matter of the strongest innovation. The main contributions of utilization of such innovations lies in the accessibility of new information and communication technologies and organizational models which can directly connect tourists with services providers. The authors analyze possible forms of internal network cooperation; such a network can focus on services offered by tourist destination and tourists’ requirements in the scope of various phases of touristic life-cycle. Stehlikova (2012) focus on information and communication technology tools and their utilization in destination management. The tourist industry as a regional political tool can serve to regulate and optimalise a region’s development. Information concerning various areas of the industry are mainly in electronic versions. Newly coined terms, such as e-tourism and e-logic are oriented towards using ICT, making information streams more effective along with organizing, planning and process managing – all in order for customers’ satisfaction and loyalty to be preserved.

### **3 METHODOLOGY**

The goal of the paper is to create proposals for development of Rožnov brewery and Rožnov beer spa and of the whole microregion in accordance with the employment of destination management principles. The research summarizes methods and approaches which were used to find out the current state and, followingly, to elaborate proposals to strengthen the position of Rožnov brewery and Rožnov spa as an attractive destination for tourists, employing the tools of destination management. Another goal

was to strengthen the attendance during seasons which are less attractive to tourists, especially during the beginning of the school year. After processing and reviewing the proposal, the methods of observation included interviews with the brewmaster, operational and PR managers as well as location field research carried out over a number of stays on the place. Also, findings from Ondryášová (2016) bachelor thesis (which was supervised by the author of the study) were used. Partially, information were drawn from <http://www.roznovskepivnilazne.cz/>. After data evaluation, the analysis of current level of application of destination management methods was elaborated, altogether with a cooperation within the network of selected entities of tourism. After processing the data, methods of analysis, synthesis, induction and deduction were used.

#### **4 ROŽNOV BREWERY AND ROŽNOV SPA**

The premises of the non-operating brewery were restituted. Tomáš Kupčík and Jaromír Beneš became the owners; after a complex reconstruction, thanks to them, the brewery was in an operational state again in 2010. The brewery has extensive premises which are gradually being expanded and the range of services is being widened. In the restaurant, there is a copper boiling house serving partially as a decoration, and partially for classes of Beer University. Education at Beer University lasts 4 hours and it is intended for local brewmasters and homebrewers. Currently, the boiling house is three times bigger than the former one. The brewery offers the whole set of 16% beers, then it regularly produces the light lager called Radhošť (11%), the light special called Rožnov (13%) and the half dark special Rothschild (13%). In summer, lemon and cherry specials are popular; these are around 11%. Medové 300 let is best appropriate for special occasions. Its production takes 10 weeks and the beer is usually available around Christmas. Its alternative is the honey special which is, by comparison, weaker: honey creates only 7%. Then the wide offer is created by the 11% light American Pale Ale, the 12% dark lager Čert, a mixture of 5 malts called Žerotín (12%), the 16% half dark special Gutmann, the 16% dark special Habsburg and the 16% light special Baron Armín Popper.

The owners, Tomáš Kupčík and Jaromír Beneš, built a spa which is of a different and new type. Their idea of a beer spa was taken after by other businessmen. Moreover, the owners managed to "...join the characteristics of alternative medicine based on old techniques of ancient Egyptians and eastern cultures with both common and less common spa a physiotherapeutic methods" (Rožnovské pivní lázně, 2015). "Thanks to the personal experience, we strongly believe that you can only live a happy live of love, happiness, health, abundance and prosperity via reaching the harmony of body and soul (Rožnovské pivní lázně, 2015). You can't be loved if you don't love yourself. You can't feel joy when you believe that the world and people in it are evil. You can't live in abundance if you believe that there is a lack of it. Let's set out on a journey exploring a yet unknown inner world. Maybe we will help you change your worldview and your view of yourself. Sometimes one sentence or meeting one person can change your life. We all have a right to live an amazing life and our wish is to

help you to open the door slightly on your journey” (Rožnovské pivní lázně, 2015; Ondryášová, 2016).

Rožnov spa provides a possibility of relaxation in the brewery. Spa treatments start in gentle herbal sauna and peeling. A bath in black beer follows, with a possibility of its unlimited consumption. The spectrum of services provided is wide. The spa offers alternative treatment techniques, but for those who are wary of alternative methods, there are fantastic physiotherapeutic massages, such as lava stones, bamboo, chocolate or honey massage, among others.

In 2015, the new type of spa was opened a sea spa also which offers both alternative and traditional wellness procedures:

“You can lengthen your life by breathing a salty sea air with 95% oxygen and ozone, altogether with a full body peeling with sea salt (30 minutes)

In wooden vats for 2, there is real seaweed in bubbling water; you will also get a mud mask with seaweed! (30 minutes)

You can get energized on a sunlight meadow where we will smear you with lotion with seaweed, and you can also get a tan, even without harmful UV radiation.

You will experience what it is like to swim with dolphins. (30 minutes)

Also, there will be “sea music,” seashells, fresh juice, delicious ice cream and Mediterranean food!

If you want to maximalize your experience, then we can offer you an extra detoxicating power of siliceous mud from a salty Siberian lake which is 5 hundred million years old, in a form of a whole body pack. Or you can try original reflex and acupressure that you will never forget...

Degustation of chocolates, pralines, fresh truffles and other delicacies in Málkova čokoládovna, altogether with a small gift.

You will experience all of that and even more, from a real deck of a ship!” (Rožnovské pivní lázně, 2017)

Rožnov brewery widens their offered services. Besides a beer and sea spa, there is also a children’s spa where children are taken care of by qualified personnel while the parents undergo the selected procedures. Fans of sweets will appreciate making their own desserts and ice cream, and visiting the chocolate factory. For those who are interested, there are brewery field trips provided.

For beer fans, the seating in a tavern is a good choice; for those who are fond of calm surroundings, there is a café where they can try sweets or other things on the menu. Since 2016, a representative restaurant has been opened, in which there is a rich offer of ready meals and specialties. In a given place, you can buy beer cosmetics, but only some of the tourists knew or had an idea that it is actually home-made and that the owner himself is involved in its production.

A disadvantage for customers are rented spaces of a wholesale store where vehicles with goods drive into the brewery courtyard. That complicates the transport and parking for visitors. I recommend to consider benefits of tenancy.

In the scope of their business activities, the brewery produces nitrogen for the industrial market.

## **5 RESULTS AND DISCUSSIONS**

Rožnov beer and sea spa are visited by 40 pairs of visitors who spent at least one night there. The brewery built 7 rooms with fixtures and fittings in the premises of a former malt house, breakfast is served. The reconstruction continues and the number of rooms will increase.

Recently, 33 pairs are accommodated elsewhere. The cooperation with five hotels and taxi services is established. It is profitable for cooperating hotels that clients are interested in the Rožnov beer spainly during weekends. The spa, thus, solves the problem with loss of visitors who stay there in working days while on business trip. The brewery has their own laundry and do the washing for 2 hotels. They cooperate with Czech Railways as well. Within weekend packages, a single passenger ticket from any station in Moravia is provided for 50 CZK, from Bohemia for 100 CZK. In addition, there is a 50% bargain for an entry to the living museum (Valašské muzeum v přírodě) during the main season.

In the brewery, there is information about tourist attractions in the microregion which help mainly to develop individual tourism and cycle tourism. This enhances the satisfaction of visitors of the microregion and their willingness to spend money here. Many visitors are becoming faithful clients who via word of mouth create a positive awareness among other potential visitors. The author of the study visited the spa at least five times.

Rožnov brewery and beer spa evaluate visitors' satisfaction and are responsibly concerned with their opinions (Ondryášová, 2016). After evaluating the quality of the network, I recommend to broaden this evaluation for cooperative organizations. Rožnov brewery and Rožnov beer spa have an accommodating and reliable staff; however, customers' satisfaction can be negatively affected by a weaker segment of the network. As a natural leader of in destination management, they should strengthen their status within the region.

## **6 CONCLUSIONS**

The research proved that Rožnov brewery and Rožnov beer spa use components of destination marketing. In doing so, they increase their productivity and, at the same time, create a leader while building the network of tourism entities in the microregion. They organize and manage cooperation with other hotels and Czech Railways company. After they run out of their own capacities, they offer their guests accommodation in proven hotels and transportation between them. Other cooperation



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is concerned with other entities of tourist industry in the destination, chiefly on the living museum (Valašské museum v přírodě). The museum is a popular attraction and supports preserving folklore traditions. During my visit in the museum, I did not notice any promotion of Rožnov brewery and Rožnov beer spa. In the scope of operating network of cooperating organization, it should be natural.

While buying accommodation packages, customers can choose which hotel they want to stay in. You can choose according to the price of services provided. For the buyer, there is free transport from the station offered and subsequently between the hotel and the brewery. Spa accommodation packages offer a 50% discount for the living museum, for culinary tourism and folklore are complementary and enhance each other. If the brewery will manage to unite the strongest and most important partners to cooperate strategically and create a network, the destination can quickly grow into flexible market vendor and a complex system which will drive economical development. An important act would be more remarkable involvement of public administration who could impact mainly sustainable development of Rožnov as a destination and its promotion.

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## Entrepreneurship Curriculum Development in Sustaining Innovation in Nigeria

*Akutson, Seth Koks*

### ABSTRACT

*The study explores the stages of Entrepreneurship Curriculum Development in Nigeria. This is with the view to determining the influence entrepreneurship curriculum development has exerted on innovative drive in Nigeria. Various literatures as they relate to the study were reviewed and conceptualized into a framework to show the stages in which entrepreneurship curriculum have advanced in the first world economy in comparison to the stage in which the Nigeria economy operate. The study found out that entrepreneurship development in Nigeria has focused more on the explicit curriculum while neglecting the implicit curriculum. The study also concluded that Nigeria is at its early stage of entrepreneurship curriculum development which has hampered the emergence of entrepreneurs. For the few that are able to create ventures, lack of marketing skills such as using digital and social media restricts their success. In an effort to enrich the entrepreneurship curriculum development in Nigeria, the study recommends internship for students to have hands-on experience and also academic institutions should build prototype businesses on campus to expose students to entrepreneurship culture and also impart modern marketing skills among others.*

**Keywords:** *Entrepreneurship; Entrepreneurship Education; Curriculum; Nigeria.*

**JEL Classification:** O11, O32

### 1 INTRODUCTION

The Word Entrepreneurship came into usage in the 18<sup>th</sup> Century when a French economist, Richard Cantillon first used the word to describe the ‘risk bearing’ activity and role carried out by the early industrialist in the transformation of resources during the industrial revolution (Akpor-Robaro, 2012). The activities of these industrialist was so great as it brought about a new dawn in Europe because some individuals think out of the box to address issues of their time by identifying opportunity and creating new markets to increase world output through the idea of division of labour etc. Even Short, Ketchen, Shook and Ireland (2010) in a similar study suggested that ‘Without an opportunity, there is no entrepreneurship’. This shows that many people over the years have confused the idea of starting-up businesses without a drive and opportunity to be synonymous to starting-up businesses with a drive (Entrepreneurship). Similarly, a member of the Massachusetts Institute of Technology (MIT) Enterprise Forum in the United Kingdom as cited in Windsor (2015) noted that entrepreneurship is the strategic utilization of ideas within an opportunity structure and Entrepreneurs are people who think outside the box and really, most of them don’t even understand how to work inside the box.

To further buttress the idea of Short *et al.* (2010), Leibenstein (1995) in a previous discourse, postulates that an entrepreneur must be dominant, and be gap-filler, i.e. have the ability to perceive where market fails and to develop new goods or processes that the market demands

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but which are not currently being supplied. Even Veeraraghavan (2009) in his assertion also support this evidence as he concludes that innovation and entrepreneurship are two sides of a coin. He suggests that ‘While there is a need for the innovations to occur which should be facilitated and even encouraged deliberately by entrepreneurs, it is equally important for them to create opportunities and environment to realize those innovations. This therefore shows that for entrepreneurs to emerge, there must be a re-orientation of the up-coming generation on the issue of entrepreneurship which is also known as entrepreneurship education.

In a 2008 UNESCO report cited in Rwamtoga (2011), it was noted that entrepreneurship education is made up of all kinds of experiences that give students the ability and vision of how to access and transform opportunities of different kinds. Entrepreneurship goes beyond business creation, it is about increasing students’ ability to anticipate and respond to societal changes. The report also added that Entrepreneurship education is education and training which allows students to develop and use their creativity, and to take initiatives, responsibility and risks. It should be called entrepreneurship education (not enterprise education) so that it does not sound as if it is focusing on business. A work from Colton (as cited in Rwamtoga, 2011) suggests that the major objectives of enterprise education are to develop enterprising people and inculcate an attitude of self-reliance using appropriate learning processes. Entrepreneurship education and training programs are aimed at stimulating entrepreneurship which may be defined as independent small business ownership or the development of opportunity-seeking managers within companies. Entrepreneurship education have transformed in the past and also in recent time across the globe. This has been as a result of changes in different generation of technology. For example (1<sup>st</sup> generation, to the ICT age). Countries who adjust their curriculum to fit into the prevailing generation of technology in the age of their existent have thus raised entrepreneurs who were relevant in those dispensations. In this ICT age, evidences abound that economies that have adjust their curriculum to accommodate ICT have raised entrepreneurs who have cause breakthrough in every facet of the society , this is because there is barely no sector that do away with ICT.

Despite the advance and adjustment of school curriculum around the world to match up with the prevailing generation of technology, Nigeria is still lagged behind and this has impacted negatively on the emergence of entrepreneurs. For example, report emanating from an Expert Consultative Workshop (2017) organized by the Entrepreneurship Research and Development Centre which was supported by the Embassy of the United State of America in Nigeria showed that many universities in Nigeria, especially from the northern region are lagged behind in teaching entrepreneurship education. This gap might not be unconnected to the weak curriculum which do not match the prevailing societal change.

It is in this light that this study therefore seeks to appraise entrepreneurship in Nigeria as it is being influenced by the curriculum development with entrepreneurship education being the transmission mechanism in order to chart a way forward for entrepreneurship advancement in Nigeria.

## **2 LITERATURE REVIEW**

### **2.1 Theoretical Underpinning**

Entrepreneurial Performance Education Model: Vuuren and Nieman (1999) developed this model as it is concerned with the elements that drive entrepreneurial performance. It was developed to guide syllabus and curriculum development. The relevance of this model is the indication that the absence of any one of the elements such as motivation, entrepreneurial

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skills or business skills will lead to zero or extremely low levels of entrepreneurial performance as measured by the involvement and execution of startup activities by the student. Vuuren and Nieman (1999) observed that those students who had completed their Bachelor of Commerce degrees and choose to go into employment rather than work for themselves in a small business, lacked motivation to do so and those with motivation started their own business. The direct linear model suggests that entrepreneurial performance is a function of motivation, entrepreneurial and business skills (Njoroge and Gathunga, 2013). This shows that failure in developing entrepreneurship curriculum will lead to poor entrepreneurship education which will reflect in graduate response to societal issues.

**Entrepreneurial Education Model:** This model was developed by Pretorius (2001) and it considers not only the content of entrepreneurial education programmes but also the context wherein such programmes are operated by the facilitators and the approaches they use. The model identifies five constructs relevant for entrepreneurial education to increase start-ups and also indicate the relevance of the programme context. The relevance of the model is that the facilitator is the key construct and based on his skills, knowledge, experience and methodology application should govern the construct but also govern the variable mix and changes it according to varying demands during the programme (Njoroge and Gathunga, 2013). This theory supports the finding of Esmi, Marzoughi and Torkzadeh (2015) in a country specific study that focused on teaching-learning method in Iran.

## 2.2 Empirical Literature

In an attempt to test the processes and influences of curriculum development on graduate skills so as to make improvement in future curriculum, Munyanyiwa, Svotwa, Rudhumbu and Mutsau (2016) in a cross country study which focused on developing countries carried out a comparative analysis on entrepreneurship curriculum development at the University of Zimbabwe and Botho University in Botswana. By carrying out a descriptive analysis using graphs and tables on data collected with the use of questionnaire that employed 5 point likert scale, the results showed that lecturers (resources persons) at the two institutions are the main drivers of curricula development and review. The study recommended courses to be taught from first year which include Small Business Management, Entrepreneurial Skills Development, Introduction to Finance and Economics.

Since many Nigerian Universities focus on both the subject and activity curricula which are sub-set of the explicit curriculum, Anene and Imam (undated) outlined 66 skills from which 550 undergraduate students of the University of Abuja were tasked to rank. The first twenty most acceptable skills which include operating a saloon and interior decoration among other ranked by students were identified as potentially viable skills for curriculum development in order to move from the activity curriculum to the practical curriculum.

In the same vein, since the subject curriculum has not been effectively utilized to raise entrepreneurs, Esmi, Marzoughi and Torkzadeh (2015) in a country specific study focused on teaching-learning method which plays a key role in shaping entrepreneurs. The result showed that Developed model which includes teaching method, systematic, organized and logical ways of providing lessons can help instructors in selecting an appropriate method of entrepreneurship teaching, and it can also help to structure entrepreneurship teaching on the right path. The study also reported that the model of systematic, organized and logical ways of providing lesson is comprehensive and includes all the effective teaching methods in entrepreneurship education.

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In a country specific study that focused on developing country, Njoroge and Gathunga (2013) analyzed whether Entrepreneurship Education as reflection of the curriculum development affect growth in small and medium size enterprises in Kenya. By using the mean score to analyze the data, the study revealed that lack of financial strategic management, marketing and entrepreneurship skills retards businesses even though there seems to be increase in sales and profit in the short run. This supports earlier assertion by Leibenstein (1995) that entrepreneurs are gap-fillers and goes beyond just setting up businesses. This might not be farfetched from evidences even in Nigeria that reported increases in small and medium scale enterprises, while poverty also increase.

### 2.3 Entrepreneurship Education and Curriculum Development

In line with promoting entrepreneurship through entrepreneurship education due to the high level of youth unemployment and in order to improve students innovative ability and help them discover opportunities around them upon graduation from higher institution of learning, the National Universities Commission (NUC) in Nigeria directed all Universities to establish entrepreneurship Centres, latest by 2007/2008 session. The aim of these centres is to among others teach entrepreneurship theory and practice. Between 2007 and 2016, many Students have graduated yet entrepreneurship intentions among the graduates seem to be at low ebb. This is evidenced as a National Bureau of Statistics report as cited in Philip, Samson and Ogwu (2013) reported that about 600,000 graduates annually tend to be idle without any placement after graduation. This situation might not be unconnected to the lack of review of the Entrepreneurship Education Curriculum to meet up with the current issues on ground as Nigeria's curriculum focuses more on theory.

In the word of Bilbao, Lucido, Iringa and Javier (2008) as cited in Avior (2014), a curriculum is considered as the 'heart' of any learning institution which mean that schools cannot exist without curriculum. They also described a curriculum as a dynamic process due to change in our society. This dynamic nature of curriculum normally leads to curriculum development which is being described as a planned, purposeful, progressive and systematic process to create positive improvement in the Education system. Bilbao, *et al.* (2008) further noted the need for continuous update of curriculum through curriculum development to address society's needs. In recent time entrepreneurship Education in Nigeria have focused on learning without exposure to the practical aspect. One area of concern that should have been developed when it comes to entrepreneurship Education is the Practical and Environmental curriculum. This area of curriculum development is the key to unlock the innovative abilities of students after much theory.

The dependency on innovation is suggested by Veeraraghavan (2009), as entrepreneurship and innovation are inextricably linked. In conceptualizing entrepreneurship, Schumpeter as quoted by Wei (2012) originally conceived entrepreneurs as innovators. This is because they introduce new combinations – new goods, methods of production, markets, sources of supply, or organizations of industry – that shake the economy out of its previous equilibrium through the "creative destruction" process. So entrepreneurs do not need to own capital, open their own business, or even work within the confines of a business firm at all. The unique feature of an entrepreneurial action is innovation. Since no innovation remains innovative for a long time, people cannot be entrepreneurs forever, but only when they actually carry out new combinations (Bjornskov, Christian and Nicolai, 2008).

Kirzner (2002) suggests that the process of innovation is actually of spontaneous and in-deliberate learning. Accordingly, the necessary characteristics of the entrepreneur is alertness, with no intrinsic skills other than that of recognizing opportunities, being necessary. Following Kirzner (2002) suggestion, the recognition of opportunities and developing of innovative skills goes beyond theories and can only be achieved outside the four walls of class room through exposure as a result of developing both the Practical Curriculum and Environmental curriculum which are all sub-set of the explicit and implicit curriculum respectively.

### **3 THE CONCEPT OF ENTREPRENEURSHIP AND CURRICULUM DEVELOPMENT AS EXPERIENCED IN SELECTED ADVANCED COUNTRIES**

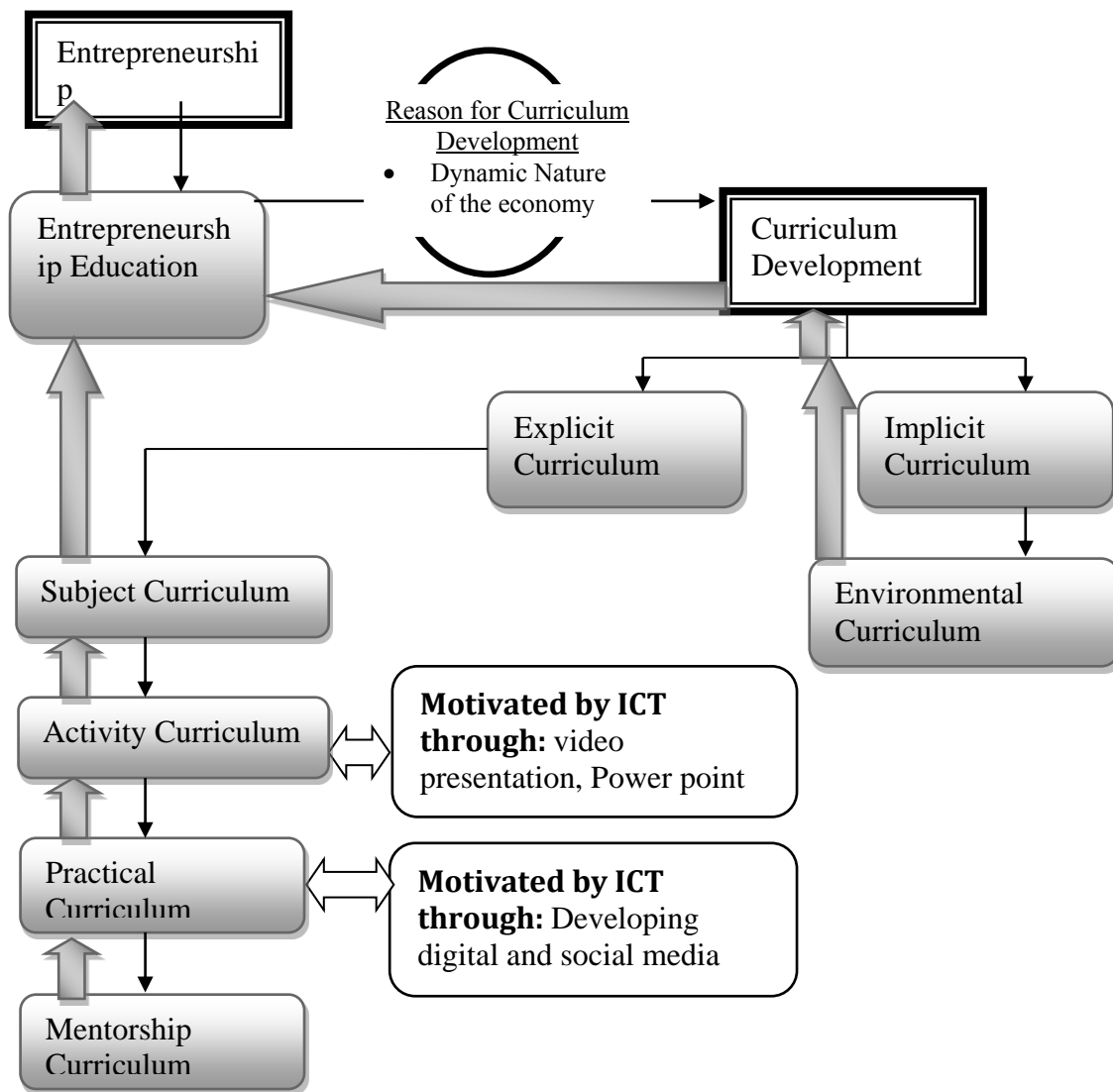
#### **3.1 Explanation of the Conceptual framework model**

From a historical perspective, curriculum development as it relates to entrepreneurship has gone through several phases that this paper describes below. Bobbit (1924; in Naia, 2013) expands the concept of curriculum development previously mentioned as curriculum advancement and curriculum making, evidencing social dimension, arguing that curriculum development should take into account the social needs which is as a result of the dynamic nature of the economy. This process, of trying to fill social needs was an important contribution to American education (and further, many countries education especially in Europe).

Fig.1 shows the linkages between the different stages in curriculum Development and the feedback effect it has on entrepreneurship. It shows that Entrepreneurship Education holds the key to unlock entrepreneurs, but this could only be unlocked when the curricular is in line with the current economic reality. A proper curriculum Development must take into consideration both the implicit and explicit curricular.

Tan (2014) described the implicit curriculum as laying more emphasis on the creation of a strong atmosphere in the environment that will facilitate the formation of entrepreneurship culture among students. It principally comprises material, institutional and cultural aspects which allow students to develop entrepreneurial awareness, foster entrepreneurship and improve entrepreneurship quality. A practical aspect of the development of implicit curriculum is found in Europe as the atmosphere towards building future entrepreneurs is highly recognized and implemented from the primary school level; for example a report by the Education, Audiovisual and Culture Executive Agency (2012) noted that in primary education, about two thirds of countries in Europe recognize entrepreneurship education and, in these countries, rather than being explicitly mentioned as part of a particular subject, entrepreneurship objectives are expressed as being transversal or cross-curricular i.e they form part of the values and competences to be developed throughout all subjects and curriculum activities of pupils in the primary school. In this situation, entrepreneurship education is integrated into other subjects; these are mostly subjects which form part of the compulsory curriculum. By this, the creativity of these pupils' increases as they move to higher institutions where they are exposed to explicit aspect of entrepreneurship education. This early exposure might not be unconnected with the massive rise of entrepreneurs in Europe.





**Fig.1 - Relationships between Entrepreneurship and Curriculum Development**

Source: Author Construct, 2017 (Adopted from Tan, 2014 and Modified by Author)

The explicit curriculum focus on giving entrepreneurship education to students. This entrepreneurship education includes entrepreneurship attitudes, knowledge and skills so as to act in an entrepreneurial way. The explicit curriculum is further divided into three (3) modules; subject curriculum, activity curriculum and practice curriculum. The subject curriculum lays more emphasis on theory impartment and also serves as the foundation for entrepreneurship education curriculum development system at the tertiary institution level. It is developed to foster students' entrepreneurship awareness and enterprise spirit, business and financial management. It is important to note that some students might catch the entrepreneurial spirit at the subject curriculum while some may not until they are pushed further into the activity curriculum.

The activity curriculum which is a sub-set of the explicit curriculum is designed to arouse students' entrepreneurship awareness, emblaze their entrepreneurship enthusiasm and develop psychological qualities and skills of entrepreneurship through forum, lecture, video

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presentation, expert interview, field visit, business plan competition, business club etc. Evidence abound that many entrepreneurs have emerged at this stage. Another aspect of the implicit curriculum is the practical curriculum. It involves exposing students to life projects to broaden the students' hand-on experience which is irreplaceable by theories or activities curriculum. It can also involve the development of software to stimulate real-life environment which will establish a sense of business risk and develop psychological quality for entrepreneurship. More entrepreneurs are likely to emerge when exposed to the practical curriculum as students are pushed beyond theories to reality. The last aspect of the curriculum development is the mentorship curriculum. Through this aspect, students are assigned proven mentors especially in the area of interest. This can stir-up more entrepreneurs as some people need to be push before they can be creative, identify opportunities and implement such opportunities.

Evidences abound that countries around the world are at different stages of curriculum development depending on the demand and structure of the economy which have determine how entrepreneurs emerge overtime. For example, as reported by Tan (2014), the Chinese economy has made significant expansion on the explicit curriculum while lagging on the implicit modules. Despite this, many entrepreneurs have emerged over the years in China. Table 3.1 below shows the differences in curriculum development as practiced by some selected countries.

Despite failure in the implicit curriculum and no evidence on the reviewing of school curriculum in China, Tan (2014) noted that the Chinese vocational colleges are laying stress on competency, focusing on the enhancement of students' professional competence and highlighting practical teaching facilities, the reinforcement and application of knowledge in practice, the improvement of practical skills, and the employment or self-employment after graduation.

As regards the duration for reviewing curricula, The University of Northern Iowa in USA used to review curriculum after every 2 years but from 2014 began to review on a yearly basis to ensure that their curriculum continued to meet the ever changing needs of industry (Posinasetti, 2014). Furthermore, in the United Kingdom (UK), Portugal, Russia, Ireland, South Africa and South Korea have their reviews done after every 3 years (Schwarz & Westerheikden, 2003). At the University of South Australia (UniSA), curriculum review is done every 2 years (University of Australia (1993).

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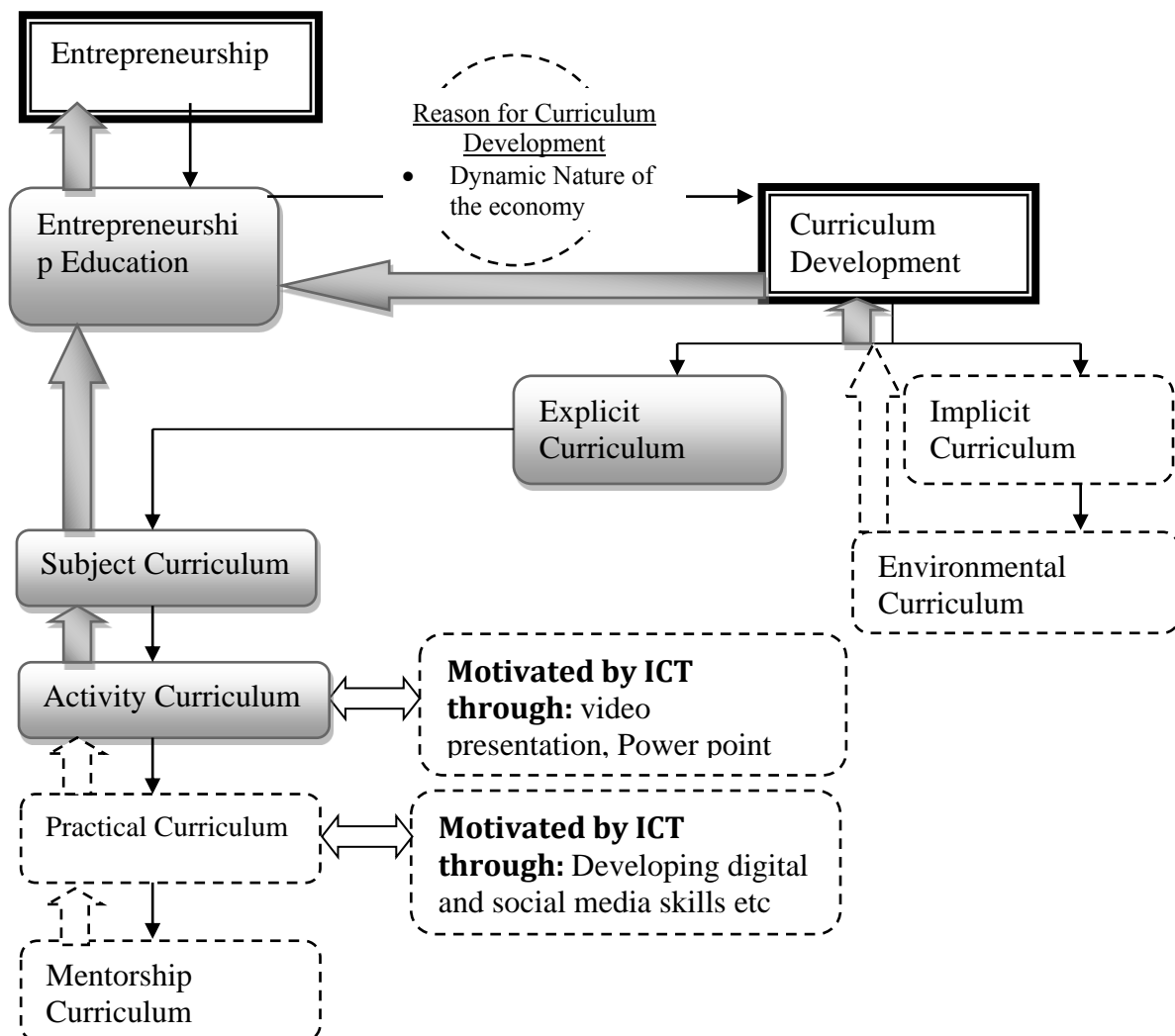
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**Tab.1 - Evidences of Curriculum Development in Selected Countries**

Country	Current Initiatives		Duration of Curriculum Review	Conclusion
	Implicit Curriculum Development	Explicit Curriculum Development		
China	Failed due to inability to stimulate practical activities at the early stage of individual growth	Many institutions have grown beyond the subject and activity modules. Currently operating at the practical modules	Not Available	Entrepreneurs have emerge due to exploit in the practical modules
Germany	Introduced transversal or cross-curricular that cut across curriculum activities of pupils in the primary school.	Advanced in practical curriculum through exposure of students right from high school	Not Available	Many entrepreneurs have emerged through these activities.
Malta	In February 2011, entrepreneurship was launched through education scheme in Primary and Secondary schools	Practical curriculum is implemented from secondary where students engage in entrepreneurial projects to add value to their sills development	A draft National Curriculum framework was launched in May 2011. It is intended to strengthen the embedding element of entrepreneurship behavior for both primary and secondary school.	Not Available
Cyprus	Create an enabling environment from lower secondary school through enterprise day where students are to visit and be familiar with the work place and activities of a person in business	The Ministry of Universities in collaboration with ministry of Education and culture conduct annual entrepreneurship competition for students in the second and third year of upper secondary school	Not Available	Not Available
Netherland	Not available	Training programme are organized for teachers to ensure they act in an entrepreneurial manner themselves to help encourage entrepreneurial behavior in their students	Not available	Not available
United Kingdom	In the United Kingdom, Enterprise Education is compulsory for pupils	Government is enhancing online resources for teachers at the enterprise village and promoting the recruitment of local enterprise. Example is found involving students setting up firms	Not available	Not available

From Table 1.0 above, it is clear that even though all countries operate at different stage of curriculum development, they still recognize entrepreneurship in steering documents at primary education level especially in Europe. These change significantly in secondary education, where virtually all countries integrate entrepreneurship into the curriculum in some form. In primary education, the cross-curricular approach prevails. Where entrepreneurship is not taught as a separate subject rather Entrepreneurship education is integrated into existing subjects, these are generally compulsory. The cross-curricular approach starts to give way to the integrated approach in lower secondary education, with each model being used in a similar number of countries (European Commission, 2012).

#### 4 THE NIGERIAN EXPERIENCE IN ENTREPRENEURSHIP CURRICULUM DEVELOPMENT IN COMPARISON TO ADVANCE COUNTRIES



**Fig.2** - Relationship between Entrepreneurship and Curriculum Development

Source: Author Construct, 2017 (Adopted from Tan, 2014 and Modified by the Author)

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In Nigeria, Entrepreneurship is not part of the curricular in primary school and secondary school as found in many part of Europe. Although it is being introduced in higher institutions in Nigeria, specifically the Universities. In recent time, Entrepreneurship has become part of the National Youth Service Corp (NYSC) cardinal program which is being introduced during the three (3) weeks orientation camp.

Fig. 2 below shows the level of curriculum development as it relates to entrepreneurship in Nigeria. It is important to note that all dotted lines are the missing link in the curriculum developmental process in Nigeria. For example, it could be noted that Nigeria curricular development is not driven by the need of the society; this tends to produce many students with entrepreneurship knowledge who lack the necessary drive to identify basic economic problems and create opportunities out of it. This is also reflected in the implicit curriculum as an enabling environment is absent to stir up creativity and entrepreneurial spirit among students from childhood. Similarly, the explicit curriculum has not developed beyond the subject curriculum where students are impacted with only theories of entrepreneurship education with the introduction of entrepreneurship study in the Universities by the National Universities Commission (NUC). In recent time, the activity curriculum is being given a nod although still at its infant stage. This is evidence through the activities of Network for Africa Students Entrepreneurship (NASE).

Although, the activity curriculum is still lagged far behind as students are not exposed to key entrepreneurship training facilities which are ICT compliance. Evidences also abound that effort have not been made in respective quarters to stimulate the digital and social skill which are important component of the practical curriculum.

In a nutshell, the following observations were found about Nigeria Entrepreneurship drive in relation to curriculum development:

*Excessively Theorized Curriculum:* The curriculum system in Nigeria fails to establish appropriate curriculum suitable for the dimensional entrepreneurial knowledge, ability and quality structure. The current system usually emphasizes theory which according to Chai (2009) is disadvantageous to foster students' entrepreneurial awareness.

*Shortage of the right Resource Persons:* Inadequacy of resource persons who are well versed in entrepreneurship theory and practice has also complicated the issue. The available resource persons are either theory experts or random practitioners of business. This makes it difficult to come up with a well-articulated curriculum education.

*Absence of Practicals:* The Nigerian curriculum does not provide for practical hands-on experience by students to have life experience of running business and nurturing it to grow in real world. This has made students to continue to fear test-running enterprises themselves.

*Absence of Mentoring:* The Entrepreneurship curriculum in Nigeria does not provide room for mentorship for students. This has shattered away many good vision and opportunities discover by students. Even in primary and secondary schools, the place of guidance counseling unit which have not only help shape moral life but have given direction to many individuals when it comes to career choice is fast becoming a thing of history.

*Skill gaps:* Muhammed, *et al.* (2015) recognized the absence of several competence skills which include discipline, commitment, simple thinking and confidence among others that is absent from students that must be developed by someone who has the interest to become an entrepreneur. These basic skills are currently absent in many students trait in Nigeria today as a lot of students lack discipline and commitment

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*Absence of Local content and Independent Development of Curriculum:* Evidence abound that different university operating within a country have their own curriculum designed with respect to local problems. Nigeria is a heterogeneous society with diverse cultural belief and ethics which is due to the multiple ethnic group in the country. Therefore, the differences in these ethnic differences have not been captured in the Nation curriculum development which might have been part of the problem encountered in the course of developing entrepreneurs.

*Lack of Modern Marketing Skills:* In most cases, the entrepreneurs that are able to create their own business ventures, lack adequate modern marketing skills such as employing the social media and digital services, these restrict the growth of their businesses. This is because customers that ordinarily would patronize the business are kept out of sight.

## 5 CONCLUSION AND RECOMMENDATIONS

The paper therefore concludes that Nigerian entrepreneurship education is still in its early stage of development. Based on the stage of Nigeria's curriculum development, the following recommendations are proffered:

*Increase Proportion of Practicals:* There is the urgent need for increasing the proportion of practicals. This could be done through sending students on internship to enable them learn how businesses are run in reality. This will enhance the Academia-business synergy towards building an innovative future.

*Inserting Local Content in the Curriculum:* There is need to consider local content in the development of the curriculum. This could be done by looking at the various economic opportunities available in each region of the country. To buttress this issue, Henry, Hill, and Leitch, (2003) as cited in Munyanyiwa, *et al.* (2016) suggested that when developing or reviewing the entrepreneurship curriculum, courses such as the development of new organisations, new markets, and new products must form the basis of an entrepreneurship curriculum whilst business management courses must emphasise the knowledge and skills required for business practice. For such a curriculum to be effectively developed or reviewed, Munyanyiwa and Mutsau (2015) argue that four perspectives need to be taken into consideration namely: a) the programme can be developed or reviewed from the perspective of the educators (lecturers) where curriculum is defined based on the expertise of the educators, b) it can also be developed based on the needs of students, c) the entrepreneurship curriculum can be analysed from the point of view of those who designed it, and d) evaluators and reviewers of the curriculum can influence the curriculum by making judgements on the curriculum content based on the pre-set criteria of programme quality and effectiveness.

*Enhancing Financial Support:* Financial support could be given to students in terms of loans to start their business and grow them while in school. Lack of finance has suffocated many business ideas before realising them.

*Encouraging Entrepreneurship Clubs:* Most universities do not have entrepreneurship clubs that will spur activities which can encourage entrepreneurial spirit among students.

*Building Prototype Businesses in Schools:* It is important that Entrepreneurship Centre build promising business projects where students can learn running businesses right in school.

*Mentorship:* Opportunities should be provided where students with potentials and idea are attached to proven mentor to help the actualization of the student dreams.

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*Infusion of Modern Marketing Skills into Curriculum:* It is very important to introduce students and business owners to the rigors of modern marketing using digital and social media. This will expose the business to places and people which will also ensure success of their ventures. This can be done by engaging all stakeholders, producing a clean copy of teaching manual. Training of trainers should also be organized.

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## Improvement of Quality Management and Performance of the Non-profit Organization Providing Social and Health Care

*Petr Bris, Jiri Patermann, Marie Cermakova*

### ABSTRACT

*This work presents an integration of two different approaches towards raising the performance of non-profit organization providing social and health care : the traditional benchmarking method and lean healthcare. Both of these approaches are demonstrated in the practical part of this work. Benchmarking helps identify potential performance gaps between the Czech organization Hvězda, o. s., and its partner NÖ Landes-pflegeheim St. Pölten Haus an der Traisen. The second part of a case study is based on lean healthcare principles applied within the Austrian organization. It focuses on a material flow optimization.*

**Keywords:** *benchmarking, lean healthcare, material flow, non-profit organization, optimal order size, quality management, reorder point.*

**JEL Classification:** M39

### 1 INTRODUCTION

The principal idea of this article is based on needs of cultivating non-profit sector, primarily oriented toward nursing, therapeutic, and hospice care. Since our society, (to become developed one) will be more often confronted with needs to offer a complex care for seniors, it is necessary to secure development of such organizations not just by an increase of subsidies, but mainly by proper managing systems and radical elimination of all, what is not bringing any value. For example wrong administrative procedures, high material reserves, not fully exploited employees potential. Such complex approach can bring not just significant cost savings, but can lead to a better quality of services (Pestoff,1995, Spear , 2005).

This work, based on the resourceful international cooperation of Czech organization Hvezda s.r.o. (Hvezda,2008) and Austrian NÖ Landes-pflegeheim St. Pölten Haus an der Traisen, has two goals:

The first goal is to assess the performance of both partnering organizations using the traditional benchmarking methods, where its theoretical core is based on American non-profit organization experience. The output of benchmarking research is the array of performance metrics, helping to particularize relative performance of benchmarking participants, and the situation analysis of each sector of performance.

The second goal is to apply principles of lean-healthcare philosophy to serve the optimization of the material flow in Austrian organization. Emphasis is mainly on precise analysis of processes and vain efforts identification.

The introductory part of work is considering the efficiency issues and approach toward their increase. Special attention is given to the progressive benchmarking methods and lean thinking, specifically to its newest evolutionary principle, a lean healthcare. Critical literary

research is processed by analytical-synthetical method and its theoretical solutions are formulated using inductive logic.

Thanks to the integration of two attitudes toward non-profit organization increase of efficiency, tested in this work, the practical part has unconventional structure. Analytical and solution sectors are directly part of benchmarking study and processes optimization project. As of method-ology, practical part is based on methods of analysis, synthesis, comparison, measuring, and ob-servations.

## **2 LITERATURE REVIEW**

### **2.1 Opportunities in raising performance and management quality of Non profit organization providing social and health care services.**

Non-profit organizations are, as of now, the neglected objects where the industrial engineering methods are not applied even when systematic reduction of costs and stress on services quality are offering huge potential for growth and cultivation of this economy sector. Another important characteristic feature, typical for non-profit organizations is their implicitly described mission, in contrast with market-oriented organizations where it is mostly profit maximization(Ford,1922). This (at the first sight not very important fact) can identify the activities which are bringing the value to their clients. But in non-profit organizations sector can, with no problems, identify all subjects closely bound to the organization functioning, their stakeholders such as the community, state, and mar-ket.

Non-profit organization is thus under influence of state or regional administration, which can significantly support its financing (grants, subsidies etc.) It must offer the services re-quested as a strain from communities and market demand with corresponding quality. Not least it is necessary to mention private organizations from the financial, market-oriented sector (businesses), serving the non-profit organizations with the sponsoring donations.

Actual attempts to implement industrial engineering methods by non-profit organizations can sig-nify (other than better processes efficiency inside given organization) the meaningful impact on the relationship with stakeholders. Taking into account contribution to the social mission of many non-profit organizations, it is the multiplication of benefits from processes optimization as well.

Saul(Saul,2004) is presenting some reasons why for the non-profit sector it is so difficult to apply the concepts or methods improving the processes efficiency, those long-term established, treated like proved and effective:

1. Many managerial operatives from non-profit organizations believe, that the industrial engineering methods are applicable only in the business world (Slinták,2013). Some of them are even afraid that the adoption and implementation of those methods, leading to higher productivity can transfer their organization to the profit-making business entity and thus bring the defor-mation the original mission. (Saul is using for this phenomenon a word corporatizing.).

2. Frequently the concern of managers in the non-profit sector is the expected possibility of the financial cost of processes optimization. In other words: How we can think about improvement when we are fighting for simple survival?

The above-mentioned reasons are implicating a high level of distrust from the organization staff toward potential initiatives of industrial engineering methods into non-profit

organizations environment. This important resistance toward any changes is coming from the strongly rooted general society image, that anything non-profitable cannot become efficient or the other way around (Slintak, 2015)

## **2.2 Approach toward efficiency of non-profit organizations and opportunities for improvement**

The efficiency of an organization can be defined as the quantified expression of those activities/processes, which can provide their objectives fulfilling (Keehley, 2008, *IT & ITIL, 2006*). Šiška is defining the efficiency accenting the fiscal dimension. „Organization efficiency is the volume of values created during a certain period of time. (...)” (Šiška, 2005). On the other hand, U. S. Agency for International Development implementing projects of health-care improvement in third-world countries is enriching the efficiency definition with the dimension of quality: „Efficiency is the actual quantity and quality of provided work”. (Methods & Tools, 2005).

For purpose of this article, the efficiency will be delimited as the definition of fulfilling the objectives of given subject during the defined time. This definition is valid for non-profit and business sectors as well, it is implicitly defining the request for quality.

A necessary condition for performance management is the definition of performance indicators, metrics.

Učeň (Učeň, 2008) is structuring metrics according to the following criteria:

- Hard (exactly measured data) vs. Soft (the ones which cannot be measured objectively, such as level of employees satisfaction.)
- Internal (defined by the organization) vs. External (defining the involvement of organization external environment).
- Financial vs. Non-financial (procedural).

Financial metrics is the traditional tool to measure the organization performance management as of its fiscal perspective. Such categories of metrics are for example liquidity, rentability, a level of debt or trend indicators.

Financial metrics system is proving to be for the organization performance measuring or its improvement as completely insufficient one and in some aspects even dangerous. Imperfections of fiscal accounting initiated the formation of its new concept, lean accounting, integrating the advantages of fiscal and processing metrics. In detail, those issues are published in work of Maskell a Baggaley *Lean Accounting: What's It All About?* (Maskell, 2005).

Another dimension of organization performance assessment is processes-driven metrics which are based on processes of organization management.

In this work the processes-driven metrics will be exploited in its complexity, it means as the indicator of efficiency measuring and processes quality or their groups.

Frequently another and different perception can be seen, where the processes-driven metrics are by authors treated as selected current running processes only. (For example in IT and telecommunication technology sectors (ITC) in the policy about Service Level Agreement are as a standard mentioned three metrics types: processes-driven, qualitative and service-driven.) (Padrta, 2005).

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Volek (Volek,2005), (according to Nenadál)(Nenadál,2004), is distinguishing the following metrics for processes efficiency (selected universal indicators of efficiency measuring):

- Running time of process
- Efficient use of process period
- Total cost of process
- Efficient use of costs
- Share of variance in process
- Added value, by process

In the discourse of system engineering the productivity is perceived as the combination of efficiency and effectiveness in relation to the certain period of time (Maartens ,2007).

Definition of quality, as one of the attributes of efficiency of evaluated process, is for the purpose of this work based on very limited approach, as of the following definitions:

(Keehley, 2008): „Quality is the level of rate of errors or a level of fulfillment of customer demands“ This simplification is based on requirements of quantification, needed for potential regulation of selected process, so-called principal expression of quality characteristics. About the significance of this definition testifies the fact, that it is containing two attitudes toward quality

ty, method Six sigma („Number of defects per million opportunities.“) (*Motorola,1994*) and standard ISO 9000 („Degree to which a set of inherent characteristics fulfills requirements.“) (*Software,2008*).

As of Raising performance concept in a non-profit organization is the principal expression of quality fully sufficient.

### 2.3 Benchmarking and Lean thinking

According to the International Benchmarking Clearinghouse, benchmarking is introducing a systematic and continuous process of measuring and comparing processes to raise the organization efficiency(Široký,2004).

In 2003 benchmarking was by U. S. Office of Management and Budget recommended to the local authorities as a promising tool allowing the cultivation of public sector economy.

Characteristics of US healthcare sector are non-functionality and enormous costs. Efforts to improve the non-efficient American healthcare system can be viewed as the beginning of new, evolutionary level of lean thinking, mentioned in literature as a lean healthcare.

The first application of lean thinking principles in healthcare sector came not until 90's, when some US hospitals, thanks to the association with Michigan car manufacturer, begin to use lean methods to improve their efficiency (Van Der Linden,2006). Kanban is often referred to as the "nervous system" of lean production.

Kanban is a key technique that determines a processes production quantity, and in doing so, facilitates JIT production and ordering systems. Contrary to more traditional "push" methods of mass production which are based on an estimated number of expected sales, kanban's "pull" system creates greater flexibility on the production floor, such that the organization only produces what is ordered. (Leopold & Kaltenecker 2015)

### **3 METHODOLOGY**

#### **3.1 Processes-driven metrics in healthcare institutions**

Based on demands of raising performance level from health and social services sector a specific set of metrics was developed, which indicates the level of efficiency (baseline), or when necessary, the difference from the best metrics of other organization (benchmark).

Such set of metrics, (when the performance will be measured as valid and reliable) is the headstone of any activity during the efforts of performance increase.

Under the patronage of non-profit organization specialized on the improvement of healthcare services around the world, the Institute for Healthcare Improvement (IHI), were finalized 13 Whole System Measures (WSM) reflecting today dimension of health care quality according to the Institute of Medicine (IOM) — see Tab.1.(Martin,2007).

IHI regulated value for each of the 13 metrics, defining the world class organization. Thanks to such approach similarity with the strategic corporate managing of Toyota Corp. we are talking about Toyota Specification. Managers can thus recognize how close or distant is the institution from the excellence status. This way implicitly it is expressed a need of fifth principle of lean thinking according to Womacka(Womack,2003) in (Graban,2008): Assertion of perfection using permanent improvement.

#### **3.2 Applications to improve the quality of management and efficiency.**

In the following Tab. 1 all potential applications (concepts) are summarized, which are aimed at raising performance level either with the performance or quality accent. For purpose of this article a detailed discussion about all mentioned application is not relevant, as of their relation to the defined criteria. It is recommended to use Tab. 1 as the most simplified (but not distorted) research of expert literature(Hunčová,2007), (Nielsen,1998),(Convis,2007)), (Ohno,1988), (Keyte,2004), (Palová, 2007). Next, using the criteria rating, two of most suitable attitudes for raising the performance level of non-profitable organization are selected, described in detail in following chapters.

As it can be seen on Tab. 1, the most suitable applications for raising the performance level of non-profit institutions according to the selected criteria are benchmarking and a concept of lean thinking.

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**Tab.1** - Criteria rating of potential applications for raising performance level of non-profitable institutions (own work)

Criteria	ISO standards	Model CAF	Benchmarking	Balanced Scorecard	Lean thinking
Requirements for organization readiness	High	Medium	Medium	High	Medium
Costs of implementation	High	Low	Low	High	Low
Demands on administration	High	Medium	Low	High	Low
Accent on efficiency	Medium	Low	Medium	Medium	High
Accent on quality	High	High	Medium	Medium	High
Accent on continuous improvement	High	Medium	High	Medium	High
Summary	4.	3.	2.	5.	1.

## 4 DATA

### 4.1 Identifying Critical-To-Quality efficiency factors (CTQ)

The main goal of this work is to raise the performance level of partners by benchmarking, in Hvězda (CR) a Haus au der Treisen as of their management, as of financing and care for partially or completely handicapped seniors and heavily impaired persons, permanently or shortly living in the residential institution.

**Tab.2** - Definition of performance metrics in system management (own work)

Code	Metric name	Definition	Metric type	Classification according to IOM
A 1	Management efficiency	<i>Average number of employees during the given period/Average number of managers and administrative staff during the given period [Employee/1 manager or administrative]</i>	Hard, processing	Efficiency
A 2	Fluctuation of employees	<i>Total number of employment terminations during the given period of time x 100 / Average number of employees during the given period in %</i>	Hard, processing	Safety
A 3	Employees satisfaction	<i>Average relative number of answers with the results as a) Satisfaction with working position b) Satisfaction with working environment c) Satisfaction with the position among co-workers [%]</i>	Soft, processing	Safety
A 4	Employees education	<i>Cost of employees education/Total cost of employees education during the given period of time/Total institution personal cost; [%]</i>	Hard, processing	Efficiency
A 5	Quality management use	<i>Orientation toward customer, employee, toward processes, improvement, leadership, suppliers and measuring [%]</i>	Soft, processing	Orientation toward patient

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As the possible CTQ of efficiency are identified the following areas or processes inside the organization, divided according to their importance and susceptible to the organization management. Definition of performance metrics can be seen in Tab. 2,3 and 4.

**Tab.3** - Definition of performance metrics in financial managements (own work)

Code	Metric name	Definition	Metric type	Classification according to IOM
B 1	Inferiority on local administration	<i>Financial resources from local administration during given period/Total financial resources during given period [%]</i>	Hard financial	—
B 2	Donations	<i>Financial resources from donations during given period/Total donation resources during given period [%]</i>	Hard, processing	—
B 3	ROA (Return on assets)	<i>Financial results for given period /Assets for given period[%]</i>	Hard financial	—
B 4	ROA (Return on assets) for 1 patient care	<i>Financial results for given period /Total cost for given period [%]</i>	Hard financial	—

**Tab.4** - Definition of performance metrics in care (own work)

Code	Metric name	Definition	Metric type	Classification according to IOM
C 1	Care performance	Average harmonized number of clients for given period/2 / Average number of selected group of care service staff for given period 3 [Harmonized number of clients/1 care service person]	Hard, processing	Efficiency
C 1.1	Care performance / physician	Ditto; [Harmonized number of clients/1 physician]	Hard, processing	Efficiency
C 1.2	Care performance/nurse	Ditto; [Harmonized number of clients/1 nurse]	Hard, processing	Efficiency
C 1.3	Care performance /caretaker	Ditto; [Harmonized number of clients/1 caretaker]	Hard, processing	Efficiency
C 2	Client financial participation	Average share of client pension on care for given period(Total cost on given period/average harmonized number of client on given period [%])	Hard, processing	Fairness
C 3.1	Client comfort	Number of single-bed rooms /Total number of rooms[%]	Hard, processing	Quality
C 3.2	Client comfort	Total rooms surface area/ Average number of clients during given period of time [m <sup>2</sup> /1 client]	Hard, processing	Quality
C 4	Client satisfaction	Positive answers frequency regarding social and healthcare services [%]	Soft processing	Quality



## 4.2 Benchmarking studies assessment

### *CTQ System of management*

As of a critical factor of management performance(see tab. 5) it is not possible, due to the missing data to asses the metrics which are typical for employees level of education and satisfaction. Very interesting results are presented by Management performance metrics, indicating a relatively low level of performance by managing and administrative staff in Hvezda organization, about 80 % less than by Austrian partner. Reasons fro such situations is possible to seek either in the managing the tasks as one and employees level of qualification and ability and proper architecture of information, integrating main processes with the managing ones. Austrian organization is using for processes management the ERP system information system, based on SAPu, but this is not the case with the Czech organization. Austrians, in addition, adopted the *job enlargement* method, where one employee is able to perform more tasks, in words of processes management, he owns more processes.

**Tab.5** - Definition of CTQ of management performance(own work)

Code	Metric name	Unit	Hvězda	Haus an der Traisen	Performance deficit (in absolute values)
A 1	Management efficiency		3,43	<b>17,5</b>	14,07
A 2	Fluctuation of employees	%	<b>2,76</b>	13,5	10,74
A 3	Employees satisfaction	%	50	n/a	—
A 4	Employees education	%	n/a	0,39	—
A 5	Use of quality management	%	<b>60,42</b>	44,83	15,59

On the other hand the Hvezda organization very positive results are coming with the Employees fluctuation level and Use of quality management. Question, if the missing observation of employees satisfaction can result in their high level of job fluctuation is thus actual. This fact can be supported by low level of Quality management principles (44,83 %.)

### *CTQ Financial management*

Metrics, where their goals are to define the critical factor of efficiency, the performance of *Financial management*,(see tab. 6), are confirming a better financial management byCzech organization. From structure nor the nature of metrics cannot be stated with certainty if a better financial performance in Hvezda is due to the elimination of costs, which can or cannot bring the value to the clients.

**Tab.6** - Definition of metrics CTQ, Financial management (own work)

Code	Metrics name	Unit	Hvězda	Haus an der Traisen	Performance deficit
B 1	Inferiority on local administration	%	<b>36,64</b>	68	31,36
B 2	Donations	%	<b>3,29</b>	2	1,29
B 3	ROA (Return on assets)	%	<b>-3,20</b>	-8,47	0,1
B 4	ROA (Return on assets) for 1 patient care	%	<b>-1,25</b>	-15,76	14,51

A Higher level of inferiority on local administration of Austrian partner is due to its legal form, as a state contributory organization. It could be interesting to test the potential correlation level of the quality management application with the profit level of one client care or alternatively with the donation system.

The great importance of the organization economics could be the level of financial autonomy, which is not existent in the case of Austrian partner. Even the employee responsible for financial and economic agenda is engaged part-time only, which could implicate uncertain presentation of Austrian organization financial results. Hvezda association is using the special economic department. Cannot this way the low-level of a performance of Hvezda management be „redeemed“ by better results of financial management?

To assess the results of this critical factor in absolute measures (as a ROA value, for example) it is not relevant for purpose of this article.

### *CTQ Care*

Austrian organization is achieving very good results in metrics defining clients comfort (see Table 7).

It is due to the domination of single-bed rooms and higher space level of two-bed rooms. In Hvezda single-bed or two-bed rooms are the same as of their surface, in some cases, clients are even in rooms with three and more beds. The main reason for this difference is the fact, that the Austrian building was specially built as a care-taking and therapeutic one, on the other hand, the Czech institution is using former offices building.

Hvezda is standing out in the performance of care and many times is thus exceeding the Austrian partner. The reason of such condition is most probably the grouping of clients according to their level of reliance, which is bringing great savings in a number of personnel needed.

**Tab.7** - Definition of performancemetrics in care (own work)

Code	Metrics name	Unit	Hvězda	Haus an der Traisen	Performance deficit
C 1.1	Care efficiency / physician	Harmonized number of clients/1 physician]	<b>185,83</b>	70,17	115,66
C 1.2	Care efficiency/nurse)	Harmonized number of clients/1 nurse	<b>27,88</b>	6,79	21,09
C 1.3	Care efficiency /caretaker	Harmonized number of clients/1 caretaker	<b>15,93</b>	6,19	9,74
C 2	Client financial participation	%	47	<b>27</b>	20
C 3.1	Client comfort	%	39,12	<b>59,30</b>	20,18
C 3.2	Client comfort	m <sup>2</sup> /1 client	12,38	<b>19,52</b>	7,14
C 4	Client satisfaction	%	93,75	n/a	—

In Haus an der Traisen clients are located without difference of their level of reliance, nurses and caretakers are overloaded with the varying demands and needs of clients.

Another significant difference, indicated by client financial participation metrics is the level of financial affordability of offered services. When Austrian clients are participating on costs by 27 %, clients of Hvezda are paying 47 %. Importance of this metrics is in the great part influenced by legal form of organization (State contributory organization Haus and der Traisen versus Private association Hvezda.)

#### 4.3 Project of optimization of material flow concept of lean thinking

The theoretical core of the project is the application of lean healthcare principles into the envi-ronment of State contributory organization Landes-pflegeheim St. Pölten - Haus and der Traisen in Austria. Selected sector for optimization of material flow inside the organization was, by reason of easy identification, the potential dissipation (muda), unevenness (mura) and irration-alities (muri).

The methodical core of the project is the application of Deming dynamic model PDCA (Plan-Do-Check-Act).

Healthcare material, which is the object of processing optimization can be divided into 3 groups as of the frequency of deliveries according to the contracts with the suppliers.

- Material delivered 1x/week

The quantity of material from total need about 55%.

- Material delivered 1x/month

The quantity of material from total need about 35%.

- Material delivered 1x/3 months

The quantity of material from total need about 10%.

Material is registered and ordered using SAP information system, operated by head nurse and it is stored separately on each floor (station.)

Next steps of analysis and the following optimization are use of a first material group which, thanks to 55 % share on total organization needs and weekly deliveries are offering a bigger space for elimination of dissipation, and refining the material flow irregularities

Every Saturday the assigned nurse is checking if it is necessary to order any material item. No precise point is defined indicating the minimum quantity and need to order new items. If she de-cides that a quantity is not adequate for next week needs, a written note is passed to the head nurse, ordering the items with SAP system. Volume quantity thus depends on nurse estimate.

Ordering is done in bulk, every Tuesday. The average time for delivery is 4 days. Invoices, finan-cial and material matter for all 4 stations are the sole responsibility of head nurse assigned by an organization.

#### ***4.3.1 Determining the optimal quantity of ordered material***

The solution leading toward material flow optimization is to change the main reason, when the size of order cannot be estimated, but defined exactly, with the date of ordering as well. Next, the visual standards must be implemented, significantly alleviating ordering and thus preventing unnecessary errors.

To define the optimal quantity of items ordering, the stochastic methods of modified fixed time interval and ordering point are applied. The reason for their application is to develop a system of supplies which in the right time, thanks to the elements of visual management, will indicate the need for ordering defined quantity of material. In other words, it is the implementation of Single-Card Kanban.

The specific of the following solution is a high level of supply reserve since the insufficient quantity of the healthcare material can cause a danger to human health.

The definition of optimal order level is based on a model of *fixed-order-interval*, since the existing constant ordering interval with the weekly periodicity(*Inventory*, 2003).

$$\text{Optimal quantity} = \bar{d}(OI+LT) + z_{1-\alpha}\sigma_d\sqrt{OI+LT} - A$$

where  $\bar{d}$  = average daily quantity;  $OI$  = order interval,  $LT$  = lead time,  $\sigma_d$  = determinant of daily consumption deviation  $A$  = quantity in stock at the moment of ordering.

Since it is simultaneously required that the ordered quantity is fixed, a formula of fixed-order-interval must be modified as well. Protective interval defined as a sum of order interval and lead time could in a case of fixed order quantity and fixed order interval lead to the growth of stock, resulting in above-described problems. The request for continuous re-count of unused material items ( $A$ ) is in contradiction with the project goals as well.

To calculate the optimal order quantity, invariable in time, a following modified definition will be used, assuming the variable demand:

$$\text{Optimal volume of order} = \bar{d}OI$$

Next, we calculate the volume of supply reserve:

$$\text{Supply reserve} = z_{1-\alpha}\sigma_d\sqrt{OI}$$

where  $z_{1-\alpha}$  is a Quantilian of standardized normal distribution, expressing the situation probability, when demand is not exceeding the supply quantity, so-called operational level. When the level of significance  $\alpha$  is 0,05; than the quantile  $z_{0,95}$  is equal to 1,645 (World, 2008).

#### Specifying the Re-Order Point

To specify a point of ordering a model of *Re-Order Point* (ROP) is used, based on the variability of demands, order interval, running lead time and level of services. It is determining such volume of stock, which triggers a new order.

A solution of this part of the project is assuming the constant demand extent, its variability is refined by definition of supply reserve as of previous formula and constant running lead time.

Re-Order Point is defined by formula:  $ROP = d\bar{L}T$

#### Specifying the optimum order volume and Re-Order Point

Preliminary stage means the statistical analysis of gathered data, which can characterize the consumption of selected stock items. Monitoring of healthcare material was performed during 14 days period. Worksheets were prepared to record each item-dispensing from the stock room.

Initial order interval is 7 days and running lead time is 4 days

When the stock items are surpassing the 30 % deviation, it is necessary to balance the items quantity using longer order interval. This way for each selected material item was defined the optimal order volume and new order interval. Implemented pilot study reliable documented that by specifying optimum order volume for each stock item and at the same moment the Re-Order Point definition, the expected optimization of material flow was achieved.

Benefits of this arrangement are:

equalization of ordered material volume

clear definition of ordering periods

reduction of idle operating capital blocked by stock items by 62,09 %;

reduction of stock items averages volume by 61,33 %;

implementing the system of material flow management in the organization supply room is financially very modest

## 4.4 Implementing Kanban system

### *Standardizing storage*

With the selected material item the standardization of storage is performed by use of visual tools, colored sticking tapes. Using the analysis as described in previous part (optimum order volume, order interval, volume of supply reserve and Re-Order Point) can be defined the permanent stock volume.

Commonly used material represent the optimum order volume. It is stored with regard to the Re-Order Point, signaled by the green tape.

To inform workers how and in what quantity the material should be stored, it is necessary to form a standard for each item, a small label firmly attached to the assigned storage space.

### ***Developing Kanbal card***

Another step during the implementation of a simple supply management is to develop a Kanbal card, which will signal the need for new order and simultaneously functioning as the information media, defining volume and periodicity of new orders.

When the worker responsible for supply process is taking the last unit before the Kanbal card, he must move the card to the assigned Kanban box, which is periodically controlled. Only using submitted Kanban cards the new orders can be introduced to the system. After the ordered item is received and registered, the Kanban card is returned to the standardized assigned position. A cycle is thus closed.

## **5 RESULTS AND DISCUSSIONS**

We will deal with the results of our research in this part of the contribution. As it was mentioned the FBA World Innovation Index consists of six modules. Firstly, we will describe results which were obtained in each module separately.

### **5.1 Benchmarking study**

Realized benchmarking study was comparing the efficiency of both partnering organizations in specific fields, based on a design of efficiency metrics, processing, and financial ones. Analyzing the critical factors, (CTQ System management, CTQ Financial management, CTQ Care) the areas of lower-than-average efficiency or with the absolute value of any metrics being lower-than-average were identified.

Using the method of traditional benchmarking the most suitable areas of optimization were defined:

NÖ Landes-pflegeheim St. Pölten Haus an der Traisen (Austria)

Employees satisfaction

Quality management

Record keeping

Donorship

Cost efficiency

Care efficiency

Clients satisfaction

Hvězda, o. s. (Czech Republic)

Administrative and managing processes

Organizing the administrative staff work

Quality management system

Donorship

Cost efficiency

Clients comfort

A general framework was proposed to eliminate the performance gaps. Such output is simultaneously taking into consideration future benefits and costs of proposed measures.

Analyzed organizations are thus supplied with the relevant study, clearly answering three important questions: What to improve? Why improve? How to improve?

## **5.2 Project of material flows optimization**

A project of material flow optimization in the Austrian organization was directed toward elimination of waste in a form of high stock volume, unnecessary movement of employees and mistakes related to the orders entering the information system. Next project goal was to clear the fluctuation of healthcare material volume using equalization of stock quantity in floor supply room and in the patient ward as well.

The proposed solution for material flow optimization was the implementation of one-card Kanban system combined with the visual management one. Such a way of material flow management was formulated using realized pilot study, where its results fulfilled defined criteria and can be interpreted as follows:

- reduction of working capital blocked by stock by 62,09 %;
- Reduction of average quantity of stored material by 61,33 %;

Another important benefit of this project is the equalization of ordered material quantity and clear definition of recurrent periods of orders, which is contributing to a smooth material flow and better workplace arrangement.

Proposed form of material management is comprehensible and in principle very simple, securing its long-term sustainability.

## **6 CONCLUSIONS**

The environment of non-profit organizations sector is not yet the usual field of active industrial engineering activity. Such situation is caused not just by lack of cooperation of non-profit organizations sector with the business or academic institutions, but mostly by poor understanding of projects which can lead to the raised performance. Corporate culture together with managers approach in many non-profit organizations is not allowing the identification of areas needed to be enhanced, increasing their efficiency, productivity, and quality of processes.

The aim of this work was to apply selected methods and/or concepts which can lead to a dramatic increase in the healthcare and welfare organizations performance. Based on literature exhaustive and critical research, two approaches were selected: traditional benchmarking and concept of lean healthcare. Their application during the international project of Czech organization Hvězda, o. s. and Austrian NÖ Landes-pflegeheim St. Pölten Haus an der Traisen represent the partial goals of this expert work.

Benchmarking study results confirmed the rightness and future of the broad use of benchmarking in the non-profit sector. Not only it is bringing structured evaluation of the performance of both partnering organizations and situation analysis, but is clearly defining the areas of needed attention and alternatively, the processing optimization.

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This way is de facto, eliminated the management unwillingness toward changes („but elsewhere it goes better") and intended projects of improvement are becoming easily intelligible (we know what and why to improve").

For example, thanks to the benchmarking study, it was discovered that Czech management performance is 1/5 of the Austrian organization performance, which, for guiding their processes is systemically using the information technology and continuously extending their staff competency (*job enlargement*).

The second part of this work was aimed toward material flow in Austrian organization. After a detailed analysis of current status of material flow the wasting was identified as the oversized material stock, unnecessary staff movement and mistakes related to orders entering the information system.

The proposed solution of material flow optimization was the implementation of one-card Kaban system combined with the Visual management. Such new way of material stock managing was formulated using realized pilot study, contributing to the reduction of working capital blocked in stock, optimizing the quantity of stored material, equalization of ordered quantities and clear definition of ordering periods. All of this with the minimum investment.

This work precisely demonstrated needs of combining the managerial tools to guide and stimulate the efficiency of a non-profit organization. Benchmarking in its nature represents more detailed and longer meta-cycle of improvement implicitly contains a need of lean-thinking methods. Such empirical methods as 5S, Visual management etc. can be defined as general promising practice with their origin in Toyota Corp.

The main asset of this work was to integrate two seemingly different tools, concepts, leading to an increase of services quality, selected processes efficiency and clients satisfaction. This way a synergy effect was reached, emerging from the comprehensive approach toward raising efficiency solution.

The study outlined some new possibilities in process of cultivating performance of non-profit organizations sector, the ones of healthcare and welfare domains. It demonstrated the sophisticated managerial tool existence which with minimum investment are allowing significantly raised performance, thus opening the space for coming research efforts related to engineering methods use in sectors others than industrious well.

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## How Computer Help the Organizational Memory in the Failure Learning? A Case Study on A Japanese Company

*Sanetake Nagayoshi, Jun Nakamura*

### ABSTRACT

*Why does organization repeat failure? Indeed, fatal failure has been repeated. Most managers in organization, however, know importance of learning from failure since it leads them improve their business performance. One of the reasons is said to be poor organizational memory. Inadequate organizational memory causing incomplete recall does not well contribute to accurate learning.*

*There is a unique company, which has succeeded in establishing their way to leaning from failure. Executing the learning activity, they have not repeated same failures which were once reviewed with their way. Eventually they have maintained good business performance.*

*We, in this paper, studied a case of organizational learning from failure in the Japanese company and explored acceleratory factors in the process of organizational memory in the learning. We found that “Computer based memory” like knowledge repository augments “hard memory” like written rule, scripts, routine work and so on, but may inhibit “soft memory” like human memory in the organizational learning from failure in the company. We also found that “hard memory” is more effective than “soft memory” in the company.*

**Keywords:** *Learning from failure, Organizational learning process, Organizational memory, Computer based memory, Acceleratory factor*

**JEL Classification:** D22

### 1 INTRODUCTION

Why does organization repeat failure? Indeed, fatal failure has been repeated (Hatamura, 2005). Most managers in organization know importance of learning from failure since it leads them improve their business performance. According to Madsen and Desai (2010), organizations learn more effectively from failure than successes, that knowledge from failure depreciates more slowly than one from success, and that prior stocks of experience and the magnitude of failure influence how effectively organizations can learn from various forms of experience. Huge money is invested on organizational learning from failure in some organizations, and many of them however are poor at and still have been struggling with it (Edmondson, 2002).

One of the reasons seems to be poor organizational memory, why many organizations have not succeeded in organizational learning from failure. Inadequate organizational memory causing incomplete recall does not well contribute to accurate learning (Starbuck, 1984; Huber, 1991).

There is a company in Japan, which enjoys successful organizational learning from failure. According to the chairperson and the president in the company, they have never repeated

same failures which were reviewed through their own learning system. And eventually they have kept good business performance since they established the system.

Nagayoshi and Nakamura (2014; 2015a;2015b;2015c;2016a;2016b;2016c;2016d) explore keys for success in the organization learning from failure. They suggest that one of the inhibitory factors for successful organizational learning from failure in the company is feeling of shame, and suggest that the inhibitory factor is reduced by altruism, personal growth intention and sympathy toward faulting employee. In the arguments, the organizational learning from failure is seen as a single process although the process includes some sub processes. Hence there lacks detail arguments about acceleratory and inhibitory factors in sub process level of organizational learning from failure.

Employing Huber (1991) in this paper, we define a process of the organizational learning from failure in the company. And we focus on the organizational memory process to study acceleratory factor.

## **2 LITERATURE REVIEW**

We, in this chapter, review existing studies related to learning from failure. Then we regard learning from failure in organization as organizational learning so that we also review organizational learning process. And also we study acceleratory factors and inhibitory factors in knowledge sharing because organizational learning begins with knowledge sharing for knowledge acquisition.

### **2.1 Learning from Failure**

Hatamura (2005) defines failure as “a human act of not reaching the defined goal,” “an unfavorable and unexpected result of human act.” And it is also indicated that there is an invaluable failure which means “an unavoidable failure even with extreme caution” and a non-valuable failure which means “a failure other than invaluable failure.”

Organization as well as individual can fail, and most organizations may have failure experience. Madsen and Desai (2010) say that organizations learn more effectively from failure than successes, that knowledge from failure depreciates more slowly than one from success, and that prior stocks of experience and the magnitude of failure influence how effectively organizations can learn from various forms of experience. It is important to learn from failure to prevent from repeating failure you once experience since it can improve your business performance.

You share your failure experience with your colleague to achieve organizational learning from failure. You sometimes cannot do well with knowledge sharing due to inhibitory factors. Many people tend to hesitate to share failure because of disadvantage and mental barrier. Most organizations, in general, are therefore poor at learning from failure (Kanno, 2014; Cannon and Edmondson, 2005). Even if company spends a lot of money, they still struggle with learning from failure (Edmondson, 2002).

### **2.2 Organizational Learning Process**

Learning from failure is a sort of knowledge creation activity since it generates new knowledge to avoid repeating same failure. Nonaka and Takeuchi (1995) propose SECI model as knowledge creation process. Argiris and Schon (1978) suggest single-loop learning

and double-loop learning as organizational learning process. They unfortunately could find no example of organizations which learned in such a double helix process.

We also see the learning from failure activity as experimental learning. Kolb, Boyatzis and Mainemelis (1999) shows four stages cycle composed of Concrete Experience, Reflective Observation, Abstract Conceptualization, and Active Experimentation as experimental learning cycle. Huber (1991) reviews to evaluate literatures as to organizational learning and shows a comprehensive organizational learning process which is composed of four sub processes like Knowledge Acquisition, Information Distribution, Information Interpretation and Organizational Memory.

### **2.3 Acceleratory Factors and Inhibitory Factors**

Chang and Chuang (2011), Wang and Hou (2015) and Chung, Cooke, Fry and Hung (2015) suggest that reputation and altruism are extremely precious rewards for people to encourage to share their knowledge. Lin (2007) examines the role of both extrinsic motivator and intrinsic motivator in explaining employee knowledge sharing intentions. We can, in general, summarize that it is claimed that intrinsic knowledge sharing motivation is more effective than extrinsic knowledge sharing motivation for successful knowledge sharing behavior (Brock, Zumd, Kim and Lee, 2005; Deci and Flaste, 1995). Bowling, Eschleman, Wang, Kirkendall and Alarcon (2010) find Organization-based self-esteem OBSE generally yielded stronger relationships with work-related variables than did general self-esteem.

Huber (1991) suggests, through comprehensive literature review in organizational learning, that organizational learning is composed of four constructs and processes and shows acceleratory factors and inhibitory factors. These are, for instance, good hard and soft memory, and computer based memory as acceleratory factor in the organizational memory process.

## **3 RESEARCH QUESTION**

We, in this paper, explore to find acceleratory factor in organizational memory in organizational learning from failure. The rests of organizational learning process like knowledge acquisition, information distribution and interpretation are discussed in other paper.

Research Question (RQ): How do they accelerate organizational memory in the organizational learning from failure in the company?

## **4 RESEARCH METHOD**

We employ one case in an engineering company in Japan. In the company, they established a system to learning from failure and have never repeated same failures once they reflected through it. Eventually they maintain good business performance. This may be a rare case, but we claim that it is significant to study a successful case of organizational learning from failure since most organizations struggle with it. The president in the company is willing to show us their failure experience and their learning from failure initiative. Thus we have decided to study the case carefully.

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The case data is collected through our multiple interviews to multiple executive managers and employees. It keeps triangulation for ensuring accuracy of data collected through interviews.

In addition, we also conduct a questionnaire survey for managers and employees in the company and analyze the collected data through structural equation model with a statistic software. We build hypotheses, employing organizational learning process (Huber, 1991), to answer the question beforehand and verify the hypothesis by the analysis of the collected data.

## 5 CASE

The case data was collected through ten interviews involving twenty employees, conducted by the authors. The interviews were conducted from July 2014 to January 2015 in Japan. We conducted triangular and multiple interviews with open-ended questions to ensure accuracy.

The company name is Sangikyo Corporation, in which ‘Hansei-juku’ is the activity for the organizational learning from failure. The full story of this case is also introduced in the previous papers (Nagayoshi and Nakamura, 2014; 2015a; 2015b; 2015c; 2016a; 2016b; 2016c; 2016d) in detail. We however describe the summary of the story for the sake of readers’ better understanding.

The company was established in 1965, which has provided engineering service for wireless telecommunication companies in Japan and other service companies not only in Japan but also outside Japan. They have been a sub-contractor of blue-chip companies but they recently have become a primary contractor of their customers in the wireless telecommunication industry.

It has rapidly changed technology in the industry, and they have been a leading company, which has the newest technology in order to be engaged with their customers. But a new technology sometimes leads them a fault because they do not get used to handle the new technology. And their customers know that a new technology sometimes leads them a fault, thus they are condoned with a first fault with the new technology. Since they are not , however, allowed to make second fault with the technology, it is important for them to learn from the fault in order to prevent themselves from repeating the fault. In other word, they must not repeat same faults to maintain their business with their customers, and they have to establish their concrete operations to deliver their business. And they started ‘Hansei-Juku’, their organizational learning activity from failure, in 2005 to achieve not to repeat failures.

According to the president in the company, they have never repeated same failure which they reviewed through the learning activity. And they have maintained good business performance since they started the activity.

If an employee make a defect which may lead the company failure, he/she must notify the defect company executives through their knowledge sharing platform. Defect includes profit Loss in a significant big project, project delivery delay, client complaint due to a fake report, human errors such as fault shut down of electric power and fault cable cut. They organize a task force team for repeat prevention to review the defect in case that it is so significant that they can fail. And they appoint the employee, who make the defect, as the leader of task force team to review the defect, although it is common that a third-party person who stands in a neutral position is appointed as a leader in such an activity. The task force team reviews the defect, analyse it and makes a countermeasure for repeat prevention. The leader writes a

detail report which includes the fact, the analysis and the countermeasure. And the report is opened to all the employee in the company through the knowledge sharing platform.

We here mention their appraisal system. The employee who make a fault has a negative evaluation in the meantime, but he/she can sometimes be awarded unless the same fault repeated for a while.

The chairperson in the company often encourages employees in the company positively to be involved the learning activity, with the following message;

*“Even if we lost 50million yen in this project, we should learn something from this project. I could believe it success if we lost 30million yen in a next project, because we could improve by 20million yen by learning from this project.”*

## **6 HYPOTHESIS**

We make a hypothesis to do an empirical study, employing an organization learning process (Huber, 1991).

### **6.1 The Process of the Learning from Failure**

Employing Huber (1991), we can reach a clear view of the process of the learning from failure in the company. First, they do task force activity, in which detail process data to result in a failure is shared among task force team members, and analyze to figure out reason and countermeasure. This is recognized as the Knowledge Acquisition. Second, they create a report to describe their leanings to deploy. This is the Information Distribution. Third, employees read the report disclosed through their knowledge sharing repository to learn something to avoid the failure. This is the Information Interpretation. Finally, the employees employ the learnings to execute their own task when they do in the next job. This is the Organizational Memory.

### **6.2 Acceleratory Factor**

We focus on the Organizational Memory in this paper and explore acceleratory factor in this process. Employing Huber (1991), we hypothesize acceleratory factors. Huber (1991) suggests that organization memory is accelerated by ‘hard memory’ like routine basis process and scripts, ‘soft memory’ with manager and employee, and computer based memory. We show Hypothesis for the Research Question.

Hypothesis: Hard Memory, Soft Memory and Computer Based Memory accelerate Organizational Memory in the learning from failure in the company.

## **7 ANALYSIS**

We conduct a questionnaire survey and a covariance structure analysis to verify the hypothesis in this chapter.

### **7.1 Quantitative Data Collection**

We also conducted a questionnaire survey from September 14, 2015 to October 6, 2015 in the company. We asked 900 employees, which included contractors at that time, to answer the



questionnaire through designated secure webpages on the Internet. The questionnaire was composed with 78 questions for verifying the hypothesis, in which participants selected a number from -3 (Strongly disagree) to +3 (Strongly agree) composed as Likert scale. As a result, 829 employees in the company responded the questionnaire, which meant we achieved a response rate of above 92%.

## **7.2 Quakitative Data Collection**

Verifying the Hypothesis, we conduct a covariance structure analysis with IBM SPSS Version 24.

We define the latent variable of “Organizational Memory” is composed of three observed variables, which are “I must pay attention,” “Colleague prevents themselves from same defect,” and “It is essential to achieve job.” We also define the latent variable of “Hard Memory” is composed of three observed variables, which are “It helps to practical job,” “It provides me improvement points,” and “It helps to establish concrete system.” And, we also define the latent variable of “Soft Memory” is composed of three observed variables, which are “Supervisor recommends me to read,” “Colleague recommends me to read,” and “It is common behavior among us.” Moreover, we define “Computer based Memory” as a dependent observed variable, which is “I know the repository.”

The estimation result of Model indicates an acceptable level of fitness ( $\chi^2=184.687$ ;  $\chi^2/d=5.771$ ; CFI=.919; RESEA=.076). It shows both of “hard memory” and “soft memory” have a significant positive effect on “organizational memory,” and “computer based memory” has a significant positive effect on “hard memory” but has a significant negative effect on “soft memory,” weakly supporting the Hypothesis. Figure1 shows the model and the result.

## **8 DISCUSSION**

Based on the analysis of Model, Hypothesis: Hard Memory, Soft Memory and Computer Based Memory accelerate Organizational Memory in the learning from failure in the company is weakly supported. “Computer based memory” like knowledge repository augments “hard memory” like written rule, scripts, routine work and so on, because Figure1 shows the relationship between the computer and the hard memory is a significant positive. It may, to the contrary, inhibit “soft memory” like human memory in the organizational learning from failure in the company, since Figure1 shows the computer has a significant negative impact on the soft memory in this company. It may suggest relying highly on computer based memory has a negative effect on human memory, because you do not have to learn things by heart since you are always able to reach them in computer based repository.

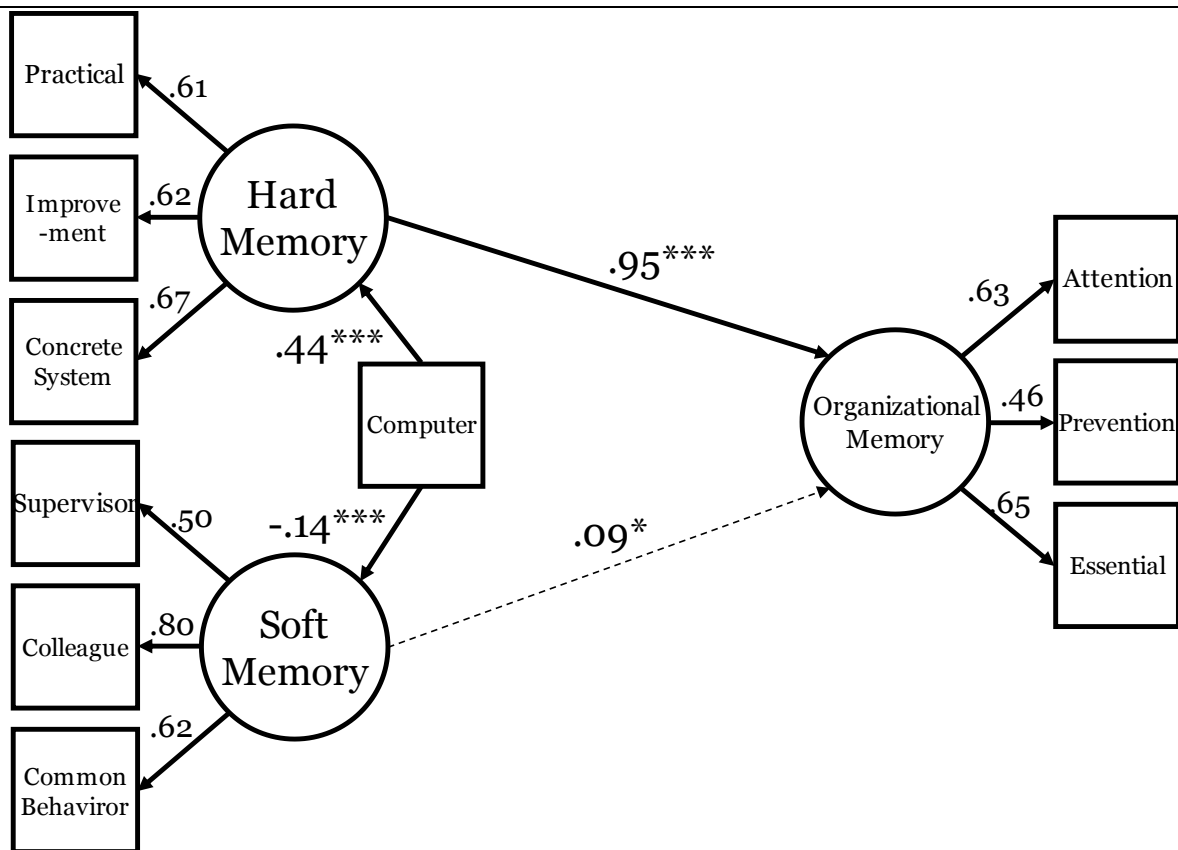


Fig.1 - Model

We also find that both of “hard memory” and “soft memory” have a positive impact on “organizational memory”, but the former has a stronger and more significant impact on it. It means that rules and routines are more effective for organizational memory in the organizational learning in the company.

## 9 CONCLUSIONS

We, in this paper, studied a case of organizational learning from failure in a Japanese company and explored acceleratory factors in the process of organizational memory in the learning. We found that “Computer based memory” like knowledge repository augments “hard memory” like written rule, scripts, routine work and so on, but may inhibit “soft memory” like human memory in the organizational learning from failure in the company. We also found that “hard memory” is more effective than “soft memory” in the company.

We briefly mention contribution of this paper. First, we find acceleratory factors in the process of organizational memory in the organizational learning from failure since there is not enough argument on it. Second, this paper provides a successful case of organizational learning from failure, although it is generally handled as so secret in organization that those who eager to learn a key for success from reference cannot access it.

There is, needless to say, limitation in this paper. First, the study in this paper depends on a single case in the company. We need further study employing multiple cases, including anonymous cases. Second, the model discussed in this paper has not so good fitness that we should polish the model to explain the phenomena better in our future research.

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## **Analysis of Employee Coaching and Practical Knowledge Level toward Employees' Performance in Tourism Industry in Jakarta**

*Laurencia Krismadewi*

### **ABSTRACT**

*The study aims to analyze the employees' coaching and practical knowledge level toward employees' performance in hotel industry in Jakarta. The method proposed quantitative descriptive by applying Multiple regression statistics in order to analyze the influence of the coaching of employees and the level of knowledge toward the performance of employees. The population involved 80 employees. The results depicted that the coaching and practical knowledge weighed positive and significant effect on the performance of employees in the hotel industry in Jakarta. Based on the hypothesis testing utilizing regression technique and significance, the results portrayed that the two independent variables either jointly or partially exposed positive effect on the performance. The study concluded that the coaching of employees seized a greater influence on employee performance improvement.*

**Keywords:** *Coaching, Practical Knowledge, Employee, Performance, Hotel*

**JEL Classification:** J24

### **1 INTRODUCTION**

Management of Human Resources emphasized the importance of the implementation of the operational functions of human resource management in the area of job analysis, employee requirements planning, procurement, development, compensation, integration, maintenance, termination and retirement. Hotel management as the subset of the industry experienced the potential growth, required effective and responsive human resource management. Coaching is required to achieve the target and a primary way to develop, motivate employees, and maintain the growth. Jakarta, the metropolitan city, considered hotel industry as the emergence global business that facilitated employees to enhance their relationships with more experienced and qualified capability. It required coaching as a prominent activity for the employee development (Hameed, 2011).

The appropriate endeavor in the management of human resources is a strategic step and a form of awareness in the era of globalization. The hotel industry will survive and sustain their business to improve the efficiency, effectiveness and productivity in this era. The hotel management must also connect human resource management policies with long-term perspective in regard with the achievements of the company, the community needs and interpersonal welfare. In the scope of hotel industry in Indonesia, it encompassed a wide range of sectors including hotel's employees in particular. Coaching in a hotel is the important type of training which is considered as the spectrum of 'talent management' due to the fact that they either emphasized on the development of special skills that benefit the company as well as the individuals or they assist people develop new process of thinking which facilitates people to conquer obstacles and develop their careers through enhancing relationships with more experiences individuals (CIPD, 2014). In this regards, the study

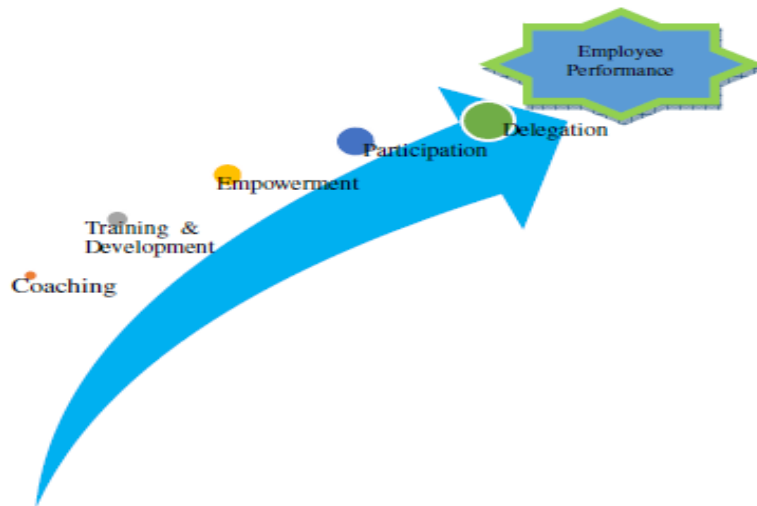
analyzed the employees' coaching and practical knowledge level toward employees' performance in hotel industry.

## **2 LITERATURE REVIEW**

In this complex and challenging business world, managing human capital is undoubtedly critical to a firm's success (Gurav & Muldakar, 2011; Núñez-Cacho & Grande, 2012). Organization that is able to create an environment where training is supported and valued by employees will be able to achieve greater commitment outcomes (Barrett, 2001)<sup>4</sup>. Organizations must strive to deliver a message to frontline employees that the company is there to assist their job and they have an opportunity to be rewarded for their exceptional performance (Tavitiyaman, 2009)<sup>5</sup>. As individual initiative and entrepreneurship arguably become more important to organizational success than a prescriptive, control-oriented mode of operation, it is not surprising that scholars and practitioners alike are exploring new models of organizational culture, roles, and work practices that can positively affect individual attitudes (Macky and Boxall 2007).

According to Kampa-Kolesch and Anderson (2001)<sup>7</sup>, coaching is a form of systematic feedback intervention that is designed to enhance professional skills, interpersonal awareness and personal effectiveness, whereas Peterson (1994)<sup>8</sup> considers coaching to be a process that equips people with the tools, knowledge (Gil & Carrillo, 2013)<sup>9</sup> and opportunities that they need for professional development and to increase their effectiveness. Coaching and mentoring helps to enhance productivity and performance of the associated employees which leads to increase quality of service and ultimately enhance financial performance of the organization (Bhatia, 2006)<sup>10</sup>. According to Dessler (2011)<sup>11</sup>, the only one process of equipping human capital with knowledge, skills and capabilities to perform meticulous job task efficiently and effectively is training of the individuals assigned to the particular job. Employee development is becoming an increasingly critical and strategic imperative for organizations in the current business environment (Sheri-Lynne, Parbudyal 2007).

Hameed (2011) mention five variables of employee development that will affect on employee performance comprise of coaching, training and development, empowerment, participation, and delegation (see Figure 1). Coaching and mentoring of staff can help the organizations to enhance employee performance, improve their strengths, employee satisfaction, quality of customer service, supervision and overall cost for each employee (Peel, 2004)<sup>13</sup>. The performance of employee is linked to enhance knowledge, skills, positive attitudes, abilities and confidence (Armstrong, 2009)<sup>14</sup>. Therefore, the organizations will enhance the performance as an obligation since the capability to keep pace with the changing business environment and fulfils the gap between existing skills and required knowledge to operate the business (Ramesh Neupane, 2015)



**Fig.1** - Employee Development and its Affect on Employee Performance A Conceptual Framework

Source: Abdul Hameed (2011, 224)

### 3 PROBLEM STATEMENT

The main objective of the study is to analyze coaching and practical knowledge level toward hotel employees' performance. The background of the study identifies some highlights i.e. the visits by foreign tourists decreased; the service satisfaction level is still low; the low quality of employees service knowledge; quality of services provided by employees is still low.

Authors address and formulate three key issues in the study as follows:

- a) Does the coaching of employees in the tourism industry in Jakarta have a significant effect on performance?
- b) Does the level of practical knowledge of the tourism industry in Jakarta have a significant effect on performance?
- c) Do the level of coaching and practical knowledge in the tourism industry in Jakarta affect on the performance?

### 4 CONCEPTUAL MODEL

The conceptualization of the relationships in a hierarchical coaching model is depicted by figure 2. The model spans three levels of an organizational hierarchy, where front-line employee teams, staff are nested within middle managers based on reporting relationships, and middle managers are nested within executive managers (Ritu Agarwala, Corey M. Angst, Massimo Magni, 2009). The conceptualization of relationships is based on a direct consensus model (Klein, Buhl Conn, Smith and Sorra, 2001)<sup>17</sup> where managerial coaching behavior at different levels of analysis is theorized to be a function of individual perceptions of their supervisees. Klein and Kozlowski (2000)<sup>18</sup> noted that such models typically described the shared properties of an organizational unit, in this case the team supervised by a specific manager.

Based on the previous research, this study emphasized more on the employees' coaching and practical knowledge level and modeled as below. The level of practical knowledge is another



method of employees' development with the objective of maintaining the employees' skills in accordance with advancing in technology and business practices, and assisting employees in order to predominate the skills required to provide larger contributions and advances in the organization both informal and formal settings. In Informal setting, it can usually be undergone as an on-the-job training which is the most common approach to the development of skills, which takes place in normal working situation, utilizing the actual tools, equipment, documents, or materials to be used by trainers that would normally be undertaken by Human Resources Department and assisted by other divisions. The training is associated with the increasing job skills and the formal proposition. Meanwhile, the formal training conducted involving employees out of work, depending on the relevant material, trainer, curriculum must be developed, and upto- date maintenance. Formal training or off-the-job training takes place away from formal employment situation because it has nothing to do with the job, but implies that the training of an employee is no longer positioned on the duties and normally functioned. Employees are dissociated from the work routine with the aims of surfeiting for the employee to more concentrate on the job after accomplishing the training. This type of training will be able to stimulate ideas and creativity of the employees' performance.

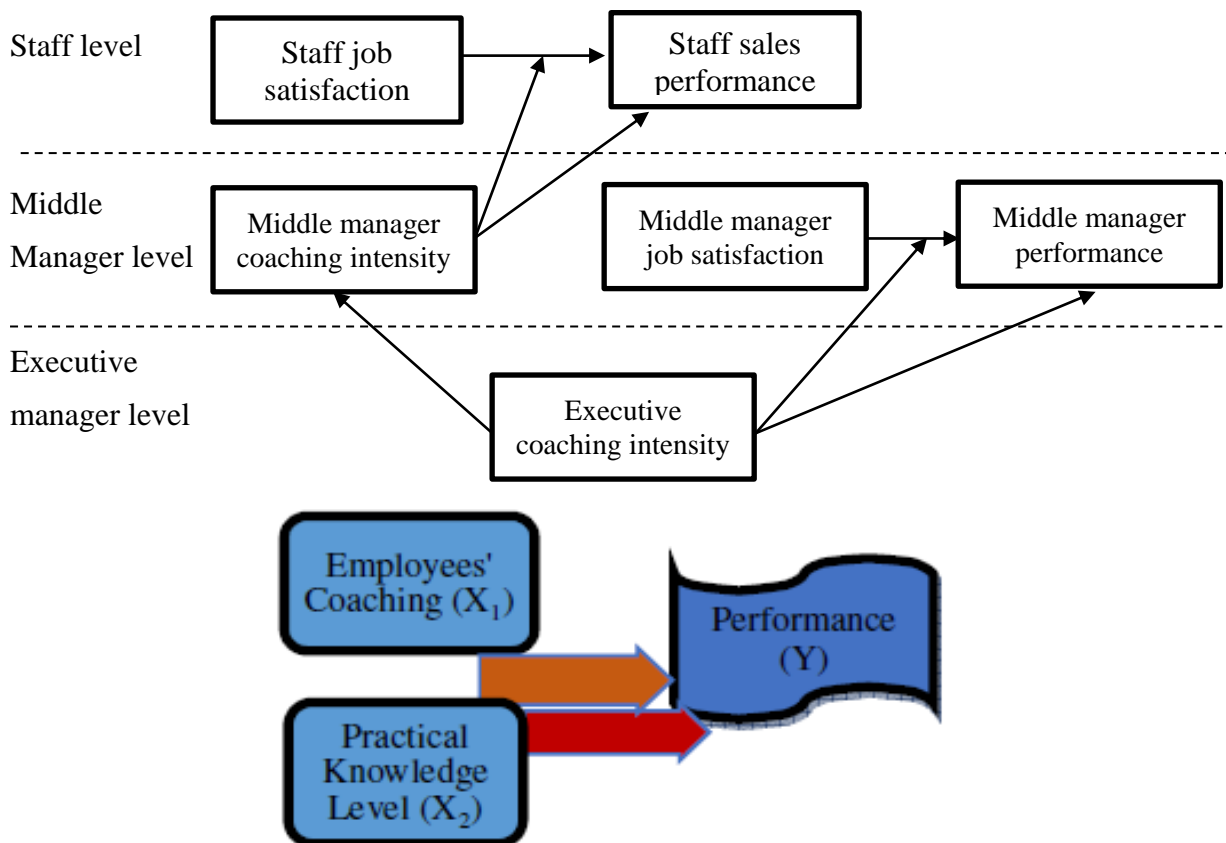


Fig.2 - Conceptual model

Source: Ritu Agarwala, Corey M. Angst, Massimo Magni,(2009).

According to Cropanzano and Mitchell (2005), from social exchange theory the coaching relationship is reciprocal. The parties establish a normative framework within which to work. The success of the process will depend on several reasons: the confidentiality within the process; the consistency of the status of both coach and coachee; and their integrity,

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rationality, altruism and commitment (Pedro Núñez-Cacho Utrilla, Félix Angel Grande, Daniel Lorenzo, 2015). Empirical studies agree on this point and consider coaching to be effective because it offers employees an intense way of learning that is suited to their individual needs and thus leads to greater career satisfaction (Colomo & Casado, 2006; Rowold & Schilling, 2006; Sherman & Freas, 2004; Zaleska & De Menezes, 2007). The support of other organisational members, such as line managers, is also necessary (Leisink & Knies, 2011).

## 5 RESEARCH APPROACH AND PROPORSITION

The study involved 80 respondents who work in hotel industry. The primary data are gathered and assembled through a structured questionnaire. The secondary data for this study are populated from journal articles, and books which contributed to the literature review. The study proposed:

*Hypothesis 1:* The coaching of employees in the tourism industry in Jakarta has a significant effect on performance

*Hypothesis 2:* The level of practical knowledge of the tourism industry in Jakarta has a significant effect on performance

*Hypothesis 3:* The level of coaching and practical knowledge in the tourism industry in Jakarta affect on the performance

## 6 DATA ANALYSIS AND FINDINGS

The study encompassed performance as the dependent variable. The independent variables comprise of coaching and practical knowledge. Data analysis was performed using Statistical Packages of the Social Science (SPSS). Multiple regression analysis was utilized to determine the relationship between the independent variables and the dependent variable.

### Coefficient of Determination

The coefficient of determination served to determine the percentage of the effect of the independent variable on the dependent variable changes. The results of data processing using SPSS are based on the following calculation:

Table 1 depicted that the numbers R obtained 0.61 and it explained the correlation between variables of coaching and practical knowledge on the performance of employees is 0,610. It denoted a strong relationship. The R square is also known as the coefficient of determination; to determine the contribution of independent variable (X) simultaneously in explaining the dependent variable (Y) may also indicate a wide. R square indicated the increase or decrease of the dependent variable explained by the linear influence of independent variable. The value of R square of 0.572 means contribution percentage of the influence of coaching variables and practical knowledge on the employees' performance amounted to 57.2%, whilst the remaining 43.8% is influenced by other variables not included in this research model.

**Tab.1** - Analysis of Multiple Linear Regressions

Independent Variabel	Regression Coefficient	Beta	t-value	Sig
(Constant)	2,536		8,489	0,000
Coaching	0,211	0,291	5,658	0,000
Practical Knowledge	0,134	0,170	3,133	0,000
R	0,610			
R Square	0,572			
F Hitung	12,045			
Sig F	0,000			

Source: Own computation based on SPSS

The table also describes that F-test examined the significance of the effect of several independent variables on the dependent variable, namely to test the significance of the effect of coaching and practical knowledge on performance. The test results can be seen above F count equal to 12.045 by using the 95% confidence level,  $\alpha = 5\%$ , the results obtained by the F table by 3.09.  $F \text{ count} > F \text{ table}$  ( $12.045 > 3.09$ ), then  $H_0$  is rejected. It means coaching and practical knowledge together affect the performance.

### Regression coefficients

After determining the effect, then it will be analyzed how the effect partially. T-test examination criteria are:

- a. If the significance of  $t < \alpha$ , then  $H_0$  is rejected and  $H_1$  accepted
- b. If the significance of  $t > \alpha$ , then  $H_0$  is accepted and  $H_1$  rejected.

Based on the data of regression analysis, the value of t is explained as follows:

1. The value of the t test for coaching variables amounted to 5.658 with a significance level of 0.000. The significance value less than 0.05, so it can be stated that the coaching variable partially effect on performance.
2. The value of the t test for work experience variable is equal to 3.133 with a significance level of 0.000. The significance value less than 0.05, so it can be implied that practical knowledge partially effect on performance variable.
3. From the beta value, fostering greater variable is 0.291 compared with the value of the practical knowledge beta variable of .170, indicating that for coaching variables are variables that dominantly influence the performance.

### Dimensions Correlation

- a. Coaching influence the Employee Performance to determine the strength of influence between dimensions variable to the dimensions of the Coaching Employee Performance variable, the obtained matrix as below (see Table 2):

**Tab.2** - The Correlation Matrix of Coaching variable Employee Performance

Variable	Employees' Performance					
	Dimension	Y1	Y2	Y3	Y4	Y5
Employees' Coaching (X1)	X11	0,338	0,389	0,332	0,459	0,282
	X12	0,373	0,242	0,397	0,535	0,387
	X13	0,486	0,303	0,346	0,431	0,547
	X14	0,457	0,350	0,531	<b>0,653</b>	0,404
	X15	0,393	0,214	<b>0,186</b>	0,365	0,270

Description :

X11 = Personal motivation	Y1 = Job Quality
X12 = Establish goals and insight	Y2 = Accuracy
X13 = Development Plan	Y3 = Initiative
X14 = Recognition of achievement	Y4 = Capability
X15 = Available resources	Y5 = Communications

Based on the data in Table 2, It showed a weak correlation between the availability of resources and employees' initiative amounting to 0.186. The weak relationship is focused dimensions which also need to be considered because of the availability of resources (human or other resources) do not significantly affect the increase in employee initiatives. The effect of high employees' initiatives can be extracted from the development of human resources and evaluated regularly to see significant improvement as well as the needs and accuracy in the development of programs that have been given or future plan.

The greatest value contained in the dimensions of coaching is 0.653. It means there is a very strong relationship to the improvement of the performance of the employee if the employee is given the recognition of the achievements. The table shows a significant leverage between the recognition of the achievements and capabilities of employees. The importance of recognition of achievement is not only limited to the recognition that the employee has achieved the target and meet the performance standards organization, but will become an effective stimulus in motivating employees to actively involved and contribute to the existing business processes.

- b. The Influence of Practical Knowledge on Employees' Performance to determine the strength of influence between variable dimensions of Practical Knowledge toward Employee Performance variable, is described by the following matrix (see Table 3):

**Tab.3** - The Correlation Matrix of Practical Knowledge and Employees' Performance

Variable	Employees' Performance					
	Dimension	Y1	Y2	Y3	Y4	Y5
Practical Knowledge (X2)	X21	0,250	0,460	0,286	0,319	0,502
	X22	0,456	0,399	0,495	<b>0,636</b>	0,485
	X23	0,408	0,350	0,315	0,423	0,382
	X24	0,165	0,247	0,181	0,125	<b>0,108</b>
	X25	0,472	0,329	0,302	0,418	0,334

Description :

X21= employment situation

Y1 = Job quality

X22 = opportunity

Y2 = Accuracy

X23= Objective

Y3 = Initiative

X24 = Supporting tools

Y4 = Capability

X25 = Evaluation

Y5 = Communications

Based on the data in Table 3, it showed the weak correlation from the communication supporting tool (0.108) and as a result concluded that the supporting tools insignificantly influence the communication, whilst the greatest value contained in the dimensions of opportunity (0.636). It means a strong relationship to the improvement of the performance of the employee if there is the opportunity given to employees in developing the potential and abilities. The support from organizations or companies in the form of an opportunity to develop the potential can be realized in the planning of career management and educational training.

## 7 CONCLUSIONS

The importance of coaching has been highlighted in many recent discussion in the management literature, where coaching is viewed as an important means to achieving the desired goal of becoming a learning organization (Dunphy, Turner & Crawford, 1997). This study has analyzed coaching and practical level knowledge in Jakarta hotel industry. The main findings on this study are listed below:

- a. The study asserts that there are some variables which influenced the development and practical knowledge in a positive and significant impact on performance, which means that by increasing practical guidance and knowledge will improve the performance of the employees of the tourism industry in Jakarta. The first one is coaching variable that influenced employees positively and significantly on the performance of employees, which means that by increasing coaching, the employees will improve the performance. Secondly, the practical knowledge variable that influenced positively and significantly on the performance of employees. Coaching employees' variable has a greater influence than the practical knowledge variable.

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- b. Based on the analysis of the relationship coaching variable and employee performance is obtained that employee development dimension becomes the dominant factor to the improved performance of employees. The more specific and strong positive effect on the performance of the dimensions of the recognition of the achievements of the employees have a positive influence on employee performance improvement, while the weak relationship is the availability of resources to the initiative, which can be concluded that the availability of resources does not significantly influence the initiative or creativity of employees.
- c. Based on the correlation analysis of the practical knowledge variable and the employee's performance, it shows that the opportunity for the employees is a dominant factor toward the performance improvement of employees. Moreover, the other analysis results of other dimensions specifically and fairly strong positive affected on the performance i.e. employment situation and the accuracy of the employees' job, opportunities for initiatives, the implementation of the evaluation of the job improvement.

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## Business Models in the Past, Present and Future: Review and Citation Analysis

*Michaela Blahová, Přemysl Pálka*

### ABSTRACT

*This paper analyzes theoretical and practical empirical results on business model research in a selected scientific database - Thomson Reuters's Web of Science. A dataset of 2,683 records published between 1952 and 2017 was collected and analyzed through the Java application for visualizing trends – CiteSpace. A network of co-citation references was created and labelled by the most-cited author. It has been found out that among the most cited authors belong the following: D. J. Teece, C. Zott, H. Chesbrough, A. Osterwalder, R. Casadesus-Masanel, B. Demil and C. Baden-Fuller. Moreover, 226 clusters of co-cited references were identified and overall properties of the network were supported by the modularity  $Q$  and the mean silhouette scores. Furthermore, phrases from the titles of articles that cited a particular cluster were extracted and visualized in a network emphasizing key topics on the business model research having been addressed in the scientific literature till 2017. Among top 5 topics that have formed the research in the given period belong business model innovation, real business cycle model, business process modelling, solution-specific business model and business model frameworks. The paper concludes by summarizing key findings and noting the limitations of the study.*

**Keywords:** *Business Model, Innovation, Value Creation, Strategy, Performance, Citation Analysis*

**JEL Classification:** M21, L20

### 1 INTRODUCTION

Although the term *business model* has long been a staple of scientific literature, a broad expansion of the literature reviews began in the late 1990s. The concept is increasingly popular, having become attractive not only to academics but also to a wide variety of business practitioners. The number of articles published in scientific journals or presented at international conferences has been rising rapidly, and the term has become widely used in corporations of all sizes.

The business models of today differ significantly from those utilized in businesses all over the world two decades ago. From the simple modelling and reporting for which they were often used, they have become a comprehensive tool for companies to help them in defining their purpose and strategy and in creating corporate value. As stated by Rhoads (2015, p. 35), “traditional key firm characteristics such as the size and age of a firm became less critical as businesses attempted to commercialize new products, enter new markets, and serve new customers.”

Due to rapidly changing business environment it is unquestionable that a successful business model shall continuously improve in order to support corporate performance and value

creation. De Nito, Canonico, Mangia and Moustaghfir (2016, p. 1) point out that “firms need to analyse different key environmental and contextual variables in an innovative way for the sake of re-conceptualizing their business models.”

Amit and Zott (2012, p. 42) note that “business model innovation can help companies stay ahead in the product innovation game. Business model innovation matters to managers, entrepreneurs and academic researchers for several reasons – e.g. it represents an underutilized source of future value or competitors might find it more difficult to imitate or replicate an entire novel activity system than a single novel product or process.” Therefore, the innovation of business models might be considered as a source of future competitive advantage.

The main aim of this paper is to formalize current business model research. In order to do so, a co-citation analysis of literature published in top management, business, economics and financial journals within the Thomson Reuters’s Web of Science electronic database is pursued. The Java application for visualizing and analysing trends and patterns in scientific literature – CiteSpace – is used to detect main components of merged networks of co-cited references, which are put together into groups when frequently cited together.

Co-citation analysis of various types of nodes is used here to identify key researchers providing theoretical and practical contributions on business model research (including various analyses of current practices affecting business models nowadays) identify major areas the researchers and practitioners have been addressing in the scientific literature in relation to the concept of a business model and trends affecting it in the past seven decades.

## **2 LITERATURE REVIEW**

What exactly can be considered a *business model* has been discussed by experts in academic and business spheres for many years. Researchers (e.g., Demil and Lecocq, 2010; Teece, 2010; Zott, Amit and Massa, 2011; Baden-Fuller and Haefliger, 2013; Baden-Fuller and Mangematin, 2013) generally contend that despite the overall rise in the literature on the topic of business models, a publicly accepted definition has not yet been developed.

Amit and Zott (2012, p. 42) define a company’s business model as “a system of interconnected and interdependent activities that determines the way the company does business with its customers, partners and vendors. In other words, a business model is a bundle of specific activities – an activity system – conducted to satisfy the perceived needs of the market, along with the specification of which parties (a company or its partners) conduct which activities, and how these activities are linked to each other.”

Osterwalder and Pigneur (2010) and Demil and Lecocq (2010) propose that the concept of the business model is associated with the corporate strategy leading to competitive advantage.

Baden-Fuller and Morgan (2010, p. 167), on the other hand, argue that “the business model is a stand-alone concept in its own right because a business model is a model.”

Teece (2010, p. 173) notes that “a business model articulates the logic and provides data and other evidence that demonstrates how a business creates and delivers value to customers. It also outlines the architecture of revenues, costs, and profits associated with the business enterprise delivering that value.”

Casadesus-Masanell and Ricart (2010, p. 198) use the analogy of a machine to help explain business models, stating that they “are made of concrete choices and the consequences of

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these choices...different designs have different specific logics of operation and create different value for their stakeholders.”

Johnson, Christensen and Kagermann (2008, p. 52-53) define a business model as being “consisted of four interlocking elements that, taken together, create and deliver value.” These are “customer value proposition, profit formula, key resources and key processes.”

While searching in various scientific databases and going through hundreds of published papers on the topic of business models, some key areas that have been widely discussed in connection with business model research can be addressed. Research papers that have been highly cited, e.g., in the Thomson Reuters’s Web of Science electronic database, can be divided into the following main categories:

Business models and business strategy (Baden-Fuller and Morgan, 2010; Baden-Fuller and Mangematin, 2013; Casadesus-Masanell and Ricart, 2010; Smith, Binns and Tushman, 2010; Teece, 2010; Achtenhagen, Melin and Naldi, 2013; Blahova and Zeleny, 2013; Zott and Amit, 2013; Da Silva and Trkman, 2014; Devang, Kruse, Parker and Siren, 2017),

Business models, innovations and sustainability (Chesbrough and Rosenbloom, 2002; Stubbs and Cocklin; 2008; Chesbrough, 2010; Gambardella and McGahan, 2010; Sanchez and Ricart, 2010; Cavalcante, Kesting and Ulhoi, 2011; Amit and Zott, 2012; Baden-Fuller and Haefliger, 2013; Boons and Luedeke-Freund, 2013a; Boons, Montalvo, Quist and Wagner, 2013b; Casadesus-Masanell and Zhu, 2013; Bocken, Short, Rana and Evans, 2014; Spieth, Schneckenberg and Ricart, 2014; Edgeman, Neely and Eskildsen, 2016),

Business model design and reinvention (Zott and Amit, 2007; Johnson et al., 2008; Al-Debei and Avison, 2010; Thompson and MacMillan, 2010; Zott and Amit, 2010; Casadesus-Masanell, Ramon and Joan, 2011),

Business models and organizational performance (Magretta, 2002; Melville, Kraemer and Gurbaxani, 2004; Morris, Schindehutte and Allen, 2005; Chesbrough, 2007; Zott and Amit, 2007; Zott and Amit, 2008; George and Bock, 2011; Breuer and Luedeke-Freund, 2017)

Categories 1-4 have been identified as key areas connected with business model research based on the data obtained from the Thomson Reuters’s Web of Science electronic database. Many other areas could have been mentioned and taken into consideration, but they have been ignored for the time being as the frequency of occurrence and the number of citations has not reached the required level.

Business models in a corporate sphere have become an important part of everyday business activity, however, they have moved beyond the traditional reporting model. According to PricewaterhouseCoopers (2016, p. 19), “business models need to flex and evolve if they are to remain resilient.”

A study that PricewaterhouseCoopers performed on 350 companies “supports that this evolution has seen a general shift in the design and content of business models towards a more complete view but that practices remain mixed.” Moreover, it has been determined that there has been a “growing trend for businesses to move towards a business ecosystem model as companies take steps to more clearly explain how they create value.”

### 3 METHODOLOGY

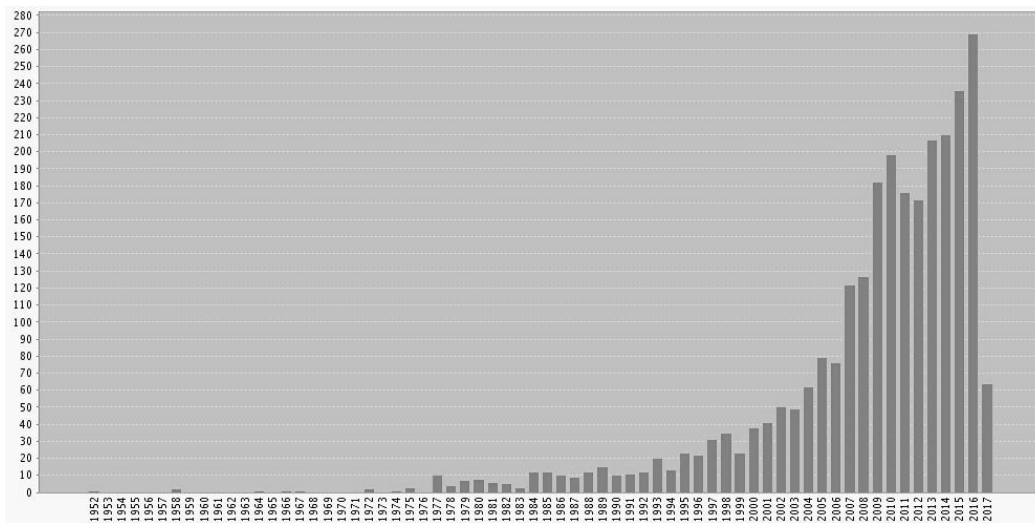
Publications for inclusion in this review were identified through Boolean searches within the Thomson Reuters’s Web of Science electronic database. Within this database, a search was conducted for publications with the term *business model* in the article title.

To ensure the highest proximity to business and management research, the research was limited to publications classified as belonging to the subject areas of “management”, “business”, “economics” and “business finance”. The review took into consideration published work from 1952 – 2017.

A total number of 2,683 records was identified through the search. In 2016, the highest number of articles was published, and the highest number of citations was recorded. The total sum of citations is 27,669. Ignoring self-citations, this number dropped to 23,072. The average citations per item is 10.31.

All records were downloaded and imported into the Java application for visualizing and analysing trends and patterns in scientific literature - CiteSpace. This application has been used by various researchers for pursuing co-citation analysis. Most of these approaches follow the steps established by Börner, Chen and Boyack (2003), and Boyack, Klavans and Börner (2005).

**Fig.1** - Published Articles in the Thomson Reuters’s Web of Science between 1952 - 2017



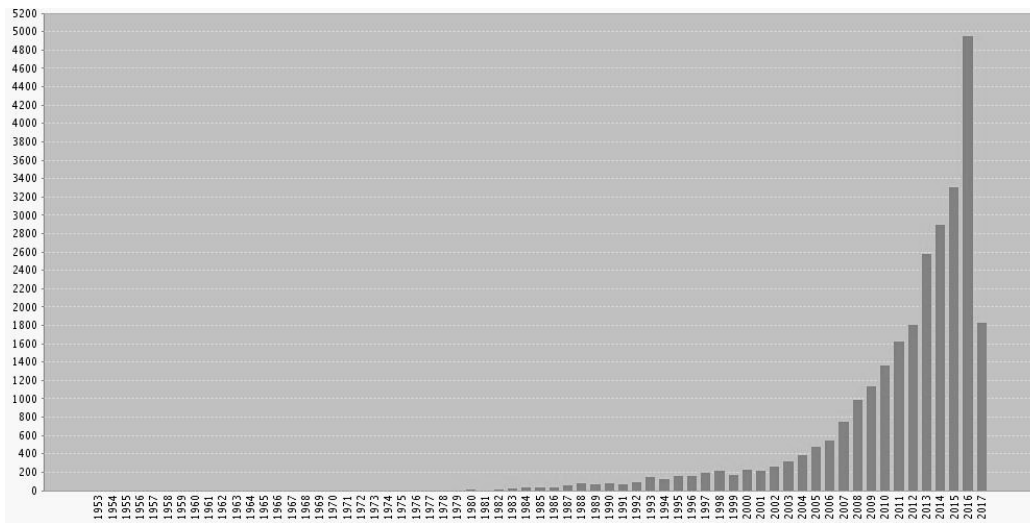
Source: Thomson Reuters’s Web of Science

**Fig.2** - Citations in the Thomson Reuters’s Web of Science, 1952 - 2017

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Source: Thomson Reuters's Web of Science

## 4 DATA

The CiteSpace application provides a visualization of a merged network based on several networks corresponding to snapshots of consecutive years.

The overall period of the research spanned from 1952 (when the term “business model” was used in an article published in the Thomson Reuters Web of Science<sup>TM</sup> electronic database for the first time) to 2017.

The merged network describes the progress over time and shows the most important footprints of the related research activities. Nodes are represented by dots in the network.

Figures 3 and 4 show calculations in the CiteSpace application necessary for the construction of a network where the nodes are cited references and the lines that connect nodes are co-citation links. References with labels are highly cited. The most nodes can be seen in the time period between 2009 and 2012 (see figure 3). The total number of nodes in the merged network is 775 and the total number of links is 2,102 (see figure 4).

**Fig.3** - Space Status (period 1952 – 2017)

Similarity measure: Cosine Link retaining factor: 2 times of #nodes					Similarity measure: Cosine Link retaining factor: 2 times of #nodes				
1-year slices	criteria	space	nodes	links / all	1-year slices	criteria	space	nodes	links / all
Pruning configuration:					1996-1996	top 50	309	13	26 / 71
1952-1952	top 50	2	0	0 / 0	1997-1997	top 50	297	20	40 / 82
1953-1953	top 50	0	0	0 / 0	1998-1998	top 50	454	10	13 / 13
1954-1954	top 50	0	0	0 / 0	1999-1999	top 50	272	15	30 / 57
1955-1955	top 50	0	0	0 / 0	2000-2000	top 50	433	5	1 / 1
1956-1956	top 50	0	0	0 / 0	2001-2001	top 50	614	12	12 / 12
1957-1957	top 50	0	0	0 / 0	2002-2002	top 50	602	13	8 / 8
1958-1958	top 50	0	0	0 / 0	2003-2003	top 50	839	5	3 / 3
1959-1959	top 50	0	0	0 / 0	2004-2004	top 50	912	15	12 / 12
1960-1960	top 50	0	0	0 / 0	2005-2005	top 50	1036	35	70 / 85
1961-1961	top 50	0	0	0 / 0	2006-2006	top 50	1066	16	26 / 26
1962-1962	top 50	0	0	0 / 0	2007-2007	top 50	1685	36	72 / 94
1963-1963	top 50	0	0	0 / 0	2008-2008	top 50	1995	67	134 / 231
1964-1964	top 50	0	0	0 / 0	2009-2009	top 50	2480	106	212 / 778
1965-1965	top 50	0	0	0 / 0	2010-2010	top 50	3022	133	266 / 1340
1966-1966	top 50	0	0	0 / 0	2011-2011	top 50	2679	132	264 / 1430
1967-1967	top 50	1	0	0 / 0	2012-2012	top 50	2580	160	320 / 1799
1968-1968	top 50	0	0	0 / 0	2013-2013	top 50	3992	56	112 / 985
1969-1969	top 50	0	0	0 / 0	2014-2014	top 50	3309	68	136 / 1229
1970-1970	top 50	0	0	0 / 0	2015-2015	top 50	4025	71	142 / 1051
1971-1971	top 50	0	0	0 / 0	2016-2016	top 50	5025	51	102 / 1024
1972-1972	top 50	4	0	0 / 0	2017-2017	top 50	1613	67	134 / 1413
1973-1973	top 50	0	0	0 / 0					
1974-1974	top 50	1	0	0 / 0					
1975-1975	top 50	53	1	0 / 0					
1976-1976	top 50	0	0	0 / 0					
1977-1977	top 50	92	0	0 / 0					
1978-1978	top 50	9	0	0 / 0					
1979-1979	top 50	20	1	0 / 0					
1980-1980	top 50	58	3	1 / 1					
1981-1981	top 50	22	0	0 / 0					
1982-1982	top 50	51	0	0 / 0					
1983-1983	top 50	21	0	0 / 0					
1984-1984	top 50	138	0	0 / 0					
1985-1985	top 50	118	6	11 / 11					
1986-1986	top 50	108	1	0 / 0					
1987-1987	top 50	77	0	0 / 0					
1988-1988	top 50	207	11	22 / 41					
1989-1989	top 50	182	11	22 / 41					
1990-1990	top 50	141	3	3 / 3					
1991-1991	top 50	110	5	10 / 10					
1992-1992	top 50	119	2	1 / 1					
1993-1993	top 50	212	11	22 / 34					
1994-1994	top 50	126	9	12 / 12					
1995-1995	top 50	347	19	38 / 110					

Source: Own computation using CiteSpace

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**Fig.4 - Process Reports (period 1999 – 2017)\***

Time Slice	Filename*	Rec in file	Rec in slice	Time Taken	Time Slice	Filename*	Rec in file	Rec in slice	Time Taken
1999-1999	_1001_1500	500	0	0,313	2008-2008	_1001_1500	500	0	0,297
	_1501_2000	500	0	0,312		_1501_2000	500	127	0,359
	_1_500	500	0	0,547		_1_500	500	0	0,438
	_2001_2500	500	23	0,250		_2001_2500	500	0	0,234
	_2501_2683	183	0	0,063		_2501_2683	183	0	0,063
2000-2000	_501_1000	500	0	0,500	2009-2009	_501_1000	500	0	0,390
	_1001_1500	500	0	0,313		_1001_1500	500	0	0,359
	_1501_2000	500	0	0,297		_1501_2000	500	182	0,375
	_1_500	500	0	0,437		_1_500	500	0	0,578
	_2001_2500	500	38	0,250		_2001_2500	500	0	0,219
2001-2001	_2501_2683	183	0	0,063	2010-2010	_2501_2683	183	0	0,063
	_501_1000	500	0	0,390		_501_1000	500	0	0,390
	_1001_1500	500	0	0,313		_1001_1500	500	166	0,422
	_1501_2000	500	0	0,281		_1501_2000	500	32	0,281
	_1_500	500	0	0,422		_1_500	500	0	0,453
2002-2002	_2001_2500	500	41	0,266	2011-2011	_2001_2500	500	0	0,235
	_2501_2683	183	0	0,062		_2501_2683	183	0	0,078
	_501_1000	500	0	0,391		_501_1000	500	0	0,375
	_1001_1500	500	0	0,312		_1001_1500	500	176	0,407
	_1501_2000	500	0	0,282		_1501_2000	500	0	0,312
2003-2003	_1_500	500	0	0,437	2012-2012	_1_500	500	0	0,453
	_2001_2500	500	50	0,266		_2001_2500	500	0	0,219
	_2501_2683	183	0	0,078		_2501_2683	183	0	0,062
	_501_1000	500	0	0,390		_501_1000	500	0	0,391
	_1001_1500	500	0	0,313		_1001_1500	500	158	0,422
2004-2004	_1501_2000	500	0	0,281	2013-2013	_1501_2000	500	0	0,265
	_1_500	500	0	0,437		_1_500	500	0	0,453
	_2001_2500	500	49	0,266		_2001_2500	500	0	0,235
	_2501_2683	183	0	0,062		_2501_2683	183	0	0,078
	_501_1000	500	0	0,391		_501_1000	500	14	0,390
2005-2005	_1001_1500	500	0	0,313	2014-2014	_1001_1500	500	0	0,328
	_1501_2000	500	0	0,281		_1501_2000	500	0	0,312
	_1_500	500	0	0,453		_1_500	500	0	0,422
	_2001_2500	500	79	0,297		_2001_2500	500	0	0,250
	_2501_2683	183	0	0,062		_2501_2683	183	0	0,063
2006-2006	_501_1000	500	0	0,407	2015-2015	_501_1000	500	207	0,531
	_1001_1500	500	0	0,328		_1001_1500	500	0	0,328
	_1501_2000	500	37	0,328		_1501_2000	500	0	0,281
	_1_500	500	0	0,469		_1_500	500	0	0,454
	_2001_2500	500	39	0,250		_2001_2500	500	0	0,249
2007-2007	_2501_2683	183	0	0,062	2016-2016	_2501_2683	183	0	0,063
	_501_1000	500	0	0,375		_501_1000	500	210	0,516
	_1001_1500	500	0	0,328		_1001_1500	500	0	0,297
	_1501_2000	500	122	0,344		_1501_2000	500	0	0,297
	_1_500	500	0	0,438		_1_500	500	167	1,438
2008-2008	_2001_2500	500	0	0,250	2017-2017	_2001_2500	500	0	0,265
	_2501_2683	183	0	0,062		_2501_2683	183	0	0,141
	_501_1000	500	0	0,375		_501_1000	500	69	0,484
	_1001_1500	500	0	0,328		_1001_1500	500	0	0,438
	_1501_2000	500	0	0,281		_1501_2000	500	0	0,328
2009-2009	_1_500	500	0	0,437	2010-2010	_1_500	500	269	0,844
	_2001_2500	500	0	0,250		_2001_2500	500	0	0,261
	_2501_2683	183	0	0,062		_2501_2683	183	0	0,078
	_501_1000	500	0	0,390		_501_1000	500	0	0,500
	_1001_1500	500	0	0,313		_1001_1500	500	0	0,468
2010-2010	_1501_2000	500	0	0,281	2011-2011	_1501_2000	500	0	0,344
	_1_500	500	0	0,422		_1_500	500	64	0,781
	_2001_2500	500	41	0,266		_2001_2500	500	0	0,313
	_2501_2683	183	0	0,062		_2501_2683	183	0	0,078
	_501_1000	500	0	0,391		_501_1000	500	0	0,531
2011-2011	_1001_1500	500	0	0,312	2012-2012	_1001_1500	500	158	0,422
	_1501_2000	500	0	0,282		_1501_2000	500	0	0,265
	_1_500	500	0	0,437		_1_500	500	0	0,453
	_2001_2500	500	50	0,266		_2001_2500	500	0	0,219
	_2501_2683	183	0	0,078		_2501_2683	183	0	0,062
2012-2012	_501_1000	500	0	0,390	2013-2013	_501_1000	500	0	0,391
	_1001_1500	500	0	0,313		_1001_1500	500	14	0,390
	_1501_2000	500	0	0,281		_1501_2000	500	0	0,328
	_1_500	500	0	0,437		_1_500	500	0	0,312
	_2001_2500	500	49	0,266		_2001_2500	500	0	0,422
2013-2013	_2501_2683	183	0	0,062	2014-2014	_2501_2683	183	0	0,250
	_501_1000	500	0	0,391		_2501_2683	183	0	0,063
	_1001_1500	500	0	0,313		_501_1000	500	207	0,531
	_1501_2000	500	0	0,281		_1001_1500	500	0	0,328
	_1_500	500	0	0,437		_1501_2000	500	0	0,281
2014-2014	_2001_2500	500	62	0,282	2015-2015	_1_500	500	0	0,454
	_2501_2683	183	0	0,047		_2001_2500	500	0	0,249
	_501_1000	500	0	0,390		_2501_2683	183	0	0,063
	_1001_1500	500	0	0,313		_501_1000	500	14	0,390
	_1501_2000	500	0	0,281		_1001_1500	500	0	0,328
2015-2015	_1_500	500	0	0,437	2016-2016	_1501_2000	500	0	0,312
	_2001_2500	500	79	0,297		_1_500	500	0	0,422
	_2501_2683	183	0	0,062		_2001_2500	500	0	0,250
	_501_1000	500	0	0,407		_2501_2683	183	0	0,063
	_1001_1500	500	0	0,328		_501_1000	500	207	0,531
2016-2016	_1501_2000	500	37	0,328	2017-2017	_1001_1500	500	0	0,328
	_1_500	500	0	0,469		_1001_1500	500	0	0,328
	_2001_2500	500	39	0,250		_1501_2000	500	0	0,281
	_2501_2683	183	0	0,062		_1_500	500	167	1,438
	_501_1000	500	0	0,375		_2001_2500	500	0	0,265
2017-2017	_1001_1500	500	0	0,328	2018-2018	_2501_2683	183	0	0,141
	_1501_2000	500	122	0,344		_501_1000	500	69	0,484
	_1_500	500	0	0,438		_1001_1500	500	0	0,438
	_2001_2500	500	0	0,250		_1501_2000	500	0	0,328
	_2501_2683	183	0	0,062		_1_500	500	269	0,844
2018-2018	_501_1000	500	0	0,422	2019-2019	_2001_2500	500	0	0,261
	_1001_1500	500	0	0,313		_2501_2683	183	0	0,078
	_1501_2000	500	0	0,281		_501_1000	500	0	0,500
	_1_500	500	0	0,437		_1001_1500	500	0	0,468
	_2001_2500	500	50	0,266		_1501_2000	500	0	0,344
2019-2019	_2501_2683	183	0	0,078	2020-2020	_1_500	500	64	0,781
	_501_1000	500	0	0,390		_2001_2500	500	0	0,313
	_1001_1500	500	0	0,313		_2501_2683	183	0	0,078
	_1501_2000	500	0	0,281		_501_1000	500	0	0,531
	_1_500	500	0	0,422					

Records in the dataset: 2683  
Records within the chosen range: 2377

Distinct references [Valid]: 61741      99,0344%  
Distinct references [Invalid]: 602      0,9656%

Parsing Time: 149.495 seconds  
Total Run time: 133.193 seconds

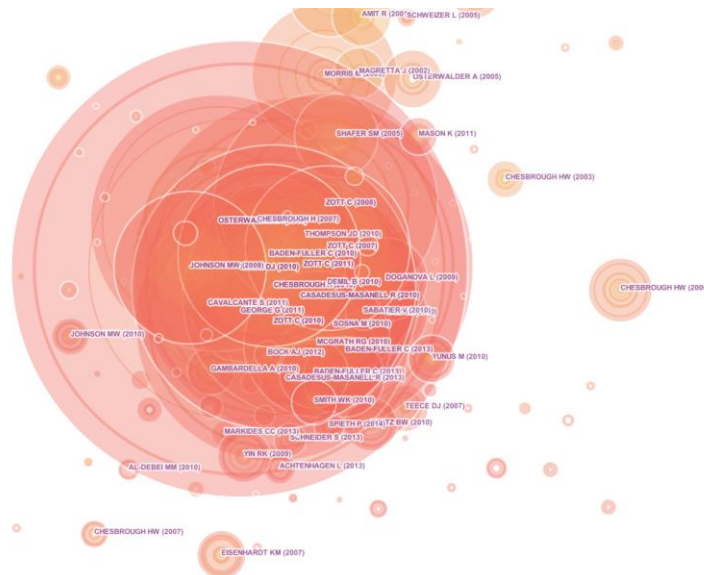
Merged network: Nodes=775, Links=2102  
Exclusion List 0

Source: Own computation using CiteSpace

\*Full process reports (period 1952 – 2017) are available in Appendix 1.

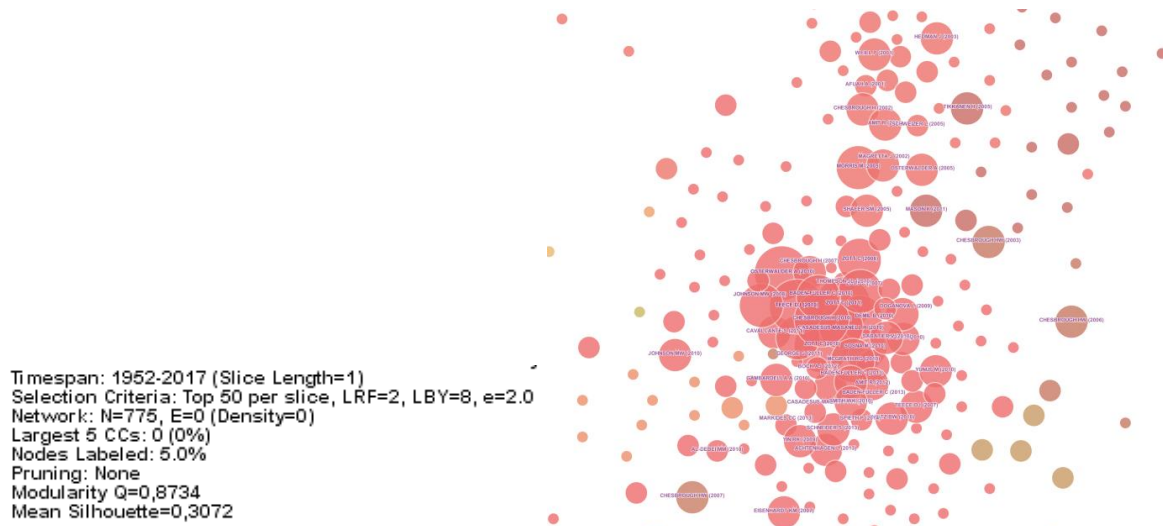
## 5 RESULTS AND DISCUSSIONS

Based on the calculated data (figures 3 and 4), the merged network of co-citation studies (1952 – 2017, # years per slice: 1) is visualized (see figure 5). To construct a network, the top 50 levels of the most cited or occurring items from each slice are selected. Each level may include multiple qualified nodes. The minimum level  $e$  is set in the project properties. The strength in links is characterized by cosine.



**Fig.5** - Visualization of Merged Network (Cluster View – Static)

Source: Own computation using CiteSpace



**Fig.6** - Visualization of Clusters (Cluster View – Static)

Source: Own computation using CiteSpace



The visualization shows the main components of the merged network of co-cited references, which are put together into groups when frequently cited together. Each group is labelled by the most cited author. When computing centrality, it has been discovered that among the most cited authors belong the following researchers: D. J. Teece (259 counts), C. Zott (191 counts), H. Chesbrough (162 counts), A. Osterwalder (148 counts), R. Casadesus-Masanel (137 counts), B. Demil (108 counts) and C. Baden-Fuller (106 counts).

After the identification of prominent groupings and the visualization of the network, a clustering process is performed. A total of 226 clusters of co-cited references are identified (see figure 6).

Overall structural properties of the network are represented particularly by the modularity Q and the mean silhouette scores. The modularity Q of 0.8734 stands for a network that is reasonably divided into loosely couple clusters. The mean silhouette of 0.3072 indicates that the sample is on or very close to the decision boundary between two neighbouring clusters.

Furthermore, noun phrases from the titles of articles that cited the particular cluster are extracted. The largest cluster is numbered 0, followed by others in descending order (the second largest is 1, etc.) – see figure 7.



**Fig.7** - Visualization of Cluster Labels (Main Group)

*Source: Own computation using CiteSpace*

Evidently, the largest area (cluster 0 with the largest number of references) is business model innovation. This is quite understandable due to current changes in global economic environment. Nevertheless, the changes in the business model are not always so easy to be done. Isolated innovations do not help to transform the business model itself. This result indicates that innovations of business models are likely to attract more attention from researchers as well as practitioners rather than a description business models.

The second largest (cluster 1) that is distant from the main group is a real business cycle model. It is evident that although business cycles do influence business model constructions, the theory of business cycles differs from the topic of business models. The third largest cluster (cluster 2) focuses on business process modelling. The fourth largest cluster (cluster 3) deals with a solution-specific business model. And the fifth largest cluster (cluster 4) compares business model frameworks. Based on the visualization, a general idea of what constituted business model research between 1952 and 2017 is gained.

## **6 CONCLUSIONS**

Every business of any size applies a certain kind of a business model within its business activity nowadays. As Teece (2010, p. 172) notes, “whenever a business enterprise is established, it either explicitly or implicitly employs a particular business model that describes the design or architecture of the value creation, delivery, and capture mechanisms it employs.”

Successful companies are already operated and managed according to various business models. To remain successful, every business model should continuously evolve and continuously apply emerging changes influencing the corporate environment both internally and externally.

In this paper, we have reviewed existing empirical knowledge on business model research using a co-citation analysis with the help of the CiteSpace Java application. The research sample consisted of 2,683 records listed in the Thomson Reuters’s Web of Science electronic database between 1952 and 2017. A co-citation analysis is used to identify co-citation clusters, which are visualized in the form of networks.

All records were analyzed and visualized in the merged network, highlighting the most cited authors in the field and key topics/areas of business model research having been addressed in the scientific literature till 2017. Among the most cited authors belong the following: D. J. Teece, C. Zott, H. Chesbrough, A. Osterwalder, R. Casadesus-Masanel, B. Demil and C. Baden-Fuller.

The topics that have formed the research in the given period are business model innovation, real business cycle model, business process modelling, solution-specific business model and business model frameworks.

Despite being systematic and rigorous, this paper is based on a literature review method that might have missed some relevant work that has been published in other areas than those that have been selected for this study and/or has been published in another scientific database than the one we have selected for our study.

Moreover, the research has focused on publications with the term *business model* in the article title. In order to make the search as precise as possible, it is recommended to broaden the research sample to include articles with the term *business model* as the article topic, too.

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## Appendix 1 - Process Reports (period 1952 – 2017)

Time Slice	Filename*	Rec in file	Rec in slice	Time Taken	Time Slice	Filename*	Rec in file	Rec in slice	Time Taken
1952-1952	_1001_1500	500	0	0.407	1963-1963	_1001_1500	500	0	0.484
	_1501_2000	500	0	0.343		_1501_2000	500	0	0.406
	_1_500	500	0	0.532		_1_500	500	0	0.688
	_2001_2500	500	0	0.281		_2001_2500	500	0	0.344
	_2501_2683	183	1	0.078		_2501_2683	183	0	0.093
	_501_1000	500	0	0.484		_501_1000	500	0	0.594
1953-1953	_1001_1500	500	0	0.438	1964-1964	_1001_1500	500	0	0.500
	_1501_2000	500	0	0.406		_1501_2000	500	0	0.469
	_1_500	500	0	0.672		_1_500	500	0	0.703
	_2001_2500	500	0	0.313		_2001_2500	500	0	0.406
	_2501_2683	183	0	0.093		_2501_2683	183	1	0.078
	_501_1000	500	0	0.578		_501_1000	500	0	0.594
1954-1954	_1001_1500	500	0	0.469	1965-1965	_1001_1500	500	0	0.453
	_1501_2000	500	0	0.375		_1501_2000	500	0	0.407
	_1_500	500	0	0.672		_1_500	500	0	0.656
	_2001_2500	500	0	0.359		_2001_2500	500	0	0.375
	_2501_2683	183	0	0.110		_2501_2683	183	0	0.109
	_501_1000	500	0	0.594		_501_1000	500	0	0.541
1955-1955	_1001_1500	500	0	0.438	1966-1966	_1001_1500	500	0	0.308
	_1501_2000	500	0	0.422		_1501_2000	500	0	0.297
	_1_500	500	0	0.625		_1_500	500	0	0.453
	_2001_2500	500	0	0.359		_2001_2500	500	0	0.234
	_2501_2683	183	0	0.078		_2501_2683	183	1	0.078
	_501_1000	500	0	0.594		_501_1000	500	0	0.391
1956-1956	_1001_1500	500	0	0.469	1967-1967	_1001_1500	500	0	0.326
	_1501_2000	500	0	0.359		_1501_2000	500	0	0.281
	_1_500	500	0	0.609		_1_500	500	0	0.437
	_2001_2500	500	0	0.360		_2001_2500	500	0	0.219
	_2501_2683	183	0	0.094		_2501_2683	183	1	0.063
	_501_1000	500	0	0.562		_501_1000	500	0	0.390
1957-1957	_1001_1500	500	0	0.406	1968-1968	_1001_1500	500	0	0.313
	_1501_2000	500	0	0.375		_1501_2000	500	0	0.281
	_1_500	500	0	0.657		_1_500	500	0	0.437
	_2001_2500	500	0	0.328		_2001_2500	500	0	0.219
	_2501_2683	183	0	0.078		_2501_2683	183	0	0.063
	_501_1000	500	0	0.562		_501_1000	500	0	0.375
1958-1958	_1001_1500	500	0	0.469	1969-1969	_1001_1500	500	0	0.312
	_1501_2000	500	0	0.485		_1501_2000	500	0	0.281
	_1_500	500	0	0.731		_1_500	500	0	0.454
	_2001_2500	500	0	0.343		_2001_2500	500	0	0.218
	_2501_2683	183	2	0.099		_2501_2683	183	0	0.063
	_501_1000	500	0	0.473		_501_1000	500	0	0.390
1959-1959	_1001_1500	500	0	0.391	1970-1970	_1001_1500	500	0	0.297
	_1501_2000	500	0	0.375		_1501_2000	500	0	0.282
	_1_500	500	0	0.578		_1_500	500	0	0.437
	_2001_2500	500	0	0.344		_2001_2500	500	0	0.234
	_2501_2683	183	0	0.094		_2501_2683	183	0	0.063
	_501_1000	500	0	0.547		_501_1000	500	0	0.375
1960-1960	_1001_1500	500	0	0.390	1971-1971	_1001_1500	500	0	0.296
	_1501_2000	500	0	0.391		_1501_2000	500	0	0.282
	_1_500	500	0	0.562		_1_500	500	0	0.422
	_2001_2500	500	0	0.297		_2001_2500	500	0	0.234
	_2501_2683	183	0	0.078		_2501_2683	183	0	0.062
	_501_1000	500	0	0.532		_501_1000	500	0	0.375
1961-1961	_1001_1500	500	0	0.484	1972-1972	_1001_1500	500	0	0.313
	_1501_2000	500	0	0.453		_1501_2000	500	0	0.281
	_1_500	500	0	0.781		_1_500	500	0	0.438
	_2001_2500	500	0	0.391		_2001_2500	500	0	0.235
	_2501_2683	183	0	0.094		_2501_2683	183	2	0.063
	_501_1000	500	0	0.719		_501_1000	500	0	0.375
1962-1962	_1001_1500	500	0	0.609	1973-1973	_1001_1500	500	0	0.313
	_1501_2000	500	0	0.453		_1501_2000	500	0	0.281
	_1_500	500	0	0.672		_1_500	500	0	0.422
	_2001_2500	500	0	0.328		_2001_2500	500	0	0.219
	_2501_2683	183	0	0.078		_2501_2683	183	0	0.063
	_501_1000	500	0	0.532		_501_1000	500	0	0.375
					1974-1974	_1001_1500	500	0	0.312
						_1501_2000	500	0	0.281
						_1_500	500	0	0.420
						_2001_2500	500	0	0.219
						_2501_2683	183	1	0.062
						_501_1000	500	0	0.375



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Time Slice	Filename*	Rec in file	Rec in slice	Time Taken	Time Slice	Filename*	Rec in file	Rec in slice	Time Taken
1975-1975	_1001_1500	500	0	0,313	1987-1987	_1001_1500	500	0	0,328
	_1501_2000	500	0	0,265		_1501_2000	500	0	0,313
	_1_500	500	0	0,485		_1_500	500	0	0,484
	_2001_2500	500	0	0,250		_2001_2500	500	0	0,242
	_2501_2683	183	3	0,109		_2501_2683	183	9	0,078
1976-1976	_501_1000	500	0	0,438	_501_1000	500	0	0,373	
	_1001_1500	500	0	0,422	1988-1988	_1001_1500	500	0	0,313
	_1501_2000	500	0	0,296		_1501_2000	500	0	0,281
	_1_500	500	0	0,438		_1_500	500	0	0,438
	_2001_2500	500	0	0,234		_2001_2500	500	0	0,218
_2501_2683	183	0	0,047	_2501_2683		183	12	0,063	
1977-1977	_501_1000	500	0	0,391	_501_1000	500	0	0,391	
	_1001_1500	500	0	0,297	1989-1989	_1001_1500	500	0	0,313
	_1501_2000	500	0	0,281		_1501_2000	500	0	0,265
	_1_500	500	0	0,437		_1_500	500	0	0,438
	_2001_2500	500	0	0,235		_2001_2500	500	0	0,234
_2501_2683	183	10	0,062	_2501_2683		183	15	0,063	
1978-1978	_501_1000	500	0	0,391	_501_1000	500	0	0,390	
	_1001_1500	500	0	0,375	1990-1990	_1001_1500	500	0	0,297
	_1501_2000	500	0	0,344		_1501_2000	500	0	0,281
	_1_500	500	0	0,469		_1_500	500	0	0,438
	_2001_2500	500	0	0,234		_2001_2500	500	0	0,218
_2501_2683	183	4	0,062	_2501_2683		183	10	0,063	
1979-1979	_501_1000	500	0	0,375	_501_1000	500	0	0,390	
	_1001_1500	500	0	0,297	1991-1991	_1001_1500	500	0	0,297
	_1501_2000	500	0	0,282		_1501_2000	500	0	0,282
	_1_500	500	0	0,437		_1_500	500	0	0,421
	_2001_2500	500	0	0,234		_2001_2500	500	0	0,235
_2501_2683	183	7	0,063	_2501_2683		183	11	0,078	
1980-1980	_501_1000	500	0	0,375	_501_1000	500	0	0,375	
	_1001_1500	500	0	0,312	1992-1992	_1001_1500	500	0	0,312
	_1501_2000	500	0	0,266		_1501_2000	500	0	0,266
	_1_500	500	0	0,438		_1_500	500	0	0,438
	_2001_2500	500	0	0,234		_2001_2500	500	0	0,234
_2501_2683	183	8	0,062	_2501_2683		183	12	0,062	
1981-1981	_501_1000	500	0	0,391	_501_1000	500	0	0,376	
	_1001_1500	500	0	0,313	1993-1993	_1001_1500	500	0	0,312
	_1501_2000	500	0	0,281		_1501_2000	500	0	0,281
	_1_500	500	0	0,437		_1_500	500	0	0,438
	_2001_2500	500	0	0,266		_2001_2500	500	0	0,250
_2501_2683	183	6	0,078	_2501_2683		183	20	0,078	
1982-1982	_501_1000	500	0	0,453	_501_1000	500	0	0,375	
	_1001_1500	500	0	0,422	1994-1994	_1001_1500	500	0	0,312
	_1501_2000	500	0	0,328		_1501_2000	500	0	0,282
	_1_500	500	0	0,547		_1_500	500	0	0,437
	_2001_2500	500	0	0,281		_2001_2500	500	8	0,250
_2501_2683	183	5	0,063	_2501_2683		183	5	0,063	
1983-1983	_501_1000	500	0	0,515	_501_1000	500	0	0,375	
	_1001_1500	500	0	0,360	1995-1995	_1001_1500	500	0	0,312
	_1501_2000	500	0	0,360		_1501_2000	500	0	0,266
	_1_500	500	0	0,531		_1_500	500	0	0,453
	_2001_2500	500	0	0,297		_2001_2500	500	23	0,250
_2501_2683	183	3	0,078	_2501_2683		183	0	0,062	
1984-1984	_501_1000	500	0	0,469	_501_1000	500	0	0,375	
	_1001_1500	500	0	0,359	1996-1996	_1001_1500	500	0	0,328
	_1501_2000	500	0	0,344		_1501_2000	500	0	0,266
	_1_500	500	0	0,547		_1_500	500	0	0,453
	_2001_2500	500	0	0,297		_2001_2500	500	22	0,266
_2501_2683	183	12	0,094	_2501_2683		183	0	0,062	
1985-1985	_501_1000	500	0	0,468	_501_1000	500	0	0,391	
	_1001_1500	500	0	0,375	1997-1997	_1001_1500	500	0	0,328
	_1501_2000	500	0	0,360		_1501_2000	500	0	0,281
	_1_500	500	0	0,515		_1_500	500	0	0,453
	_2001_2500	500	0	0,250		_2001_2500	500	31	0,266
_2501_2683	183	12	0,063	_2501_2683		183	0	0,047	
1986-1986	_501_1000	500	0	0,359	_501_1000	500	0	0,406	
	_1001_1500	500	0	0,312	1998-1998	_1001_1500	500	0	0,297
	_1501_2000	500	0	0,282		_1501_2000	500	0	0,281
	_1_500	500	0	0,437		_1_500	500	0	0,438
	_2001_2500	500	0	0,250		_2001_2500	500	35	0,250
_2501_2683	183	10	0,109	_2501_2683		183	0	0,062	
	_501_1000	500	0	0,469	_501_1000	500	0	0,391	

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Time Slice	Filename*	Rec in file	Rec in slice	Time Taken	Time Slice	Filename*	Rec in file	Rec in slice	Time Taken
1999-1999	_1001_1500	500	0	0,313	2008-2008	_1001_1500	500	0	0,297
	_1501_2000	500	0	0,312		_1501_2000	500	127	0,359
	_1_500	500	0	0,547		_1_500	500	0	0,438
	_2001_2500	500	23	0,250		_2001_2500	500	0	0,234
	_2501_2683	183	0	0,063		_2501_2683	183	0	0,063
	_501_1000	500	0	0,500		_501_1000	500	0	0,390
2000-2000	_1001_1500	500	0	0,313	2009-2009	_1001_1500	500	0	0,359
	_1501_2000	500	0	0,297		_1501_2000	500	182	0,375
	_1_500	500	0	0,437		_1_500	500	0	0,578
	_2001_2500	500	38	0,250		_2001_2500	500	0	0,219
	_2501_2683	183	0	0,063		_2501_2683	183	0	0,063
	_501_1000	500	0	0,390		_501_1000	500	0	0,390
2001-2001	_1001_1500	500	0	0,313	2010-2010	_1001_1500	500	166	0,422
	_1501_2000	500	0	0,281		_1501_2000	500	32	0,281
	_1_500	500	0	0,422		_1_500	500	0	0,453
	_2001_2500	500	41	0,266		_2001_2500	500	0	0,235
	_2501_2683	183	0	0,062		_2501_2683	183	0	0,078
	_501_1000	500	0	0,391		_501_1000	500	0	0,375
2002-2002	_1001_1500	500	0	0,312	2011-2011	_1001_1500	500	176	0,407
	_1501_2000	500	0	0,282		_1501_2000	500	0	0,312
	_1_500	500	0	0,437		_1_500	500	0	0,453
	_2001_2500	500	50	0,266		_2001_2500	500	0	0,219
	_2501_2683	183	0	0,078		_2501_2683	183	0	0,062
	_501_1000	500	0	0,390		_501_1000	500	0	0,391
2003-2003	_1001_1500	500	0	0,313	2012-2012	_1001_1500	500	158	0,422
	_1501_2000	500	0	0,281		_1501_2000	500	0	0,265
	_1_500	500	0	0,437		_1_500	500	0	0,453
	_2001_2500	500	49	0,266		_2001_2500	500	0	0,235
	_2501_2683	183	0	0,062		_2501_2683	183	0	0,078
	_501_1000	500	0	0,391		_501_1000	500	14	0,390
2004-2004	_1001_1500	500	0	0,313	2013-2013	_1001_1500	500	0	0,328
	_1501_2000	500	0	0,281		_1501_2000	500	0	0,312
	_1_500	500	0	0,437		_1_500	500	0	0,422
	_2001_2500	500	62	0,282		_2001_2500	500	0	0,250
	_2501_2683	183	0	0,047		_2501_2683	183	0	0,063
	_501_1000	500	0	0,390		_501_1000	500	207	0,531
2005-2005	_1001_1500	500	0	0,313	2014-2014	_1001_1500	500	0	0,328
	_1501_2000	500	0	0,281		_1501_2000	500	0	0,281
	_1_500	500	0	0,453		_1_500	500	0	0,454
	_2001_2500	500	79	0,297		_2001_2500	500	0	0,249
	_2501_2683	183	0	0,062		_2501_2683	183	0	0,063
	_501_1000	500	0	0,407		_501_1000	500	210	0,516
2006-2006	_1001_1500	500	0	0,328	2015-2015	_1001_1500	500	0	0,297
	_1501_2000	500	37	0,328		_1501_2000	500	0	0,297
	_1_500	500	0	0,469		_1_500	500	167	1,438
	_2001_2500	500	39	0,250		_2001_2500	500	0	0,265
	_2501_2683	183	0	0,062		_2501_2683	183	0	0,141
	_501_1000	500	0	0,375		_501_1000	500	69	0,484
2007-2007	_1001_1500	500	0	0,328	2016-2016	_1001_1500	500	0	0,438
	_1501_2000	500	122	0,344		_1501_2000	500	0	0,328
	_1_500	500	0	0,438		_1_500	500	269	0,844
	_2001_2500	500	0	0,250		_2001_2500	500	0	0,281
	_2501_2683	183	0	0,062		_2501_2683	183	0	0,078
	_501_1000	500	0	0,422		_501_1000	500	0	0,500
					2017-2017	_1001_1500	500	0	0,468
						_1501_2000	500	0	0,344
						_1_500	500	64	0,781
						_2001_2500	500	0	0,313
						_2501_2683	183	0	0,078
						_501_1000	500	0	0,531

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## Factors Affecting Investment Intention in International Logistics Zone: A Case of Firms in Vietnam

*Sinh Vo The, Hieu Le Minh*

### ABSTRACT

*This paper explores the effects of factors on the investment intention in international logistics zones (ILZ). Data collected from 202 valid respondents were analyzed by descriptive statistic, exploratory factor analysis, and multiple regression analysis. The statistically significant results demonstrated that cost factor (0.248) has the highest contribution on investment intention, other variables, namely, the infrastructure (0.238), location (0.189), operation (0.183) are also positively contributed to investment intention in international logistics zone. The influences of the two political and market variables on firms' investment intention were not supported in this study. The findings provide a glimpse into the strategies of logistics zones administrators.*

**Keywords:** *International Logistics Zone, Regression Analysis*

**JEL Classification:** M16

### 1 INTRODUCTION

With the growing competition, companies have begun pursuing greater efficiency in logistics and transportation systems, in order to deliver the products and services to the clients quickly, usually outsource the logistics task to professional logistics service providers. The logistics service providers are stationed mostly in international logistics zones where provides firms a place for value-added servicing of products, cargo trade, warehousing, logistics, assembly, reassembly, packaging, repairing, processing, manufacturing, exhibition, technical services, cargo consolidation and distribution, re-exporting, transshipment, forwarding and customs service (Lu and Yang, 2007). Numerous researches have explored the different aspects of international logistics zones (McIntyre et al., 1996; MacCarthy and Atthirawong (2003); Lu and Yang, 2007; Nathanail, 2007; Baird, 2007; Carbone and Gouvernal (2007); Lu et al., 2008). The development of ILZ will heavily impact on the economic growth. At present, over seven hundred international logistics zones are located in the world. Several logistics zones have been established at major Asian airports and seaports in Singapore, Hong Kong, Korea, Japan and Taiwan. To deal with the competitive pressure, Taiwan, Korea and Japan have implemented a series of measures to enhance port logistics infrastructure and make their competitiveness stronger such as expanding port, establishing free trade zones (FTZ), improving hinterland transport networks, reforming inefficient and unreasonable port logistics processes through logistics information system integration and specialized logistics enterprise training. As a emerging market with the rapid growth, Vietnamese import and export enterprises are demanded for logistics services. Many logistics service firms are now looking for the opportunities to join the local logistics sector because of a failure to fully adapt requirements. From a government perspective, an important objective of the growing establishment of logistics zones is to attract investment to stimulate the domestic economy.

To develop successful logistics strategic planning and attract firms, it is imperative for international logistics zones' administrators to properly understand factors in the investment environment that influence firms' intention to invest in international logistics zones. This involves not only an analysis of market and economic factors but also an assessment of social, demographic, political, infrastructure, and legal factors. Over the past decade, there has been many researches investigating the impact of environmental factors on investment decisions and choice of market entry mode. The previous studies have indicated that environmental factors in different kinds of zones, such as free trade and export processing zones, have an encouraging effect on attracting foreign direct investment and a positive effect on selecting investment location (Woodward and Rolfe, 1993; Brenes et al., 1997b; Johansson and Nillsson, 1997; Head et al., 1999). They concluded that environmental factors such as market orientation, labor force, tax incentive, and infrastructure of host country are catalytic attractiveness. The current literature on the impact of environmental factors on firms' decision to invest in international logistics zones, however, has not considered one important aspect: determinants influencing manufacturing firms' foreign direct investment decisions can be applied to factors impacting on their decision to invest in logistics zones. This study explores the effects of factors, namely, infrastructure, port site conditions, political, cost, business operation and market on the investment intention in international logistics zones.

## **2 LITERATURE REVIEW**

According to the research (McIntyre et al., 1996), international logistics zones can attract the investors to locate their manufacturing company in the host country, increasing employment opportunities, improving logistics sector and potential for economic growth. De Langen (2007) revealed that ports are an pivotal factor developing a region's economic and states that the investment in infrastructure would directly benefit the local economy. Located in an international logistics zone helps the enterprises reduce costs as well as provides more flexible external transport connectivity, enabling the company to distribute the products more efficiently among the target countries and expand globally. MacCarthy and Atthirawong (2003) believes the firms have more competitive advantage with an appropriate location for production. In the researches (Tong and Walter, 1980; Sethi et al., 2002; Oum and Park, 2004; Bevan et al., 2004; Lu and Yang, 2007; Tongzong, 2009; O'Connor, 2010; Gordon et al., 2011), the authors states the factors such as cost, infrastructure, labor characteristics, as well as governmental, political and economic factors are the important influential factors for international enterprises. Based on the literature review, this study examines six categories of factors including infrastructure, port site conditions, political, cost, business operation and market that are hypothesized to directly affect investment intention of enterprises in international logistics zones. The research model of this study is illustrated in Figure 1.

### **2.1 Infrastructure**

Porter (1990) believes that infrastructure is one of important determinants of foreign investment and flow of trade. In addition, Wu and Strange (2000) indicated the importance of soft infrastructure (i.e., information and skill human resource) in foreign direct investment decisions. In the research of the port competitive, Carbone and Gouvernal (2007) also found that infrastructures with high-efficiency is one of the competitive factors. According to Rodriguez (2008), the existing infrastructures brings benefits (i.e., productivity) by the

technological and operational innovations. O'Connor (2010) also states that the infrastructure constructions in both the port and airport play an important role in international logistics activities.

*H1: The infrastructure factor has a positive effect on firms' intention to invest in international logistics zones.*

## **2.2 Location**

According to the research of Lirn et al. (2003), geographic location is the first consideration factor for port selection. After that, Song and Yeo (2004), through 70 port experts, states that geographic location is the principal aspect effecting port competitiveness. Moreover, Oum and Park (2004) also finds geographical location is one of the principal factors considered by transnational enterprises in establishing their regional logistic centers. From the previous studies, Lu et al. (2008) conducted a research on different industries in which location factor is confirmed as a influential factor for chemical, automotive component and metal industries.

*H2: The port location factor has a positive effect on firms' intention to invest in international logistics zones.*

## **2.3 Political**

Loree and Guisinger (1995) found that political instability had a negative impact on foreign direct investment. Moreover, the previous studies (Globerman and Shairo, 1999; Sethi et al., 2002; Oum and Park, 2004) also confirmed political factors effect foreign direct investment. Oum and Park (2004) believe that in order to build a successful logistics center, the government should design and carry out appropriate policies and strategies, since the governmental policies may influence the enterprises selecting the port location. Gordon et al. (2011) point out in the study that many scholars suggest that governmental policies should be scheduled for planning and implementation, so as to integrate the inland logistics centers or distribution centers. Reduction and exemption in tariffs and business taxes as well as simple clearance procedures promote the operational performance of an international logistics zone (Lu and Yang, 2007).

*H3: The political factor has a positive effect on firms' intention to invest in international logistics zones.*

## **2.4 Cost**

Wu and Strange (2000) found that cost as a pivotal consideration on the choice of location of foreign insurance companies in China. Sethi et al. (2002) believes that cost is an important factor influencing decisions of investors in considering the investment in international logistics zones. Oum and Park (2004) conducted a research in which results cost factor was an important factor for multinational companies while they decided the locations of their regional distribution centers. Lu et al. (2008) confirmed the importance of cost for clothing, textile, plastics and communication network industries when conducting a research on different industries.

*H4: The cost factor has a positive effect on firms' intention to invest in international logistics zones.*

## 2.5 Business Operation

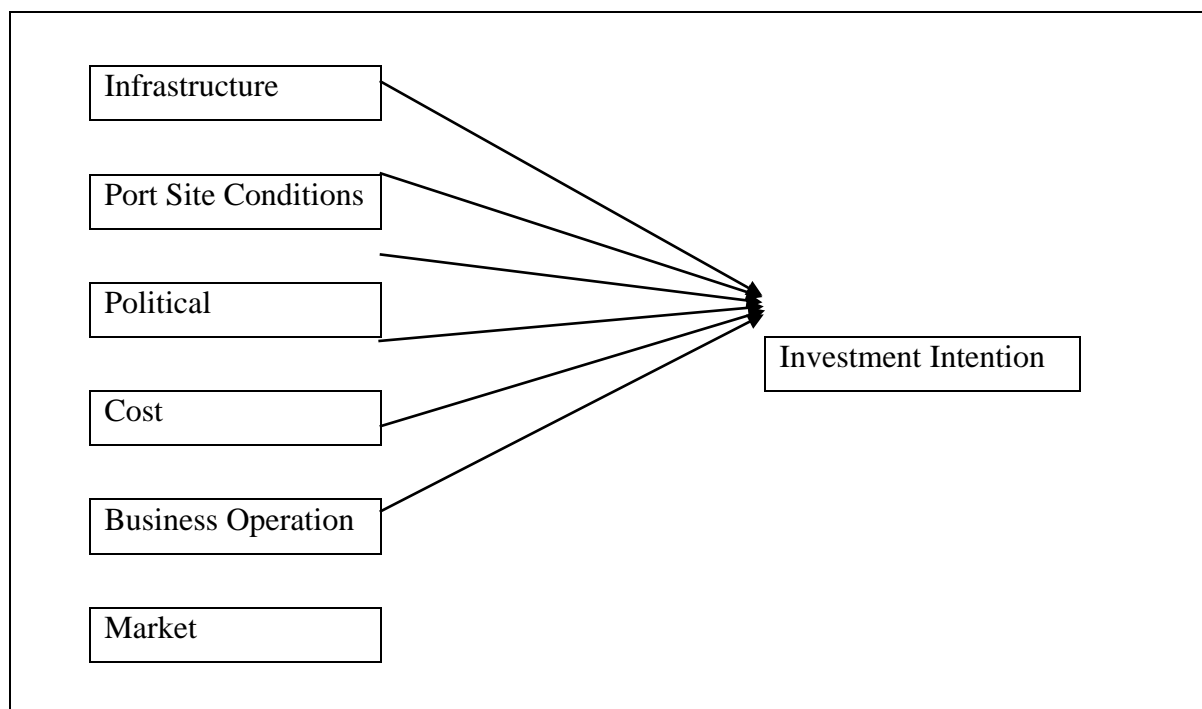
Business operation in port is an important concern of investors who are considering the investment in international logistics zones (Lee and Yang, 2003; Oum and Park, 2004; Tongzon and Heng, 2005; Inamura et al., 2007; Leong, 2007; Gordon et al., 2011). The research of Tongzon and Heng (2005) shows operational efficiency significantly influences on the overall performance of the port.

*H5: The business operation factor has a positive effect on firms' intention to invest in international logistics zones.*

## 2.6 Market

Sethi et al. (2002) found that market size of the host country has a positive impact on the inflow of foreign direct investment. In the research of the multinational operational firms, Oum and Park, 2004 also confirmed this relationship.

*H6: The market factor has a positive effect on firms' intention to invest in international logistics zones.*



**Fig.1 - Conceptual Model**

## 3 METHODOLOGY

This study aims to identify the relationship between independent variables (i.e., infrastructure, port site conditions, political, cost, and market) and dependent variable (i.e., investment intention) from perspectives of firms in Vietnam.

The sample population for this research was composed of the firms located in Vietnam. The questionnaire was sent to the investment division of the 800 firms located in Vietnam on 20th February 2017. The initial mailing elicited 103 usable responses. A follow-up mailing was

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sent 2 weeks after the initial mailing. An additional usable responses were returned. The total number of usable responses was 202, therefore, the overall response rate for this study was 25.25%. Respondents were approached and informed about the purpose of the survey in advance before they were given the questionnaire. Before survey distribution, the questionnaire was pre-tested and revised by the 10 practitioners/experts in international logistics zones to ensure the content in validity and reliability measurements. The designed questionnaire based on the work of (Lu and Yang, 2007). After comments and guidance provided from pre-test interview meeting, some revisions by choosing the exact question wording would help respondents can understand and answer properly. Then, our interview items somehow slightly were different from dimensions of Lu and Yang (2007) (Table 1).

**Tab.1 - Consideration Dimensions and Question Items**

Dimension	Question Item	Relevant Literature
Infrastructure	<ul style="list-style-type: none"> <li>- Communication System</li> <li>- Labor quality and skilled labor force</li> <li>- Reliability of energy supply</li> <li>- Efficiency of port operations</li> <li>- Transport linkage</li> </ul>	Tongzon (1994); Zhang (2003); Lee and Yang (2003); Liu and Yang (2007); Oum and Park (2004); Wang and Cheng (2010)
Port site conditions	<ul style="list-style-type: none"> <li>- Geographic location</li> <li>- Port area</li> <li>- Length of port deep-water coastline/parking apron area</li> </ul>	Fleming and Hayuth (1994); Tongzon (1994); Lee and Yang (2003); Zhang (2003); Matsumoto (2004); Chu and Huang (2005); Baird (2007)
Political	<ul style="list-style-type: none"> <li>- Political stability</li> <li>- Security</li> <li>- Efficiency of government administration</li> <li>- Guarantee of foreign investment policy</li> </ul>	Sethi et al. (2002); Ahmed et al. (2002), Oum and Park (2004); Lu and Yang (2007); Gordon et al. (2011)
Cost	<ul style="list-style-type: none"> <li>- Cost of land acquired</li> <li>- Labor cost</li> <li>- Corporate tax incentives</li> <li>- Operational costs</li> </ul>	Tongzon (1994); Baird (1996); Lee and Yang (2003); MacCarthy and Attirawong (2003); Lu and Yang (2007); Tongzon (2009)
Business operation	<ul style="list-style-type: none"> <li>- Administrative efficiency</li> <li>- Favorable living mechanism and environment</li> <li>- Convenient financial and banking services</li> </ul>	Lee and Yang (2003); Oum and Park (2004); Tongzon and Heng (2005); (Inamura et al., (2007); Leong (2007); Gordon et al. (2011)
Market	<ul style="list-style-type: none"> <li>- Size of economic</li> <li>- Economic growth</li> </ul>	Lee and Yang (2003); MacCarthy and Atthirawong (2003); Park (2003); Oum and Park (2004); Lu and Yang (2007)

According to the classification of measurement scales by Cooper and Schindler (2006), considering that the collected data fall into the discrete type, the ordinal scale is adopted as the criteria for measurement. Based on Likert's seven-point scale, 1-grade indicates the factor is extremely unimportant among the considerations of an enterprise in stationing in an international logistics zone, while 7-grade means it is extremely important. The research contents fall into two parts: part one explores the priorities of consideration factors of logistics service providers to station in an international logistics zone, with all 21 items covered; part two focuses on the basic information of respondents and their enterprises. Statistical analyses such as descriptive, exploratory factor analysis (EFA), estimation of reliability using Cronbach's  $\alpha$  and multiple regression analysis were used according to the respective objectives of the study.

## 4 RESULTS AND DISCUSSION

### 4.1 Demographic Profile

A survey conducted about 800 firms located in Vietnam including manufacturing companies and logistics service providers. A total 202 valid samples were collected. The respondents consist of logistics service providers (54.46%) and manufacturing companies (45.54%). The respondents's titles consist of 55.94% were manager, 22.77% were assistant manager, 9.41% were vice president or above, 6.44% were director, 2.97% were supervisor and 2.48% were other. The age of firms ranks from 33.17% were more than 20 years, 22.77% were 16 to 20 years, 19.8% were 11 to 15 years, 8.91% were 6 to 10 years, 15.35% were less than 5 years (Table 2).

**Tab.2 - Respondents' profile**

<b>Characteristics</b>	<b>Number of respondents</b>	<b>Percentage of respondents</b>
<b><i>Job Title</i></b>		
Vice-president or above	19	9.41
Manager	113	55.94
Assistant manager	46	22.77
Director	13	6.44
Supervisor	6	2.97
Other	5	2.48
<b><i>Age of firm</i></b>		
Less than 5 years	31	15.35
6–10 years	18	8.91
11–15 years	40	19.80
16–20 years	46	22.77
More than 20 years	67	33.17
<b><i>Type of firm</i></b>		
Logistics service	110	54.46
Manufacturing	92	45.54

### 4.2 Exploratory Factor Analysis

A principal component analysis was conducted to check the correlations between the variables to reduce the complexity of the multivariate data. According to the study (Gliner et al., 2009), statements with loading greater than 0.5 were retained for analysis and reliability test was examined for each extract factors (Table 3). These reamed factors/dimensions were then utilized during the testing of regression analysis

Factor analyses employed the principal components method to extract initial factors and an orthogonal (VARIMAX) terminal rotation. Six factors were obtained with the result of Kaiser-Meyer-Olkin (KMO) value of 0.734 and significant level of 0.000. This indicated that the sample structure was obtainable and adequate.

Additionally, the factors together explained approximately 61.367 percent of the total variance of the sample. To determine if the 6 statements relating to investment environment

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criteria could be represented by a smaller number of underlying dimensions, factor analysis showed that the six factors had Eigen-values greater than one.

**Tab.3 - Factor analysis**

Statements	Factor Loading						(N=202)
	Infrastructure	Location	Political environment	Cost	Operation	Market	Cronbach's $\alpha$
IN1.Communication System	0.815						0.754
IN2.Labor quality and skilled labor force	0.788						
IN3.Reliability of energy supply	0.729						
IN4.Efficiency of port operations	0.574						
IN5.Transport linkage	0.546						
PS1.Geographic location		0.799					0.736
PS2.Port area		0.777					
PS3.Length of port deep-water coastline/parking apron area		0.768					
PO1.Political stability			0.771				0.674
PO2.Security			0.752				
PO3.Efficiency of government administration			0.618				
PO4.Guarantee of foreign investment policy			0.564				
CO1.Cost of land acquired				0.789			0.715
CO2.Labor cost				0.700			
CO3.Corporate tax incentives				0.678			
CO4.Operational costs				0.618			
BO1.Administrative efficiency					0.795		0.673
BO2.Favorable living mechanism and environment					0.761		
BO3.Convenient financial and banking services					0.519		
MA1.Size of economic						0.829	0.634
MA2.Economic growth						0.802	



Then, reliability test were performed for each factor using Cronbach’s alpha. The first factor, infrastructure, had a reliability of 0.754 including “communication system”, “labor quality and skilled labor force”, “reliability of energy supply”, “efficiency of port operations”, “transport linkage”. The second factor had a reliability of 0.736 labeled ‘location’ including “geographic location”, “port area” and “length of port deep-water coastline/parking apron area”. The third factor had a reliability of 0.674 labeled ‘political environment’ including “political stability”, “security”, “efficiency of government administration”, and “guarantee of foreign investment policy”. The fourth factor had a reliability of 0.715 named ‘cost’ including “cost of land acquired”, “labor cost”, “corporate tax incentives” and “operational costs”. The fifth factor named ‘operation’ had a reliability of 0.673 including “administrative efficiency”, “favorable living mechanism and environment”, “convenient financial and banking services”. The sixth factor, ‘market’, had a reliability of 0.634 consisted of two items, namely, “size of economic” and “economic growth”.

### 4.3 Regression analysis

Multicollinearity test is important because if multicollinearity exists between two or more independents variables it can deteriorate the results of multiple regression. In this study, multicollinearity has been examined between the independents variables using VIF as shown in Table 4. The result in Table 4 indicates that multicollinearity does not exist among all independent variables because the Tolerance Values are more than 0.10 and VIF values are less than 10. The result suggests that the current study does not have any problem with multicollinearity and this allows for standard interpretation of the regression coefficients.

**Tab.4** - Tolerance Value and the VIF of variables

Variables	Collinearity Statistics	
	Tolerance	VIF
Operation	.887	1.127
Location	.885	1.130
Infrastructure	.832	1.202
Cost	.896	1.117

In this model, R<sup>2</sup> value for the first stage of analysis regression model is 0.595 (Table 5), which means that the influencing factors explain 59.5 percent of the variance in investment intention. Standard multiple regression also provides an adjusted R<sup>2</sup> value. The adjusted R<sup>2</sup> value in this model was 0.587, indicating fitness of the model. ANOVA was used to assess the statistical significance of the result. The result in Table 6 demonstrates that the null hypothesis that the multiple R in the population is equal to 0 is rejected since the model of this study is statistically significant at p= .000. As can be seen from table 5, the R<sup>2</sup> was statistically significant, with F =72.277 and p < .001, the common expression of the regression equation is stated as follows:

$$\text{Investment Intention} = 0.410 + 0.248*\text{Cost} + 0.238*\text{Infrastructure} + 0.189*\text{Location} + 0.183*\text{Operatio}$$

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**Tab.5 - Model Summary**

R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
.771	0.595	0.587	0.31201	1.722

**Tab.6 - ANOVA**

	Sum of Squares	df	Mean Square	F	Sig.
Model					
Regression	28.144	4	7.036	72.277	0.000**
Residual	19.178	197	0.097		
Total	47.322	201			

\*\* significant at the 0.01

The presented theoretical model has seven concepts, in which the dependent variable is investment intention, independent variables including (1) infrastructure, (2) location, (3) political environment, (4) cost, (5) operation, (6) market. Regression analysis is conducted to determine the specific weighting of each factor affecting on investment intention. The value of the factors used to run the regression is the mean of the observation variables. Regression analysis was performed by total regression of variables (Enter method) with SPSS software. The results in Table 7 shows that except for two variables of political environment and market, the other independent variables contributed significantly to the investment intention. Table 9 summarizes results of research findings related to the hypothesis 1-6.

**Tab.7 - Coefficients**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	0.423	0.220		1.919	0.056
Operation	0.178	0.034	0.263	5.172	0.000**
Location	0.188	0.035	0.263	5.335	0.000**
Infrastructure	0.240	0.038	0.320	6.340	0.000**
Political environment	-0.015	0.034	-0.022	-0.453	0.651
Cost	0.249	0.034	0.363	7.344	0.000**
Market	0.010	0.035	0.014	0.297	0.767

\*\* significant at the 0.01

**Tab.8** - Coefficients after excluding the two variables

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	0.41	0.188		2.182	0.030
Operation	0.183	0.033	0.270	5.607	0.000**
Location	0.189	0.034	0.264	5.486	0.000**
Infrastructure	0.238	0.037	0.318	6.391	0.000**
Cost	0.248	0.033	0.361	7.527	0.000**

\*\* significant at the 0.01

The four factors including infrastructure, location, cost, and operation have a relationship with investment intention (significant at the 0.05 level.). The two political environment and market factors have no relationship (at the 0.05 level of significance) with investment intention and should be excluded from regression analysis. The cost has the highest contribution on investment intention among the independents variables (0.248). Other variables were also significantly and positively contributed to investment intention arranged in descending order: the infrastructure (0.238), location (0.189) , operation (0.183) (Table 8). Cost and infrastructure have a significant influence on investment intention, this result confirms the study of Liu and Yang (2007). Also, location and operation have a significant influence on investment intention confirming the results of the previous study (Park, 2004; Lu et al., 2008; Inamura et al.,2007; Leong, 2007; Gordon et al., 2011). Surprisingly, political environment has no significant influences on investment intention, this result are different from the previous study (Loree and Guisinger, 1995; Mudambi and Navarra, 2003), indicating that for the dimension to be considered when selecting the international logistics zone for investment, political environment is not the consideration factor in the study. However, the result confirms the study of Liu and Yang (2007).

**Tab.9** - Summarizes of Research Findings

Hypotheses	Assumption of hypothesis
The infrastructure factor has a positive effect on firms' intention to invest in international logistics zones.	Supported
The port location factor has a positive effect on firms' intention to invest in international logistics zones.	Supported
The political factor has a positive effect on firms' intention to invest in international logistics zones.	Not Supported
The cost factor has a positive effect on firms' intention to invest in international logistics zones.	Supported
The business operation factor has a positive effect on firms' intention to invest in international logistics zones.	Supported
The market factor has a positive effect on firms' intention to invest in international logistics zones.	Not Supported

## **5 CONCLUSIONS**

This paper has examined the hypotheses concerning the relationship between influencing factors and investment intention by multiple regression analysis. It appears that cost factor, has the highest contribution on investment intention in international logistics zone. Other variables namely operation, location, infrastructure are also significantly and positively contributed to investment intention in international logistics zone. But, the study did not find any significant relationship between political environment, market and investment intention in international logistics zone.

### **5.1 Significant Contributions and Practical Implications**

The study findings have implications for practice and research. Firstly, the research contributes to studies in the international logistics zones field by finding influencing factors related to the investment intention from firms in Vietnam. The results stated that cost is the most important factor, followed by operation, location, infrastructure for the firms' investment intention in international logistics zones. Thus, administrators should consider the cost factor as a core factor for attracting investors, meet investors' need of minimizing costs. For example, administrators could offer land, labor and corporate tax at low cost, the firms are more likely to station in the zones. Moreover, the study suggest that a country needs to consider the relevant area when locating international logistics zones. Although this paper did not find out the significant effects between political environment, market and investment intention, this contributes to the body of literature on investment environment in international logistics zones context, especially in Vietnam. Secondly, findings from this research will also facilitate policy makers understanding of all key dimensions and focusing their resources on areas in need of improvements. The study results help administrators have relevant policies and strategies to accurately meet investor's demand and focus areas of priority for their investments such as developing infrastructure facilities (i.e., communication system, efficiency of port operations, labor quality and skilled labor force, transport linkage ,reliability of energy supply). Finally, the study may also be a benefit to current and potential international logistics zones investors because the listed items may help them identify and assess what they are really seeking from logistical location.

### **5.2 Limitations and Suggestions**

There are limitations associated with this research project. Firstly, this study focused on convenient samples from Vietnam in which may limit the generalization of the results. Expansion of this study to more types of companies in the other countries or Asia could be considered. The perceptions of investors and administrators may be different, the comparision should be considered. Future research could examine a wider range of samples including investors and administrators or using longitudinal data to verify the validity of the study.

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## Effects of Consumer Perception of CSR Activities and Technology Acceptance on Intention to Adopt Mobile Banking: Evidence in Vietnam

*Nguyen Thi Phuong Thao, Nguyen Van Anh, Sang-Lin Han*

### ABSTRACT

*The purpose of this paper is to propose and examine a conceptual model that best explains the key factors influencing Vietnamese customers' intention to adopt mobile banking (m-banking). The proposed conceptual model was based on the Technology Acceptance Model (TAM). This was extended by adding perceived risk, perceived cost and trust as external factors. In addition, the conceptual model was extended by adding three dimensions of CSR including Economic responsibility, Environmental responsibility and Social responsibility as the antecedents of trust. Structural Equation Modeling (SEM) was conducted to analyze the data collected from the field survey questionnaires administered to a convenience sample of Vietnamese banking customers. The results showed that behavioural intention is significantly influenced by perceived usefulness, perceived ease of use, perceived risk and trust. Specially, CSR initiatives play a vital role in building customer's trust. Therefore, this study has attempted to fill this gap by empirically examining some of the important factors influencing the adoption of m-banking from the Vietnamese customers' perspective. Finally, practical and theoretical implications for both Vietnamese banks and researchers in the m-banking context are also discussed in the concluding section.*

**Keywords:** Vietnam, TAM, CSR, Behavioral intention, Mobile banking

**JEL Classification:** M1, M31

### 1 INTRODUCTION

Mobile financial services provide convenience and promptness to customers along with cost savings, banks are interested in expanding their market through mobile services. In the last several years, retail banks in Viet Nam have introduced and diffused mobile banking systems throughout their operations to improve people's quality of life and to bring efficiency to banks. In fact, according to Zhou (2012a) mobile banking (m-banking) allows people to perform bank transactions anytime and anywhere. With m-banking, users are able to access account balances, pay bills, and transfer funds through mobile devices, instead of visiting banks or using internet banking based on computer (Gu et al., 2009). Mobile banking also benefits banks by promoting better efficiency and improved service quality. Data from 2015 shows that smart phone rate penetration in Viet Nam was 30% whereas m-banking transaction consisted of about 10% of total bank transactions in 2015 so these numbers are relatively modest compared with many countries and it has not achieved its full potential. In other words, despite the fact that m-banking beneficial to the customers, the adoption rate of m-banking in Vietnam is quite low and m-banking adoption is still in the early stage in comparison to other service provided by banks. Against this backdrop understanding the

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consumer intention toward m-banking will be very crucial for the marketing strategy of banking institutions.

Furthermore, despite its rapid growth and its good economic performance, nowadays the Vietnamese business community has been facing important issues for its sustainable development, especially societal and environmental ones. Recent scandals of Vedan company committed to serious pollution in Thi Vai River, Vietnamese customers has boycott Vedan's product. In the same case, Coca-Cola Vietnam was stayed away by consumers due to transferring price incidentally during a decade to avoid paying governmental tax. In other words, Vietnamese customers are willing to boycott any corporations if they violating Corporate Social Responsibilities. In the same vein, after Formosa- Taiwan steel factory leaks toxic waste into the sea that caused massive fish deaths along a 200-km (124-mile) stretch of coastline in April 2016 and numerous cases of health safety problems especially toxic ingredients found out in consumer goods have been raising a greater concern on corporate social responsibility (CSR) in Vietnam.

In addition, a report by Nielsen revealed that an astounding 73 percent of Vietnamese online consumers were willing to pay more for products and services provided by companies committed to positive social and environmental impact. That figure beat Europe's 40 percent, Latin America's 63, North America's 42, and even topped ASEAN's sustainable champion Singapore, which came in at 48 percent. Therefore, this research aims to investigate whether CSR initiatives (Economic, Social, environment dimensions) effect on behavioral intention to use m-banking through customer trust.

Research in mobile commerce has shown that trust is crucial for any business relationship (Palvia, 2009; Wang et al., 2015), especially in m-commerce, because it reduces uncertainty (Gu et al., 2009). In the same way, building users' initial trust is essential for mobile banking service providers (Zhou, 2012a).

Moreover, there are growing concerns about risk in online banking services across the world. During the last few years, internet-based attacks have increased tremendously and also highlighted the multiple cases of the theft or fraud, breaches of personal privacy and attacks by hackers (So and Sculli, 2002; Littler and Melanthiou, 2006).

Besides, there may be situations in which an individual want to use m-banking but is prevented by lack of money and since the recent researches have revealed that perceived cost was found to be affect consumer acceptance of M-banking in Australia, Iran and Taiwan (Wessels & Drennan, 2010; Hanafizadeh et al., 2014; Yu, 2012). Moreover, the Vietnamese customers seem to be sensitive to the price and price plays a vital role in buying decision making process. Hence, in this study the author adopt the TAM as the base model and adjust the model to reflect the characteristics of mobile banking in Vietnam context by adding trust, three dimension of CSR (Economic responsibility, social responsibility, environmental responsibility), perceived risk and perceived cost factors to enhance understanding of m-banking adoption intention of Vietnamese customers.

This study differs from some past studies as follows. First, as Shaikh & Karjaluo, (2015) note, past studies have limited and mainly focused on SMS banking in developing countries and virtually no studies have addressed the use of m-banking applications via smart phones or tablets which is addressed in this study. Second, most of the past studies have studied the relationship of trust and intention to use m-banking but this study is one of the first study investigate the relationship of the CSR with m-banking intention adoption through trust. Third, many studies proved CSR has a vital role in creating customer trust in Hospitality or

Food industry and this study examine the role of CSR in banking industry, particularly in m-banking, which has not yet researched before. This study may find out valuable applications for bank managers to support their planning strategies and marketing campaigns that help banks develop sustainably.

The outstanding growth of mobile sector worldwide has created a unique opportunity to provide social and financial services over the mobile network. With over four billion mobile phone subscriptions worldwide, mobile network has the ability to immediately offer m-banking to 61% of the world population (Kshetri & Acharya, 2012). According to the Vietnam mobile market report, there is significant growth in the use of mobile phones, with over 90% of the population in Vietnam using them. However, with all the benefits of m-banking, the usage and adoption of m-banking is still low among banks customers in Vietnam. Though many of such people argue that internet and other technology based transaction is not safe, not practical and would lead to fraud, a lot of people think it safer, flexible in time and can be done anywhere and anytime (Chowdhury & Ahmad, 2011). Hence, it is necessary to investigate the factors that lead customers to adopting or rejecting m-banking services. Although prior studies on m-banking adoption have provided background information on the adoption behavior with regard to m-banking, studies that focus on the risk perception and trust factors that influence consumers to adopt m-banking services are limited. Thus, understanding such factors will play a critical role in reducing the challenges associated with the use of m-banking. For example, risk and privacy issues have been identified as major contributing factors for the slow uptake of m-banking (Dupas et al., 2013). However, previous study revealed that consumers do not consider m-banking to be prone to risk (Rammile & Nel, 2012). Risk and privacy are related to trust in the banking industry – which is especially important when banks are trying to increase their customer base and improve their services by introducing technological innovations (Dupas et al., 2013). However, previous studies still have many limitations and have recommended further research in this field.

This study will help researchers, developers, and managers to understand the major determinants of customer acceptance of m-banking that can help banks to improve the rate of m-banking adoption in developing country context. Moreover, researcher argues that the results also have a “practical value” particularly for Vietnamese banks. A large number of customers using m-banking could justify the investments that banks have made in this technology, thus increasing the rates of return (Lee & Chung, 2009). The understanding of the factors that affect intention to use mobile banking services enables banks to target bottlenecks of this adoption and improve their services (Zhou et al., 2010).

## **2 LITERATURE REVIEW AND BACKGROUND**

### **2.1 Mobile banking**

#### **2.1.1 Definition**

M-banking has received a considerable attention in academic research and thus several conceptualization of m-banking currently exists. M-banking (m-banking) is defined as an application of m-commerce (Kim et al., 2009), an innovative method for accessing banking services (Xin Luo et al., 2010) that offers additional value for customers by providing “anytime, anywhere” access to banking service (Lee and Chung, 2009). Turban et al. (2006) conceptualized m-banking as any form of banking transaction that is carried out through a mobile device, such as a mobile phone or a personal digital assistant.

### ***2.1.2 General background of mobile banking in Vietnam***

Mobile banking came to Vietnamese market in 2010, 6 years after internet banking, and developed quickly. Currently, there are 32 banks in Vietnam offer mobile banking service for their customers. According to the statistical data of Smartlink card services joint stock Company, there are more than 3 million customers using mobile banking services. The number of transactions per month achieved approximately 14 to 15 million (Nguyen, 2014). With 22 percent of Vietnamese have bank accounts and more than 30 percent of Vietnamese owned at least one smartphone; the demand of mobile banking in Vietnam is high. The target of mobile banking is young customers whose age from 18 to 34 (Nguyen, 2014). This group is highly adaptive and easy to accept new technology. However, the current usage of mobile banking in Vietnam is below potential. According to a representative of Smartlink card services joint stock Company, the growth of mobile banking in Vietnam need more time to meet its demand because customers are still used to their familiar payment channels. The Vietnamese are unaware of modern payment services<sup>28</sup>. The security dilemma also raises a difficulty for most banks when they started offering mobile banking services since bank's customers concerns about risk in online banking services because most of the internet services are operating in an open environment, their applications and outcomes are vulnerable to security and privacy threats such as phishing activities, malwares, spywares, spoofing, and password-sniffing. Vietnamese people also prefer a simple way to access their bank accounts via mobile device but also want it to be secured in case of lost or stolen device. Most of mobile banking services available in Vietnam now are either lack of convenience, simplicity or security, which hinder the potential of mobile banking.

## **2.2 Corporate social responsibility (CSR)**

CSR covers the economic, legal, ethical and discretionary expectations that society has of organizations at a given moment in time (Carroll, 1979). CSR is the commitment by a company to improve the welfare of its community by implementing certain discretionary practices and increasing the availability of its resources (Kotler & Lee, 2005).

Throughout the past several decades, numerous aspects of CSR have been the subject of investigation in academic and business literature. Although the nature and scope of the CSR remains uncertain, scholars have tried to summarize and categorize various CSR activities (Maignan & Ferrell, 2001; Smith, 2003). One thing they all agree is that the purpose of business is to generate profits for shareholders, which is economic responsibility. In addition, following laws and legislations and keeping their business ethics seem to be a must-responsibility that society and the public automatically expect from business. It is noted that Carroll's (1998) four dimensions of CSR: economic, legal, ethical, and philanthropic responsibilities have been widely accepted among others and the four aspects of CSR are described in detail in the following part.

### ***2.2.1 Economic Responsibility***

Some scholars argue that companies do not need to promote socially responsible actions because their only responsibility is to be profitable for stockholders (Friedman, 1970), which is an economic dimension of CSR. Novak (1996) defines economic responsibility as to be

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<sup>28</sup> <https://m.vietnambreakingnews.com/tag/sihanvina-bank/>

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profitable for principals by delivering a good quality product at a fair price to customers. Novak more fully describes seven economic responsibilities: “(1) satisfying customers with goods and services of real value; (2) earning a fair return on the funds entrusted to the corporation by its investors; (3) creating new wealth, which can accrue to non-profit institutions which own shares of publicly-held companies and help lift the poor out of poverty as their wages rise; (4) creating new jobs; (5) defeating envy though generating upward mobility and giving people the sense that their economic conditions can improve; (6) promoting innovation; and (7) diversifying the economic interests of citizens so as to prevent the tyranny of the majority” (also summarized by Lantos, 2001)

### ***2.2.2 Legal and Ethical Responsibilities***

Business ethics and legal responsibilities have been studied in management studies and these are considered as must-responsibility (Carroll, 2000; Spitzek, 2005). These responsibilities are expected to be implemented all of the time, and only when companies breach one of these responsibilities, it becomes an issue. The result is often negative publicity. Although many scholars categorize legal and ethical responsibilities together in their discussions of CSR, legal and ethical responsibilities can be completely different (Lantos, 2001).

Maignan & Ferrell (2001) summarize some of the legal responsibilities including: accurate reporting of business performance, ensuring that products meet all legal standards, avoiding discrimination in hiring and compensation, and meeting all environmental regulations. Legal duties involve obeying the law and playing by the rules.

However, laws and legislation have flaws to ensure responsible actions. They only provide a moral minimum for business conduct; they are reactive (telling what ought not to be done) rather than proactive, (telling what ought to be done); and they are often followed involuntarily (Carroll, 2000; Lantos, 2001).

On the other hand, ethical duties overcome the limitations of legal responsibilities. They involve being moral, doing what is just and fair; respecting peoples' rights; and avoiding and preventing damage caused by others (Smith & Quelch, 1993). Although ethical responsibilities are not necessarily codified into law, they include those policies, institutions, or practices that are either expected (positive duties) or prohibited (negative duties) by members of society (Carroll, 2000). They derive their source of authority from religious beliefs, moral traditions, and human rights commitments (Lantos, 2001; Novak, 1996). Some of the examples of ethical responsibilities by Maignan & Ferrell (2001) are: implementing a code of conduct, organizing ethics training programs, incorporating integrity in the performance evaluation of employees, and providing full product information to customers. Today, virtually all members of the business system agree, at least in theory, that corporations are expected to keep at least their promises on legal and ethical responsibilities.

### ***2.2.3 Philanthropic Responsibility***

Carroll's (1998) philanthropic responsibility, also known as discretionary responsibility, is the most controversial issue raised over the legitimacy of CSR.

Philanthropy means “giving back” time and money in the forms of voluntary service, voluntary association, and voluntary giving. This reflects society's wish to see businesses participate actively in improving society beyond the minimum standards set by the economic, legal, and ethical responsibilities (Maignan & Ferrell, 2001) Over the past half century,

business has been judged not only by its economic and moral performances, but also by its social contributions (Carroll, 1998; Lantos, 2001; Maignan & Ferrell, 2001)). Philanthropic responsibility includes activities, such as providing work-family programs, reaching out to communities, and giving donations to charitable organizations (Maignan & Ferrell, 2000).

In marketing, philanthropic efforts by companies have been shown through cause-related marketing (CRM). Whether it is to help children around the world, homeless people in the community, or providing shelters for animals, philanthropy has been implemented in many different ways. By doing this, companies hope to create a positive image of the company, which may lead a customer to purchase a product from the company (Cornwell & Coote, 2005; Nan & Heo, 2007; O’Cassand Lim, 2001).

### ***2.2.4 Environmental responsibility***

Separate from the philanthropic definition of CSR, environmental responsibility has gained remarkable attention from governments, organizations, and the general public in recent years. Laws and legislations have been made and corporations have voluntarily participated in developing environmentally responsible ways to conduct their business.

Global warming and pollution have generated a great deal of public concern regarding the environment, which leads many to support environmental protections (Choi et al., 2009).

This environmental aspect of CSR has perhaps gained the most attention from marketing managers, and firms have put a tremendous amount of effort toward communicating with customers about their environmental efforts. Consumer behaviors on green purchasing and attitudes toward environmentally friendly products have been studied in many marketing studies (Chan, 2001; Choi et al., 2009; Manaktola & Jauhari, 2007; Tanner & Kast, 2003).

Although Carroll’s (1998, 2000) four-dimension of CSR has been widely accepted by many scholars, existing marketing literature seems to generally agree on at least three dimensions of CSR: economic, philanthropic (also called social or discretionary), and environmental (Leigh & Murphy, 1988; Málovics et al., 2008)

## **2.3 Effects of CSR**

### ***2.3.1 Effects of CSR on customers’ attitudes***

Recent research suggests that socially responsible organizational behavior can positively affect consumers’ attitudes toward the organization (Brown & Dacin, 1997; Martin & Ruiz, 2007; Perez, 2008; Sen & Bhattacharya, 2003, 2004). The findings indicate that consumers’ awareness of a company’s CSR practices have a positive influence on customers’ attitudes toward the company, including an organization’s image, reputation, and evaluation of product attributes (Martin & Ruiz, 2007; Perez, 2008). The effect occurs both directly and indirectly through customer–company identification (Lichtenstein et al., 2004). For example, if a consumer purchased products from a company that had recently teamed up with an environmental organization, would others conclude that he/she sincerely cared about the environment? This issue is important because many consumers are interested in reflecting their self-images by using or purchasing certain products and brands (Yoon et al., 2006).

Customers can be triggered by a company’s CSR initiatives to develop a positive attitude toward the company. However, that is not always the case. Becker-Olsen et al., (2006) investigated the role of perceived fit (e.g., similarity between its mission and CSR initiatives)

and timing of a CSR initiative (reactive vs. proactive) on consumers' responses to CSR initiatives. The results show that a low-fit between cause and the company's CSR action negatively affects consumer's belief, attitudes, and intentions and even with the high-fit initiatives if a firm was perceived reactive rather than proactive, its CSR initiatives have a negative impact on consumers. Thus, the companies should find an appropriate CSR action that can be perceived by customers as a right fit between CSR and the company.

### ***2.3.2 Effects of CSR on customers' behaviors***

Much research suggests that CSR increases customer-company identification (CCID), repeat purchase, customer loyalty and trust (McDonald & Rundle-Thiele, 2008); however, others confirm that it is unlikely that consumers will blindly accept these CSR programs as sincere actions. They may or may not reward the firm (Barone et al., 2000; Creyer & Ross, 1997; Ellen et al., 2000; Sen & Bhattacharya, 2001), and in fact, some research suggests that consumers will punish organizations that are perceived as insincere in their social involvement (Becker-Olsen et al., 2006; Sen & Bhattacharya, 2001; Simmons & Becker-Olsen, 2006). Thus, companies must carefully review their CSR practices and when and how to use them for marketing communication purposes.

Mohr and Webb's study (2005) performed an experiment to examine the influence of different prices and various CSR dimensions on consumers' response. They have manipulated two CSR domains (environment and philanthropy) and prices (higher and lower than average). The result found that both CSR domains have a positive impact on customers' purchase intention, and the environmental domain has a stronger impact on purchase intent than price does.

In summary, numerous studies have shown that CSR can have a positive impact on key stakeholder groups, such as employees, consumers, distributors, and stock holders (Sen & Bhattacharya, 2004; Sen et al., 2006). Academic research on consumer responses to companies' CSR actions reveals its company-favoring effects on cognitive and affective (e.g., beliefs, attitudes, identification as well as behavioral outcomes (e.g., patronage, loyalty) (Anisimova, 2007; Bhattacharya & Sen, 2003; Barone et al., 2000; Brown & Dacin, 1997; McDonald & Rundle-Thiele, 2008; Salmones et al., 2005) is still the most dominant criteria in consumers' purchasing decision (Boulstridge & Carrigan, 2000).

### **2.4 Picture of CSR activities in Viet Nam**

International economic integration occurred during the last decade has brought to Vietnamese businesses, especially the private sector that comprised mainly small and medium enterprises (SME), opportunities to expand their activities and to go global. Most importantly, it enables the private sector to grow and to contribute remarkably to the economic development of the country. While holding just 30% of total national assets, the Vietnamese private businesses contribute 40% to GDP, 30%-40% to export turnover and absorb 50% of the total workforce. Despite its rapid growth and its good economic performance, the Vietnamese business community has been facing nowadays important issues for its sustainable development, especially societal and environmental ones, including waste management, energy saving, systematic implementation of workplace safety standards, and taking care of the well-being of workers as well. Recent scandals of factories committed to serious pollution in ThiVai River and numerous cases of health safety problems especially tainted milk distribution, toxic

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ingredients found out in consumer goods..., have been raising a greater concern on CSR in Vietnam. Along with these environmental and health issues, Vietnamese export-oriented companies have been also encountering problems of good citizenship when their foreign investors and buyers require them to take business practices based on respect for people, communities and the environment. For instance, the U.S.-Vietnam textiles agreement signed in May 2003 included an obligation for the Vietnamese authorities to encourage exporting companies to implement CSR codes in return for access to the U.S. market. Moreover, different from other countries, Vietnam's environment has been ravaged by a history of wars, aggressive industrial development and poor environmental regulation. Every year, 220,000 tons of industrial waste is dumped into the Mekong River, where fishermen reel in their living next to the beer and cement factories that are putting cancer rates through the roof.

Poor mining practices and other industrial activity have polluted so much of the country's soil and water that access to safe drinking water is becoming a real problem. Ecologies sprayed with Agent Orange during the Vietnam War are still recovering, climate change has created typhoons devastating coastal communities, and floods are destroying countless farms along the Mekong River Delta.

Vietnam's factories have promoted CSR in more ways than demonstrating what happens if you don't respect it. Thanks to historically cheap labor and low standards for labor rights, Vietnam has long been attractive to Western countries looking for a place to outsource manufacturing operations. Many Vietnamese manufacturers produce goods for Western corporations. This means they are subject to the high CSR standards of fully developed economies overseas and in Europe.

This influence has bled into most of Vietnam's big businesses – and because Western buyers support the Vietnamese economy (and vice versa), outside funding is being provided to enhance the topic of CSR at the political level.

In 2004 Vietnam Government adopted the Strategic Orientation for Sustainable Development, which identifies 19 prioritized areas under the three pillars (economic, social and environmental) of corporate social responsibility. This better defined the government's responsibilities when it comes to CSR, and led to the development of Vietnam's "Green Growth" strategies for 2011 to 2020.

In recent decades, Vietnam has experienced changing in customer's behavior; "green consumption" is the primary trend of consumption around the world. Not only do consumers desire using high quality products but also they crave for safe and friendly products which are produced by a highly reputable and responsible company. Environmental problems become social problems (Fierman, 1991). 1990s was called as "Earth decade" (Daniel & Rylander, 1993) or "Environmental decade" (McDougall, 1993). Several studies also indicated the concerning to individual environment (Chan, 1996; Donaton & Fitzgerald, 1992; Kerr, 1990; Ottman, 1993; Schlossberg, 1992; Wall, 1995) and awareness towards consumer environment (Ellen, Wiener & Cobb-Walgren, 1991; Kim and Choi, 2005; Verhoef, 2005) affecting positively to purchasing intention of consumers.

Though some companies still employ unfair labor standards, and many factories still dump waste into the water and pump greenhouse gases into the hazy sky, Vietnam is a country bent on improving CSR. This was the same story as 10 years ago, but the difference is that now, things are actually happening. Vietnam is starting to make good on its promises to develop sustainably, and to create businesses that will facilitate that process and create a better life for its citizens.



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Therefore, it can be concluded CSR is a relatively new matter in Vietnam. Nevertheless, recently, with the environmental disasters and the negative consequences on the society caused by enterprises, the social responsibility has become urgent. In Vietnam, the implementation of CSR is fully in conformity with targets of sustainable development strategy. In other words, Vietnam government, Vietnamese business owners and customers have been recognizing the importance of CSR now and activities of reactions of consumer in recent years have reflected that the term Corporate Social Responsibilities is an issue getting a lot of attention from communities. For example, the “The Corporate Social Responsibilities Award” is organized annually to appreciate corporations which perform well Corporate Social Responsibilities.

Besides, recently customers are willing to boycott corporations because of violating Corporate Social Responsibilities. For instance, Vedan’s products and Coca-Cola Vietnam are stayed away by consumers due to polluting Thi Vai River and transferring price incidentally during a decade to avoid paying governmental tax, respectively. Hence, recently companies have realized the importance of CSR with a tool of marketing strategies to help companies build the image, trust and reputation to develop sustainably and gain advantages against the competitors. One of an example is Vietcombank (VCB), one of the biggest state-owned commercial bank in Vietnam. VCB is aware of corporate social responsibility so Vietcombank often pays attention to social welfare and charity activities that have large impact on the society such as “Nghĩa tình Truong Son”, “Noi vong tay lon”, “Ngay vi nguoi ngheo”...; equipped ship CQ-01 for the Navy Forces, supported earthquake and tsunami victims in Japan. During the year, Vietcombank has spent over 100 billion VND for these social welfare programs especially in 2015 VCB spent more than 2566 billion to social welfare contribution, supporting community for the overall development of society. Hence, from 2012 to 2016 VCB was chosen the most favorable bank in Vietnam.

Also, since its operation in September 1996, VIB has constantly implemented different community-oriented activities (CSR) in many localities across the country, apart from banking operations. This is aimed to make contributions to people development and social life of the local people.

Over the past years, VIB has been actively involved in significant social programs, focusing on 3 areas: Education, Environment, and Enrichment. For instance, the bank has donated money to support victims of Can Tho Bridge collapse, construction of hospitals for poor people of Kien Giang province, the Operation Smile Fund, people in the flooded areas in central provinces and so on. Specially, VIB has sponsored the Academy of Banking’s “Future Bankers” program and the program “Glorify Vietnam”, and Vietnamese talents nurturing program for poor primary school students with high achievements across the country, etc... In 2013, VIB was honored with the “The Excellence of Corporate Social Responsibility” award granted by the Ministry of Planning and Investment and the Economics & Forecast magazine.

By all above picture of CSR in Vietnam, this study’s purpose is investigating the relationship between CSR activities with three dimensions (Economic, social, environment) on consumer’s intention to use m-banking.

### 3 HYPOTHESES DEVELOPMENT AND RESEARCH MODEL

#### 3.1 Hypothesis development

##### 3.1.1 CSR initiatives

Previous studies have used the concept of CSR in marketing and consumer behavior literature, with several scholars examining the influence of CSR initiatives and consumer responses on financial performance (Sen & Bhattacharya, 2001; Brown & Dacin, 1997). Several studies have attempted to investigate the effects of CSR on factors such as customer loyalty, trust, word of mouth, intentions, attitudes, satisfaction, and brand identification (Luo & Bhattacharya, 2006; Handelman & Arnold, 1999; Sen & Bhattacharya, 2001). From an economic perspective, the fundamental motivation for CSR is to maximize firm profitability for shareholders (Zenisek, 1979). However, some scholars indicated that corporations bear a responsibility to contribute to the betterment of society as a whole (Brown & Dacin, 1997; K. Davis, 1975; Drumwright, 1996; Handelman & Arnold, 1999), as well as to integrate environmental concerns in business operations (Dahlsrud, 2008; Homburg et al., 2005).

A firm's CSR activities engender its image of honesty, integrity, credibility and high responsiveness towards customer concerns (Sirdeshmukh et al., 2002). Maignan & Ferrell, (2000) argue that a firm's CSR activities can be a good source of customer trust and reduction of skepticism. For example, Swaen & Chumpitaz (2008) study cosmetics and sportswear customers and report that CSR perceptions positively impact on customer trust. These scholars argue that CSR perceptions and trust are significant variables in the cultivation of long-term affiliations between customers and firms. Moreover, Salmones et al., (2009) identify a direct relationship between a firm's ethical responsibility and customer trust in retail service markets. Similarly, Choi & La, (2013) state that a firm's ethical-legal responsibility positively affects customer trust in service contexts.

In addition, in recent decades customers have experienced changing in customer's behavior; "green consumption" is the primary trend of consumption around the world. Not only do consumers desire using high quality products but also they crave for safe and friendly products which are produced by a highly reputable and responsible concerning to individual environment (Chan, 1996; Wall, 1995) and awareness towards consumer environment (Kim & Choi, 2005; Verhoef, 2005) affecting positively to purchasing intention of consumers. In addition, many scandals related on environmental issues such as Formosa, Vedan cause the boycott behavior of Vietnamese to those companies. Therefore, based on the theoretical and empirical arguments stated above, the following hypotheses are proposed:

*H1. Economic responsibility has a positive impact on trust*

*H2. Social responsibility has a positive impact on trust*

*H3. Environmental responsibility has a positive impact on trust*

##### 3.1.2 Trust

Mobile banking is an exchange situation without the physical presence of branch and personal interactions. Therefore, trust is a crucial element for decision making (Zhou, 2011; Grabner-Krauter & Kaluscha, 2003). While consumers initially trust their e-vendors and have an idea that adopting online service is beneficial to job performance or life style, they will eventually believe that on-line services are useful (Gefen et al. 2003). In particular, Gefen et al., (2003) investigated the role of trust in an on-line shopping setting explicitly indicated that trust is an

antecedent of perceived usefulness. Trust also has a direct influence on a consumer's behavioral intention to use the service (Wu & Chen 2005). Trust is one of the determinants of perceived usefulness especially in an on-line environment (Vlachos et al., 2009). Pavlou, (2003) also found that trust has a positive effect on perceived usefulness in an e-commerce setting.

*H4: Trust has a positive impact on the perceived usefulness of m- banking services.*

*H5: Trust has a positive impact on the behavioral intention to use m-banking services*

### **3.1.3 Perceived risk**

Due to the high degree of uncertainty and perceived risk in e-commerce operations, trust becomes an important factor for people to obtain confidence on an exchange partner. Customers need to trust in m-banking to use it. Viruses and Trojan horses may exist in mobile terminals too; so, these problems increase users' concern about payment security, and decrease their trust in m-banking, which, in turn, can affect their usage intention and behavior (Zhou, 2012a). In the relationship between customers and m-banking terminals, if trust is not present, there is no adoption and no use of this technology (Zhou, 2012b).

Indeed, risk perception is one of the main barriers to m-banking adoption in Brazil (Cruz et al., 2010), the most important in China (Laforet & Li, 2005; Faqih & Jaradat, 2015) and has a significant relationship with users' attitudes and intention to use m-banking in Iran (Mohammadi, 2015). This construct also has significant relationship with internet banking adoption (Yiu et al., 2007) and with customer's lack of interest in online commercial transactions (Liao et al., 2011). The perception of risk is a significant factor affecting trust (Al-Gahtani, 2011) and affecting mobile banking adoption (Al-Jabri & Sohail, 2012 and Ha, et al., 2012). As risk perception can generate a negative effect on trust, the researcher included this variable in the model.

A closer look at the relevant studies leads the author to observe that perceived risk is one of the most important obstacles hindering the customers' willingness to adopt m-banking (Akturan & Tezcan, 2012; Hanafizadeh et al., 2014). Accordingly, this study assumes the following hypothesis:

*H6: Perceived risk has a negative impact on trust*

*H7: Perceived risk has a negative impact on behavioral intention to use of m-banking services*

### **3.1.4 Perceived ease of use**

Perceived ease of use is conceptualized as an individual's assessment of the mental effort involved in using the new technology (Davis, 1989). Various other studies (Davis, 1986, 1989) also pointed that perceived ease of use can influence perceived usefulness because other thing being equal the easier the technology is to use the more useful it can be. In the context of internet banking, research shows that perceived ease of use has a positive and significant effect on perceived usefulness (Wang et al., 2003). According to Akturan & Tezcan (2012); Wang et al., (2006) perceived ease of use has a positive relationship with intention to adopt m-banking. The researchers concluded that if customers perceive mobile banking to be easy to learn and use, adoption of the service follows. Thus, the following hypotheses are developed:

*H8: Perceived ease of use has a positive impact on perceived usefulness to use m-banking services.*

*H9: Perceived ease of use has a positive impact on behavioral intention to use m-banking services.*

### **3.1.5 Perceived usefulness**

Davis (1989) defined perceived usefulness as the extent to which individuals believe that using the new technology will enhance their task performance. In the context of user acceptance of m-banking services, perceived usefulness could be because of transactions like online request for cheque/demand draft, sending monthly e-statements, online payments, etc. that improves performance, saves time and increase effectiveness of service or some or several add-on benefits such as bill payments, mobile recharge, etc. These benefits are also expected to be further enhancing over a period of time through technological advancement or breakthrough.

Extensive research provided ample evidence of the significant positive effect of perceived usefulness on the development of the initial willingness to use mobile banking (Aboelmaged & Gebba, 2013; Wang et al., 2006; Luarn & Lin, 2005). Luarn & Lin (2005) stated that the ultimate reason that people employ mobile service systems is that they find the systems useful for their banking transactions. Therefore, the following hypothesis is proposed:

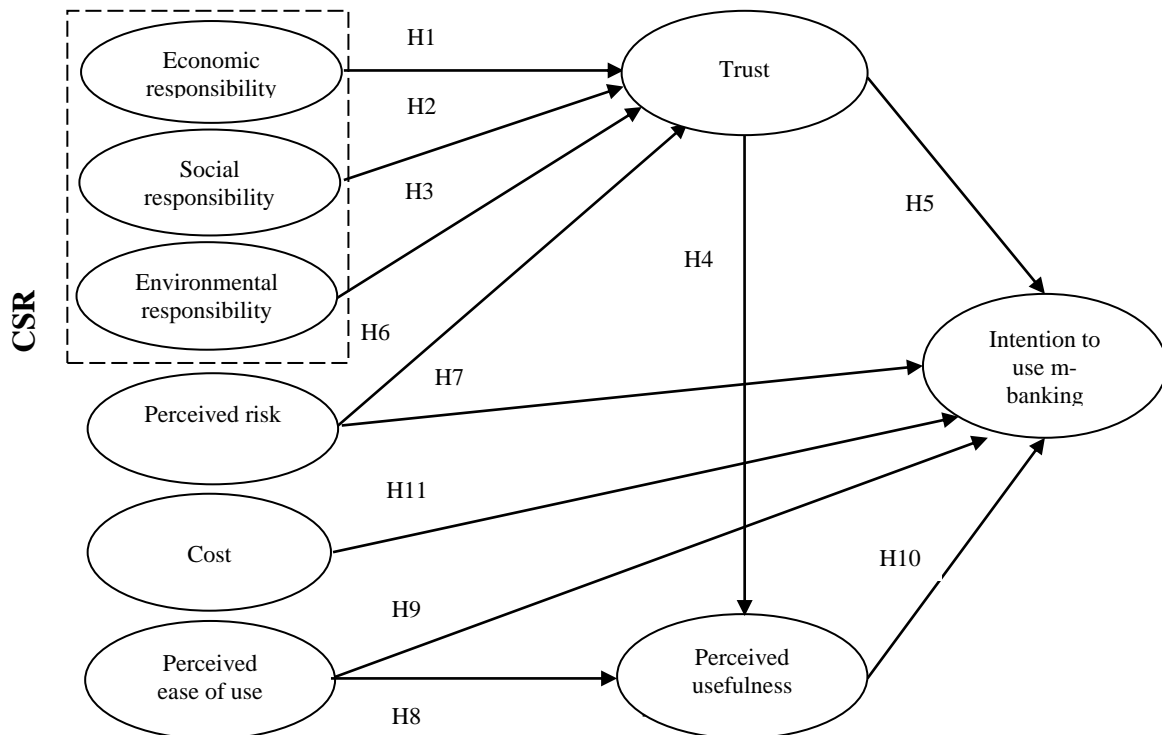
*H10: Perceived usefulness has a positive impact on individual behavioral intention to use m-banking services.*

### **3.1.6 Perceived cost**

Perceived financial cost is defined as the extent to which a person believes that he or she has the financial resources needed to use a system (Wang et al., 2006) because purchasing, using, and maintaining a system costs money. Perceived financial cost has been found to have a significant negative influence on the behavioral intention to use mobile banking (Wessels & Drennan, 2010; Wang et al., 2006; Luarn & Lin, 2005).

*H11: Perceived cost has a negative impact on the behavioral intention to use m-banking services*

Based on hypothesis development processing mentioned above, research model is illustrated as follows:



#### 4. MEASUREMENT AND METHODOLOGY

A typical seven-point Likert scale was used to measure the constructs presented in the proposed model (scores were ranged from 1= “strongly agree” to 7= “strongly disagree” with “neutral” score = 4). The conceptualization and development of the questionnaire was based on the existing literature, resulted in total of 31 items. All items are shown in Table 4. The questionnaire instrument was developed based on the constructs of economic responsibility, social responsibility, environmental responsibility, trust, perceived risk, perceived usefulness, perceived ease of use, perceived cost, and intention to use m-banking. Perceived risk was adapted from Featherman & Pavlou, 2003 and added one more item. Intention to use m-banking (three items) and perceived ease of use (three items) and perceived usefulness (four items) were adopted from Cheng et al., 2006 ; Nasri & Charfeddine, 2012. Three dimensions of CSR including 9 items were adapted from Zhu et al., 2013; Park & Lee, 2009 and were modified. Perceived cost including three items was adapted from Kim et al., 2007. In this study, the measures of trust including six items were based on studies in marketing area which examined the relationship between trust and various constructs and trust is the overall trust about the bank, so trust measurement was adapted from Wei et al., 2009 and Suh & Han, 2002 and then modified appropriately.

This study uses primary data collected from the questionnaire survey in selected provinces in southern of Vietnam to test the hypotheses. The questionnaire was survey by two ways paper based and online method. In total, 612 samples were gathered and eligible for data analysis (235 samples supported via the docs.google.com; 377 samples collected via paper-based method). In order to test the hypotheses, structural equation modeling (SEM) was employed using the computer software program AMOS with maximum likelihood (ML) method of estimation.

## 5. RESULTS

### 5.1 Demographic results

Table 1 summarizes the demographic characteristics of the respondents. As a whole, this sample consisted of generally young, well-educated Vietnamese consumers with a high level of income. These characteristics are representative of Vietnamese m-banking users with a young age as well as higher education and income levels compared to the general population.

**Tab.1** - Demographic results

Demographic profile		Viet Nam	
		Respondents (N=612)	Percentage (%)
Gender	Male	363	59.3
	Female	249	40.7
Age	<20	57	9.3
	20-30	296	48.4
	31-40	212	34.6
	41 - 50	29	4.7
	> 50	18	2.9
Education	High school	15	2.5
	College	45	7.4
	Undergraduate	367	60.0
	Graduate	185	30.2
Living area	Big city	317	51.8
	Small city	295	48.2
Usage duration	<1 year	115	18.8
	1-2 years	160	26.1
	>2 years	337	55.1

### 5.2 Frequencies

Multiple response analysis was also done to evaluate the respondent's answers in the m-banking activities they frequently use. As shown in table 2, the top three m-banking activities are most frequently used by the respondents is the Transfer money (83.3%), followed by Account information inquiry (66.9%) and Pay bills (40.2%), respectively.

**Tab.2** - Top three activities for using M-banking (Multiple responses)

Mostly m-banking activities	Percent
Transfer money	83.3%
Account information inquiry	66.9%
Pay bills	40.2%

### 5.3 Reliability and validity analysis

Reliability was done to test the degree to which the set of latent construct indicators are consistent in their measurements. The reliability of the variables was assessed by the Cronbach's Alpha and Item-total Correlation. The acceptable threshold for Cronbach's Alpha is 0.70, while constructs which are highly inter-correlated indicate that they are all measuring the same latent constructs. The resulting alpha values range from 0.816 to 0.930 which above the acceptable threshold of 0.7. Also, the item-total correlation test results are satisfactory.

**Tab.3** - Composite reliability, AVE and correlation of constructs' values

VIETNAM	CR	AVE	1	2	3	4	5	6	7	8	9
1.RISK	0.903	0.756	0.869								
2.TRUST	0.901	0.695	-0.802	0.834							
3.SOCIAL	0.838	0.635	-0.444	0.412	0.797						
4.ENVIRONMENT	0.900	0.751	-0.418	0.385	0.713	0.866					
5.USEFULNESS	0.915	0.729	-0.404	0.540	0.277	0.253	0.854				
6.COST	0.931	0.819	-0.387	0.502	0.356	0.287	0.524	0.905			
7.ECONOMIC	0.817	0.598	-0.410	0.487	0.658	0.474	0.490	0.439	0.773		
8.EASY OF USE	0.852	0.659	-0.492	0.641	0.211	0.236	0.701	0.493	0.387	0.812	
9.INTENTION	0.887	0.723	-0.668	0.741	0.368	0.374	0.647	0.452	0.538	0.677	0.850

*Note: Diagonal elements are the square root of AVE. Off-diagonal elements are the correlations among constructs.*

A confirmatory factor analysis was conducted to test the measurement model. This assesses what the construct or scale is, in fact, measuring. To construct validity, two checks have to be performed: the convergent validity and discriminant validity. All the model-fit indices exceeded their respective common acceptance levels suggested by previous research, thus demonstrating that the measurement model exhibited a good fit with the data collected in Viet Nam  $\chi^2_{(612)} = 874.934$ , CMIN/df= 2.566,  $p = .000$ ; GFI = 0.911; TLI = 0.953; CFI = 0.960; RMSEA = 0.051.

Values for composite reliability are recommended to exceed 0.70 (Chin, Marcolin, & Newsted, 2003) and AVE values should be greater than the generally-recognized cut-off value of 0.50 (Fornell & Larcker, 1981). Table 3 shows that all composite reliability and AVE values of Viet Nam meet the recommended threshold values. Therefore, it is an evidence for convergent validity. In addition, the square root of AVE for each construct is greater than the correlations between the constructs and all other constructs, indicating that these constructs have discriminant validity.

### 5.4 Structural results: Hypothesis testing

SEM was used to test the hypotheses. The SEM results indicated that the model had an acceptable fit in Viet Nam. In particularly, the indices of model with data collected in Viet Nam are  $\chi^2_{(612)} = 999.183$ , CMIN/df = 2.855,  $p = .000$ ; GFI = 0.898; TLI = 0.944; CFI = 0.952; RMSEA = 0.055.

**Tab.4** - Unstandardized structural paths

Hypothesis	Vietnam				
	R.E	S.E	t value	P	Result
H1:Economic responsibility → Trust	.371	.057	6.570	.000	S**
H2: Social responsibility → Trust	.321	.092	3.477	.000	S**
H3: Environmental responsibility → Trust	.164	.062	2.639	.008	S**
H4: Trust → Perceived Usefulness.	.135	.034	3.925	.000	S**
H5: Trust → Intention To Use	.339	.062	5.461	.000	S**
H6: Perceived risk → Trust	-.688	.039	-17.616	.000	S**
H7: Perceived risk → Intention To Use	-.176	.056	-3.126	.002	S**
H8: Perceived ease of use → Perceived usefulness	.585	.045	13.047	.000	S**
H9: Perceived ease of use → Intention To Use	.249	.059	4.238	.000	S**
H10: Perceived usefulness → Intention To Use	.280	.055	5.058	.000	S**
H11:Perceived cost → Intention To Use	-.019	.028	-.666	.505	NS

Note: \*\*: significant at  $P < 0.01$ ; S: Support; NS: Not support; P: P-value

Table 4 presents the unstandardized structural paths; and Figure 3 presents the significant structural relationship among the research variables and the standardized path coefficients with their respective significance levels. Only 1 of 11 hypotheses proposed is found insignificant (H11). In addition, the figure 3 shows the model explained substantial variance in both perceived usefulness ( $R^2=52\%$ ), Trust ( $R^2=73.5\%$ ) and intention to use ( $R^2=67.4\%$ ).

### 5.5 Mediation analysis

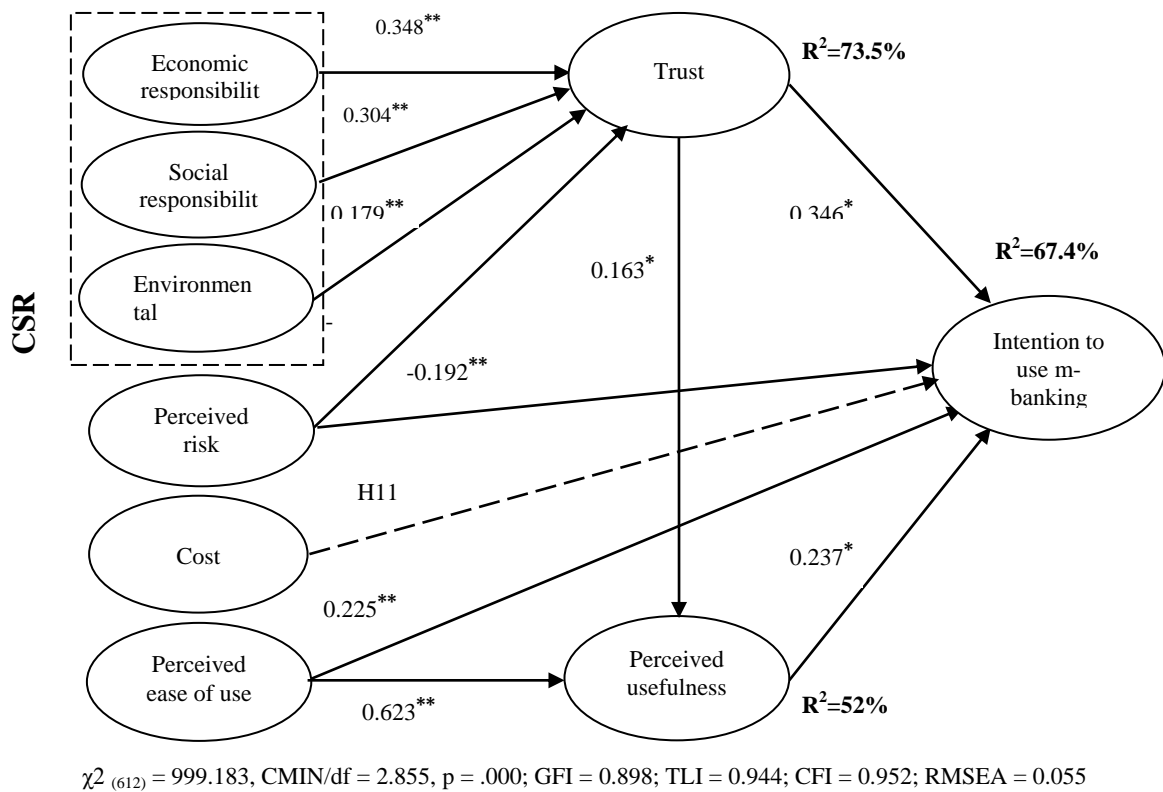
Investigating the mediating role of trust in the relationship between the bank's CSR activities and its intention to use m-banking is also one of the key objective for the study. In order to ascertain significant mediation effects, four conditions need to be met: (1) the three CSR initiatives should have a significant impact on trust; (2) the trust should significantly affect intention to use m-banking, (3) the predictor variables should significantly affect the dependent variable, and (4) the impact of the predictor variables on the dependent variable should not be statistically significant or be reduced after accounting for the effect of the mediator variable (trust) (Andrews, Netemeyer, Burton, Moberg, & Christiansen, 2004).

The first two conditions were tested by estimating Model 3 (the fully mediated model) in Table 5 which specifies that the two categories of CSR initiatives can influence intention to use m-banking indirectly through trust. Model 3 showed an acceptable fit ( $\chi^2 = 310.59$ ,  $df = 96$ ;  $CFI = 0.967$ ;  $TLI = 0.958$ ;  $GFI = 0.940$ ,  $RMSEA = 0.060$ ). Two (economic and environment responsibility) of the three predictor variables showed a significant impact on trust (except social responsibility), and trust had a significant effect on intention to use m-banking. Therefore, the first two conditions were met. The third condition was tested using Model 2 (the simple direct model). Since Model 2 is saturated, it showed a perfect fit to the data. The model estimation results in Table 5 show that all three categories of CSR initiatives had a significant effect on intention to use m-banking. Therefore, the third condition was satisfied. As shown in Table 5, the magnitudes of the predictor variables' path coefficients in Model 1 are smaller than those in Model 2 and all of the predictor variables in Model 2 were statistically significant.

Beside, in Model 1 all three predictor variables had a significant path coefficient but their path coefficients are smaller than those in model 2. These results satisfy the fourth condition.



Hence, all four conditions were satisfied, and this ascertains the presence of significant mediating effects of trust.



**Fig.1** - Results of testing Hypotheses of Viet Nam

A further point of interest was whether the mediation was of the “full” or “partial” kind. In order for full mediation to exist, two additional conditions had to be met: (1) the fit of Model 1 should not be better than that of Model 3, and (2) all the path coefficients of the predictor variables to the dependent variable should be statistically insignificant in Model 1 (Andrews et al., 2004). The estimated  $\chi^2$  statistics for Model 1 and Model 3 were 275.165 (df = 93) and 310.59 (df = 96), respectively. The  $\chi^2$  difference value of 35.425 for three degrees of freedom was significant (p = 0.00). This suggests that Model 1 fits the data significantly better than Model 3. In addition, all three path coefficients of the predictor variables in Model 1 were significant. Therefore, the trust partially mediated the effects of the CSR activities on intention to use m-banking.

**Tab.5** - Results of Model testing

Fit estimate	$\chi^2$	df	$\chi^2$ diff	CFI	GFI	TLI	RMSEA
Model 1	275.165	93		0.972	0.947	0.963	0.057
Model 2	saturated						
Model 3	310.59	96	35.425	0.967	0.940	0.958	0.060

	Model 1 proposed model	Model 2 simple direct model	Model 3 fully mediated model
Economic ---> intention	0.312***	0.561***	
Social --->intention	0.256***	0.271**	
environment --->intention	0.187**	0.330***	
Economic --->trust	0.394***		0.434***
Social --->trust	0.017		0.055
environment --->trust	0.222**		0.245***
trust --->intention	0.628***		0.758***

\*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

## 6. CONCLUSIONS AND IMPLICATIONS

### 6.1 Conclusions

This study was conducted with the intention of providing further understanding regarding the main factors that could shape the clients' intention to use of m-banking in Vietnam. Therefore, to achieve this aim, a model comprising factors taken from TAM along with perceived risk, perceived cost, trust and three dimensions of corporate social responsibility was proposed. The statistical results supported the predictive power of the conceptual model in explaining adequate variance in behavioral intention (BI). Specifically, all values of  $R^2$  (BI (67.4 per cent), PU (52 per cent), Trust (73.5 per cent) were observed within an acceptable level of 30 per cent as suggested by Kline (2011). In addition, such values of  $R^2$  in the current study are fairly close to those accounted for by other IS and m-banking studies that have been formulated using TAM (Akturan & Tezcan, 2012; Venkatesh & Davis, 2000). This, in turn, provided further evidence supporting the conceptual model proposed in the current study to explain the Vietnamese customers' intention to use m-banking services.

The structural results indicated that behavioral intention to use m-banking is significantly determined, supported and validated by the concepts of CSR through trust. Among the subjective factors of CSR, economic responsibility is found as a more significant determinant of customer trust than environmental and social responsibility. These findings could be explained by the nature of Bank service market. The bank industry is one of the most competitive and economic activities of banks including new job creation, value contributions and investments to the society are the main responsibility of Vietnam Banks. Besides, the results indicated that environmental responsibility affect to behavioral intention stronger than social responsibility. This can be attributed that during the past few years, Vietnamese

consumers have been facing serious food safety, and health problems due to environment crisis. Therefore, banks should incorporate CSR initiatives in their integrated marketing communication strategy in particular branding strategy so as to attract more customers.

The statistical results highly proved Trust as a key factor predicting BI with a regression weight of 0.346. In other words, Vietnamese customers seem to be more motivated to adopt m-banking if they trust they trust banks. This could be attributed to in m-banking there are growing many concerns about risk in online banking services because it is operated in an open environment, their applications and outcomes are vulnerable to security and threats such as theft, fraud breaches of personal privacy and attacks by hackers. Theoretically, these results are parallel with prior studies of m-banking that have tested and approved trust as a crucial factor in determining the customers' intention. For example, Hanafizadeh et al., (2014a) conduct a study on m-banking adoption in Iran. Lee and Chung (2009) used the DeLone and McLean 2003 model in their investigation on m-banking adoption and indicated that trust, system quality and information quality were important factors to m-banking adoption in South Korea.

The empirical results have also showed that there is a relationship between perceived usefulness and adoption intention of m-banking with a regression weight of 0.237. Hence, it can be implied that Vietnamese customers will use m-banking if they perceive it as more effective, productive and a useful technology. This may be explained that m-banking is considered as a convenient way that helps customers access a wide range of high quality financial services anytime and anywhere. These findings consistent with previous study of m-banking that tested the relationship between perceived usefulness and customer's intention to use m-banking (Akturan & Tezcan, 2012; Hanafizadeh et al., 2014; Luarn & Lin, 2005).

In addition, the empirical results have also supported the significant relationship between perceived ease of use and behavioral intention with a weight of 0.225. This, in turn, means that respondents were more likely to have a higher intention to adopt m-banking if they perceived that the use of such technology was not difficult and required less effort. Given the particular nature of m-banking, a certain level of knowledge and skill is required to properly use such system. In fact, using m-banking requires customers to perform all tasks alone without any assistance from banking staff which, in turn, perceived ease of use could play a vital role in determining the customers' intention to use m-banking. Such results of perceived ease of use extracted in the current study are in line with existing literature in the IS area (Venkatesh et al., 2003) and in m-banking (Thakur & Ramesh , 2015; Gu et al., 2009; Hanafizadeh et al., 2014; Luarn & Lin, 2005). Perceived ease of use was also found to be a key predictor of perceived usefulness with a weight of 0.623. In other words, if the customers perceive that using m-banking needs less effort and is not difficult, they will perceive to use such a system more advantageously and be more useful in their daily life (Davis et al., 1989). By the same token, several studies in the area of m-banking have supported the instrumental influence of perceived ease of use as a contributing factor of behavioral intention via perceived usefulness (Gu et al., 2009; Luarn & Lin, 2005). Furthermore, perceived usefulness showed higher effect on intention to use m-banking in comparison with ease of use and this underlines seriousness of perceived usefulness in Vietnamese' m-banking usage. It sounds better to say that for the managers of the bank to improve users' attitudes, they need to pay more attention to improving system's usefulness while investing on its ease of use.

Surprisingly, this study discovered that perceived costs is not associated with the adoption level of mobile banking, whereas the findings of previous studies about m-banking adoption intention in Australia, Iran and Taiwan (Wessels & Drennan, 2010; Hanafizadeh et al., 2014;

Luarn & Lin, 2005) have revealed that perceived cost was found to be affect consumer acceptance of m-banking. This contradiction could be explained by the fact that Vietnamese customers just have to pay 3.300 VND fee when they transfer money instead of 22.000 VND if they make that transaction at the bank.

Finally, this study empirically proved that perceived risk was a significant negative factor determining the behavioral intention to adopt m-banking with a regression weight of -0.192. Accordingly, it could be concluded that Vietnamese customers are less likely to be encouraged to adopt m-banking with a higher degree of expectation of suffering a loss as a result of using such a system. This relationship could return to the particular and sensitive nature of the banking industry in general as well as online banking technology which is universally characterized by a high uncertainty, intangibility, heterogeneity, and vagueness along with the absence of human interaction (Akturan & Tezcan, 2012). This could be attributed to the increase in the number of electronic financial crimes in Vietnam recently. The result is consistent with previous findings such as Koenig-Lewis et al., (2010) found that there is strong relationship between the perceived risk on the German customers' acceptance of m-banking. In addition, the results also confirm the findings of Hanafizadeh et al., (2014b) that perceived risk negatively affect mobile banking adopt in Iran.

## **6.2 Implications**

The results give some important implication for developers, manager to formulating strategies. Firstly, perceived ease of browsing, identifying information and performing transactions should facilitate favorable and persuasive informative about new products and must demonstrate usefulness for consumers. Secondly, banks should attempt to enhance consumers' perceptions of the beneficial features and nature of m-banking. Marketing activities should focus on the tangible and immediate benefits of using m-banking services including quicker financial transaction speed, broader varieties of financial services, and enhanced financial transparency. Besides, expanding the range of financial services provided by the m-banking and maintaining the permanency of their performance efficiently and effectively, 24/7 will support the role of perceived usefulness (Zhou et al., 2010).

Moreover, a simple and friendly design of m-banking services will not only enhance the perceived ease of use in using such a channel but also will contribute to the role of perceived usefulness (Jaruwachirathanakul & Fink, 2005). Further, an effective, personal, and practical training program that will educate customers on how they can efficiently use m-banking could be more helpful to override any complexity and confusion related to the use of this system. Such a program could also enhance the individuals' self-efficacy which, in turn, contributes to their perception towards such systems as more useful and easier than less banking channels (Compeau & Higgins, 1995).

Concurrently, security risks related to the new innovation should be strongly minimized. Thus, banks should search for risk-reducing strategies that might contribute in arousing high confidence in prospecting customers. Taking this point further, it is suggested to focus on the prevention of intrusion, fraud and identity theft through the development of trust-building mechanisms to attract customers. Such mechanisms include designing a secure mechanism such as a system equipped with unique attributes and highly secure passwords, fingerprints, voice patterns and facial characteristics for users to enhance their confidence, instructing consumers about how safeguard their private information to prevent any misuse in virtual transactions. Other strategies that could be more useful in mitigating PR include a money-

back guarantee policy in the case of mistakes and false transactional data entry, providing them with circulatory passwords and ability to change passwords to enhance security in personal financial transactions and providing the system with tracing codes in consumers' transactions for them to be able to track problems if they occurred seem to help this perception.

Trust was also identified as a factor that positively affected intention to use m-banking. However, in mobile banking context, building customer trust is very challenging. So how can m-banking service provider gain customer trust? The current findings suggest that besides using mechanism including long term service, statement of guarantee for every transaction and digital receipts and enhancing security controls when designing and updating banking apps, CSR initiatives can help to build customer trust and the findings also suggest that customer trust serves as a mediator in the relationship between CSR and intention to use m-banking service. This partial mediation effect of customer trust indicates that consumers' positive perceptions of CSR lead to customer trust and that customer trust, in turn, influences intention to use m-banking. Hence, in order to gain customer trust, doing CSR activities is a critical intermediate step for any banks. Therefore, managers should recognize the influence of CSR on gaining trust of customer to make them adopt m-banking services. Specially in Vietnam, a country with many environment crisis such as Formosa crisis and ThiVai River crisis, any banks focus on environment matter and economic matter it would get a lot of attention of customer and they can build the reputation and image so that they can build the customer trust which in turn improve the percentage of people to use bank service such as m-banking which has many risks.

In sum, bank managers often face tough choices in allocating company resources and in prioritizing strategic initiatives. This study's findings that CSR contributes to increase intention to use m-banking suggest that managers can obtain substantial benefits by integrating CSR initiatives with other strategies.

### **6.3 Theoretical and practical contribution**

The current study contributes to theory within the areas of m-banking and consumer adoption behavior. From a theoretical perspective, the results of the study provide new information related to consumer intention to adopt m-banking that has not been previously examined, to a large extent, in the existing related literature. Thus, the study adds to and expands our knowledge of the most important factors influencing consumer attitude and behavioral intention towards adopting m-banking services. In doing so, the current research has applied proven theory and constructs in traditional banking, online banking and m-banking research, and has extended and validated the theoretical relationships between the focal constructs in the research model. In addition, the study makes a strong contribution to the current m-banking literature by extending TAM to include perceived risk, perceived cost, trust and three dimensions CSR that previous TAM studies in the context of m-banking did not include; as a consequence, they may have omitted crucial factors that influence consumer adoption of m-banking service. The results of the present study suggest that perceptions of CSR have a positive impact on customer trust in mobile banking service. Therefore, the findings of the present research are particularly noteworthy because this is the first research that proves the link between perceived CSR activities and customer trust in the context of mobile banking services.

The value of research in the area of marketing lies in its ability to be applied in practice. In this sense, the value of this research is that it expands our understanding of m-banking by identifying and synthesizing the most important factors influencing customer adoption of m-banking services in Vietnam. The practical implications of these findings are that adding to the understanding of m-banking from a consumer's behavior perspective and, therefore, act as a valuable base for banks.

Specifically, the findings highlight that particular factors (perceived ease of use, perceived usefulness, perceived risk, trust as well as CSR initiatives) will determine customer behavioral intention to adopt m-banking services.

#### **6.4 Limitation and future research**

The current study is restricted by some limitations and can be reported as follow.

First there are other factors that have been ignored and therefore should be measured by future researches such as self-efficacy, resistance change and technology readiness.

Secondly, this study concentrated on the customers' intention adoption; yet, customer satisfaction, word-of-mouth, and customer loyalty as a consequence of using m-banking will be valuable directions to be examined in future researches.

Thirdly, as the current research is applying the survey-based method, it could be argued that this method is prone to the inherent limitation of measurement errors. However, the measurement errors were reduced, as indicated by the study's good reliability and validity results. Finally, the current study used cross-sectional survey to examine customers' adoption of m-banking. Thus, future research is needed to replicate and validate the findings using a longitudinal research which would allow for further examination of m-banking adoption at multiple points of time.

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## Analysis of Factors Affecting Consumers' Intention to Buy Organic Food

*Bui Ngoc Tuan Anh, Nguyen Viet Nguyen, Mach Ngoc Thuy & Doan T. Hong Van*

### ABSTRACT

*The consumption of organic food is on the rise due to increasing health consciousness among Vietnam regarding food intake, as well as to the growth of the organic agricultural sector in this country. This study examines the influence of Health consciousness, Perceived behavioral control, environmental concerns, attitudes, subjective norm, price perceptions, reference groups, ethical perspectives to on purchasing intentions of Organic food in Vietnam. To this end, hypotheses have been developed and subjected to empirical verification using a survey with 200 people in Ho Chi Minh City, where all people come from all over Vietnam. Early results show respondents are highly aware of organic food, they find organic food to be good for their health as well as have the intention to purchase Organic food products for their families.*

**Keywords:** *Organic food, attitudes toward organic food, purchase intention.*

**JEL Classification:** M31

### 1 INTRODUCTION

Vietnam is an agricultural country famous for agricultural products such as rice, vegetables and fruits. However, the level of food safety of agricultural products in the country is very low. According to statistics from the Food Safety Department (Ministry of Health), only in the first 10 months of 2015 there are 4077 people poisoning, of which 21 people died from the cause of food poisoning. In the long run, the use of dirty food postmortem impatient but not immediate action should be difficult to investigate responsibility. Today, the pesticide residue in vegetables is a potential cause of cancer for millions of people.

Therefore, many manufacturers are very keen, actively seek out sources of production, providing consumers with clean, safe and quality organic food. They hope to find a business opportunity for themselves, which also provides an opportunity for consumers to use safe food sources. However, there is a paradox that takes place, even though these items have been around for a long time in the market, with a commitment to quality that is very good. But it does not attract much attention or attention from consumers in the food market in Vietnam in general, as well as Ho Chi Minh City in particular. So why did the paradox?

Therefore, finding out what is the exact cause that affects the psychology of consumers and make them decide not to buy this product line is needed and thereby make the best management practices and solutions to come up with appropriate solutions to help organic food reach consumers better.

## 2. LITERATURE REVIEW

### 2.1 Theoretical background

There are many theories explaining the behavior of people in general and consumer behavior in particular. In which, there is a Theory of reasoned action (TRA) (Fishbein and Ajzen, 1975) and the Theory of planned behavior (TPB) (Ajzen, 1991). Both of theories are widely used in explaining the intention to perform human behavior in general. In the field of organic food, there are many studies that use those theories to find the relationship between the various factors and the intention to buy organic food. Therefore, the author argues that the use of rational behavioral theory and planned behavioral theories as a theoretical basis for this study is appropriate. The TPB is an extension of Theory of reasoned action (Fishbein and Ajzen, 1980; Fishbein and Ajzen 1975). It defines that intentions of behavior are influenced by three factors: Attitude, subjective Norm, and Perceived behavioral control, all of which lead to the formation of a behavioral intention ( Ajzen, 1985). Attitude refers to a person's evaluation of a problem, whether it is beneficial or not; Subjective norm is defined as the perception of social pressure to perform or not perform an act; Perceived behavioral control is an individual's perception of whether it is easy or difficult to carry out a particular behavior. Therefore, the following hypotheses were proposed based on the above discussion:

*H1: The attitude of consumers to organic foods positively influences their intention to buy organic food.*

*H2: The subjective norm positively influences the mindset of consumers when buying organic food.*

*H4: Perceived behavioral control positively influences consumers' intention to buy organic food.*

### 2.2 Price consciousness

Price is the amount of money that the buyer must pay to get the product (Philip Kotler et al., 2011) and Price of Organic food play a role in the release of consumer intent and consumer behavior, and often the price is always an obstacle to consumers' buying decisions, as they pay more for same product (Boccaletti and Nardella, 2010). The discussion leads to the formulations of Hypothesis:

*H3: Price negatively influences the consumer intention to purchase organic food.*

### 2.3 Moral attitude

Valor (2007) defined Moral attitude as an activity where consumers demand human rights and as a type of consumer activity, based on the concept of product trust (Including the right to a safe environment). The TPB model almost relies on the influence of ethical factors on behavioral attitudes (Armitage & Conner, 2001; Arvola et al., 2008; Dowd & Burke, 2013). Morality plays an important role in the sphere of influence, which resists individual and social conflict (Manstead, 2000). The purpose of consumer morality is to measure self-esteem, which is increased by adherence to prediction to one's own ethical principles (Schwartz, 1977). This moral obligation is of great use in the purchase of organic food today. It shows the individual's personal, social and environmental concerns. Therefore, it is also one of the potential conflicts that can arise between individuals and society. In 2013, Dowd and Burke realized that the addition of "consumer morality" had a profound effect on TPBs,

as it added an additional 8% explanation of the TPB model and Arvola et al (2008) also agrees that consumer ethics in TPB models will give the data a little bit more detail than the original TPB model. Therefore, the above has led to the construction of H5 hypothesis:

*H5: Moral attitude positively influences the consumer intention to purchase organic food.*

## **2.4 Reference Group**

Hyman (1942) introduced the term reference group is a person or group of people that significantly influences the behavior of an individual and the involvement of the reference group in non-gender Deadline for famous individuals. Any group of qualities an admirer can refer to (Stanton, Etzel & Walker, 1994). Especially, this reference group will affect individuals in three respects (Park & Lessig, 1977). Impact on expressive value - this is the effect of personal desire to improve personal values in the eyes of others; Impact on compliance - Individuals adhere to an individual or a group of other people because they are aware that they will be the ones who will reward or punish them; they understand that their behavior can be seen; And finally, the impact of information - personal information is influenced by others as this information increases their understanding and improves their adaptability to a number of environmental aspects. The following hypotheses was proposes based on the above discussion:

*H6: The reference group positively influences consumers intention to buy organic food.*

## **2.5 Environmental Concern**

Mat Said, Ahmadun, Hj Paim and Masud (2003) define environmental concerns as the beliefs and attitudes of individuals to the environment. Malonye and Chan Lau (2000) define environmental concerns referring to the extent of a person's involvement in environmental activities. Pagiaslis and Krontalis (2014) also mentioned in their study that environmental concerns have a direct and positive impact on consumers' intentions to purchase eco-friendly products. With the environment and it plays an important role in determining the intention to buy organic food (Smith & Paladino, 2010) as buying organic food is considered a professional behavior with the environment. The discussion results into the following hypotheses:

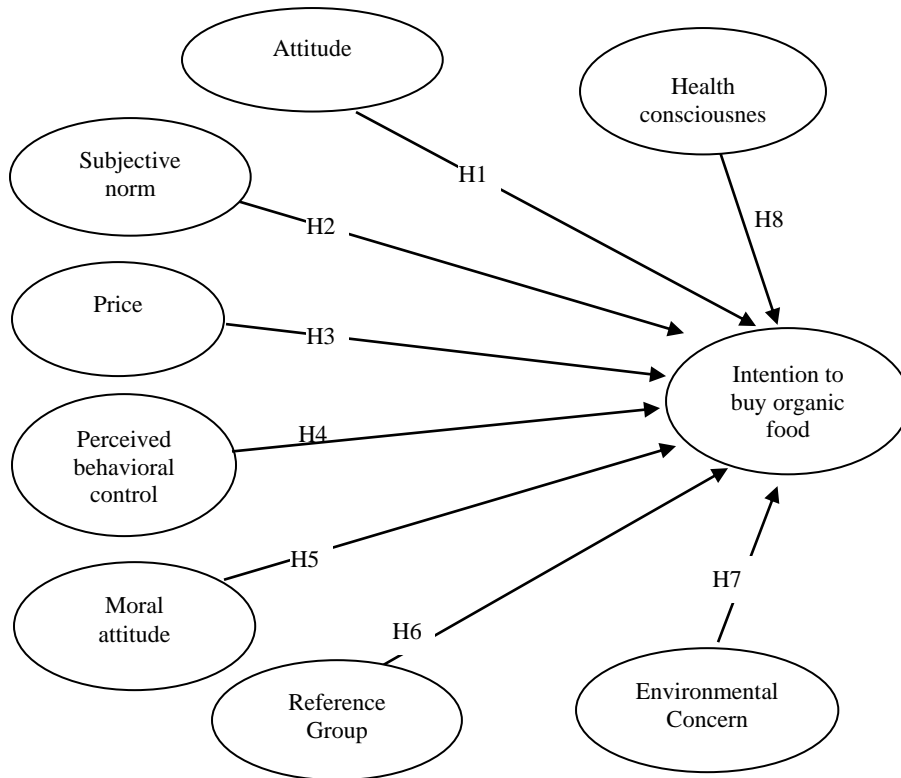
*H7: Environmental concerns has positively influenced the intention to buy organic food.*

## **2.6 Health consciousness**

Attention to health consciousness is related to the human psychological system (Rosenthal, 1986). It is defined as a good state of physical and mental strength and happiness, not merely a sickness or an illnessless state (WTO, 1948). In addition, health consciousness can be defined as "the extent to which health problems are integrated into one's daily activities" (Jayanti & Burns, 1998). Health consciousness are considered to be one of the main drivers of consumer attitudes and their intention to purchase organic food (Chakrabarti, 2010; Davies, Titterington, & Cochrane. Magnusson, Arvola, Hursti, Åberg, & Sjod, 2003; Zanolli- & Naspetti, 2002). Consumers consider health as an important parameter while buying food products (Wandel & Bugge, 1997) and show interest in issues related to food and health (Rozin, Fischler, Imada, Sarubin, & Wrzesniewski, 1999). Therefore, the following hypotheses were proposes base on the above discussion:

*H8: Health consciousness among consumers positively influences their attitude toward organic food.*

Based on hypothesis development processing mentioned above, research model is illustrated as follows:



**Fig.1 - Research framework**

### 3 METHODOLOGY

The purpose of this step is to measure the factors affecting consumers' intention to buy organic food and thereby validate the proposed theoretical model and associated hypotheses. Verification of scales, models, and hypotheses is performed in the following steps: Preliminary verification using Cronbach's Alpha reliability coefficient, EFA exploratory factor analysis, and multivariable regression.

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**Tab.1** - Scales have been added, edited

Variables		The statements measure the concepts
Consumer attitudes purchase (Wang, Wiegerinck, Krikke, và Zhang -2013)	AP1	Buying organic food is a good idea
	AP2	Buying organic food is a wise choice
	AP3	Buying organic food is very beneficial for yourself
Health consciousness (Tarkiainen and Sundqvist – 2005)	HF1	I choose food very carefully to protect health
	HF2	I do not care about health as other consumers.
	HF3	I often think about health issues
Environmental concerns (Roberts and Bacon - 1997)	EC1	The natural environment balance is easily destroyed
	EC2	The excessive human intervention into the natural environment creates disastrous consequences
	EC3	Humans must keep natural environmental balance in order to survive for long
	EC4	People are seriously abusing their environment
	EC5	People must live in harmony with nature in order to survive.
Price consciousness (Victoria Kulikovski and Manjola Agolli - 2010, cited by Le Thuy Huong - 2014)	PP1	Organic food is expensive.
	PP2	Organic food is more expensive than usual
	PP3	I am willing to pay more for organic food.
Moral Attitude (Arvola et al - 2008) (Concerns about ethical)	CE1	I feel myself contributing something better to society
	CE2	It is the right thing to do in accordance with moral standards
	CE3	I became a better person
Subjective norm (Han, Hsu, and Sheu - 2010)	SS1	Most people who are important to me think I should buy organic food
	SS2	Most people who are important to me wishes I buy organic food
	SS3	The people I value most think I should not use organic food
	SS4	My friend, who has views on diets think I should buy organic food
	SS5	My family thinks that I should buy organic food rather than regular foods
	SS6	My friends usually have positive opinions, advised me to use organic foods
Reference Group (Park and Lessig -1977, cited by Le Thuy Huong - 2014)	RG1	I wanted to look like those appearing in commercials for organic food
	RG2	I feel that buying organic food will help me build my self-image
	RG3	Decided to buy my organic foods affected by those who have relations in society
	RG4	My decision to buy organic food was influenced by my family members
Perceived behavioral control (Rhan et al - 2010)	CB1	To buy or not to buy organic food is completely depending on me
	CB2	I believe if I want, I can buy organic food
	CB3	I do not have the resources and time to buy organic food
Intention to buy organic food (Lee, Hsu, Han, and Kim - 2010)	IP1	I agree to buy organic products if it is available in the market
	IP2	I plan to buy organic products if it is available in the market
	IP3	I will try to buy organic products if it is available in the market
	IP4	I will try to buy organic food in the future



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This study consists of two steps: preliminary research and formal research. Preliminary research was conducted through a qualitative research methodology that was used on a sample of about 10 people who used organic food and used in-depth interviews with subjects aged 18-45. Study conducted in April /2017.

The formal study was conducted through quantitative research. This research aims to test the scale and model of research. The study was conducted through a formal questionnaire with direct interview techniques for readers aged 18 to 45 who live in the Ho Chi Minh City area, regularly reading the site. In addition, the survey subjects do not discriminate male / female and occupation. The study was conducted in April 2017. Samples were chosen by random method with the expected sample size of  $n = 200$ .

In the study of this topic, the scale was constructed on the basis of theories of factors affecting consumers' intention to buy organic food along with their measurements in internationally published research studies. These scales are aggregated from a variety of studies and adapted and adapted to the Vietnamese market visitor based on the results of qualitative research with in-depth interview techniques.

The conceptual scale will use prior research scales with adaptations to fit the research situation. After eliminating and supplementing the observation variables, the scale of the factors affecting consumers' intention to buy organic food used for the study was 34 observations measuring nine components as Table 1.

### 4 DATA

With an expected sample size of  $n = 200$ , chosen according to convenient method, initially 200 samples were emitted. Within 30 days of the survey, The total number of questionnaires collected was 178, accounting for 89%, the result was 58 valid samples, 20 samples were rejected because lack of information on some questions or conflicting answers.

The model consists of four control variables: income, region, marital status, expenditures.

According to the survey results, it can be seen that the group of people with incomes from 1 to 5 million VND, including 108 people, accounted for the highest rate of 68.4%. Groups with income of 5-10 million, 32 people, accounting for 20.2%. Only 18 people with income of over 10 million VND accounted for 11.4%. As can be seen in the survey sample of high-income consumers is low.

In the hometown, 136 people from the South occupied the highest rate of 86.1%. The number of people coming from the Central in the sample was 16 people at the rate of 10.1%. The remaining 6 people from the North are 3.8%. So it can be seen that although it was investigated in Ho Chi Minh City, regional diversity is still evident in the sample.

In terms of marital status, the single group of 142 people accounted for 88.9%, much larger than the 16 in the married group at the rate of 10.1%.

On expenditure, the group of people spending from 100,000 to 500,000 VND, including 132 people, accounted for the highest rate of 83.5%. Expenditures from 500,000 to 1,000,000 VND, including 18 people, accounted for 11.4%. Only 8 people spend over 1,000,000 VND at 5.1%

## 5 RESULTS AND DISCUSSIONS

### 5.1 Results

#### *Reliability Analysis (Cronbach Alpha - $\alpha$ )*

Cronbach's alpha was utilized to assess the reliability of the measures for the independent variables. All alpha coefficients for the constructs exceeded the recommended threshold value of .7 (Hair, Black, Babin, & Anderson, 2010). HF2, PP3, SS3, CB3 which look at the cronbach's alpha if item deleted column if we remove any variables.

**Tab.2** - The results of the scale evaluation in Cronbach Alpha

Variables	Symbol	Number of observation variables	Reliability ( $\alpha$ )
Consumer attitudes purchase	AP	3	0.915
Health consciousness	HF	2	0.762
Environmental concerns	EC	5	0.895
Price of the product	PP	2	0.861
Moral Attitude	CE	3	0.895
Subjective norm	SS	5	0.881
Reference Group	RG	4	0.904
Perceived behavioral control	CB	2	0.770
Intention to buy organic food	IP	4	0.857

Thus, through the tool Cronbach Alpha, the author removed a sympathetic factor. All remaining variables with a confidence scale continued to be included in the EFA factor analysis.

#### Factor Exploratory Analysis (EFA)

Principal Component Analysis extraction with Varimax rotation is used in factor analysis of independent variables. Factors leading less than 0.3 will be eliminated, while the Eigenvalue stop (representing the variation explained by each factor) > 1 and the total variance deviation greater than 50% (Gerbing and Anderson, 1988). So the third Factor Exploratory Analysis (EFA):

The results show that  $KMO = 0.8$  satisfies  $KMO > 0.5$  (Kaiser, 1974). Thus, it can be concluded that factor analysis is appropriate for existing data. Likewise with the Barlett test result showing  $p = 0.000 < 5\%$ . This means that variables are interrelated and qualify for factor analysis by EFA verification.

Results of factor analysis: The three observable variables are HF3, HF1, CE1 respectively in EFA runs. The results of the final EFA analysis showed that  $KMO = 0.8$  was satisfactory, at the Eigenvalue value = 1.036 with the factorial method with Varimax rotation, which allowed for the calculation of 6 components from 23 observation variables and the variance of accumulation was 77.787%. This is the required variance (> 50%).

**Tab.3** - Factor analysis results EFA 4th

	Factor					
	1	2	3	4	5	6
SS5	.844					
SS6	.813					
SS2	.747					
SS1	.712					
SS4	.696					
CE3	.647					
CE2	.641					
EC3		.880				
EC2		.820				
EC5		.806				
EC1		.743				
EC4		.738				
RG3			.872			
RG2			.860			
RG4			.857			
RG1			.780			
AP2				.875		
AP3				.823		
AP1				.817		
PP1					.833	
PP2					.815	
CB1						.823
CB2						.785

The four factors extracted include:

- (F1) Subjective norm includes variables SS1, SS2, SS4, SS5, SS6, CE2, CE3. The EFA results for subjective norm and moral attitude suggest that five subjective benchmarking criteria and two criteria for measuring consumer ethical concerns are loaded into one factor. Due to the change should new factors is set Ethical standards. (ES)
- (F2) Environmental concerns includes variables EC1, EC2, EC3, EC4, EC5
- (F3) Reference groups includes variables RG1, RG2, RG3, RG4
- (F4) Consumer attitudes includes variables AP1, AP2, AP3
- (F5) Product prices includes variables PP1, PP2
- (F6) Perceived behavioral control includes variables CB1, CB2

So after performing the EFA factor test, we get the following results: subjective norms, environmental concerns, reference groups, consumer attitudes, product prices, and Perceived behavioral control are priced at the Factor loading requirement (> 0.3). Therefore, all the

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scales selected for the variables in the model are guaranteed to be required and can be used in subsequent analyzes.

## Verification of Correlation Coefficients

After verifying the reliability and value of the scale, factors are included in the model test. The factorized factor value is the mean of the observed factors of that factor.

Before testing the model, Pearson correlation coefficients were used to examine the linear relationship between independent variables and dependent variables.

According to the Correlation Coefficient Table under, the correlation coefficients between the independent and dependent variables are significant at 99%. The team found that the correlation coefficient between the dependent variable was intention to buy and other independent variables were relatively high. Therefore, it can be concluded that these independent variables are suitable for inclusion in the explanatory model for the intention to purchase organic food.

**Tab.4 - Results of correlation coefficient test**

		Intention to buy organic food	Ethical standards	Environmental concerns	Reference Group	Consumer attitudes	Price of the product	Perceived behavioral control
Intention to buy organic food	Pearson Correlation	1	.593**	.401**	.377**	.425**	.287**	.496**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000
Ethical standards	Pearson Correlation	.593**		.337**	.518**	.457**	.222**	.294**
	Sig. (2-tailed)	.000		.000	.000	.000	.005	.000
Environmental concerns	Pearson Correlation	.401**	.337**	1	.038	.471**	.459**	.439**
	Sig. (2-tailed)	.000	.000		.639	.000	.000	.000
Reference Group	Pearson Correlation	.377**	.518**	.038	1	.080	.011	.043
	Sig. (2-tailed)	.000	.000	.639		.013	.889	.590
Consumer attitudes	Pearson Correlation	.425**	.457**	.471**	.080	1	.480**	.383**
	Sig. (2-tailed)	.000	.000	.000	.013		.000	.000
Price of the product	Pearson Correlation	.287**	.222**	.459**	.011	.480**	1	.406**
	Sig. (2-tailed)	.000	.005	.000	.889	.000		.000
Perceived behavioral control	Pearson Correlation	.496**	.294**	.439**	.043	.383**	.406**	1
	Sig. (2-tailed)	.000	.000	.000	.590	.000	.000	

Hypothesis testing and regression analysis

The corrected R2 was 0.479 which means that the linear regression model was constructed in accordance with the data set at 47.9%. It can be understood that the independent variables in this model are capable of explaining 47.9% of the variation of "intention to buy organic food", the rest being explained by other factors not mentioned. in the model. The Durbin-Watson test was performed with a coefficient of 1.672 (<2) which allowed the independent variables to self-correlate with each other. The F test is used in the variance analysis table to test the hypothesis of linearity regression. This test with the idea of considering the linear relationship between dependent and independent variables is done with the hypothesis H0 being  $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = 0$ .

**Tab.5 - Assess suitability of regression models**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.706 <sup>a</sup>	.499	.479	.52069	1.672

a. Predictors: (Constant), CB, RG, AP, PP, EC, ES (Ethical standards)

b. Dependent Variable: IP

It shows that the adjusted R2 is 0.479 which means that the linear regression model was constructed in accordance with the data set at 47.9%. It can be understood that the independent variables in this model are capable of explaining 47.9% of the variation of "intention to buy organic food", the rest being explained by other factors not mentioned. in the model.

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The results of Table 4.14 below show the results of this testResults of testing the suitability of the model

From the results of Table 4.15 we find that all the ethical, behavioral and behavioral control factors are statistically significant in the model (sig <0.05), while the remaining factors Including environmental concerns, consumer attitudes and product selling prices were not statistically significant (sig> 0.05). The low variance coefficient (from 1.377 to 1.886, less than 2), so the multi-collinearity phenomenon among the independent variables in this regression model is small, acceptable. Therefore, the relationship between the independent variables does not significantly affect the interpretation of the regression model.

**Tab.6 - Statistics of each factor in the model**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.156	.197		.791	.430		
	Ethical standards	.322	.077	.332	4.200	.000	.530	1.886
	Environmental concerns	.108	.074	.105	1.459	.147	.646	1.547
	Reference Group	.139	.053	.180	2.596	.010	.692	1.446
	Consumer attitudes purchase	.075	.060	.094	1.248	.214	.586	1.706
	Price of the product	-.007	.061	-.008	-.113	.910	.669	1.494
	Perceived behavioral control	.279	.061	.312	4.611	.000	.726	1.377

a. *Dependent Variable: IP (Intention to buy)*

In summary, based on the results of the regression analysis above, the author concludes: There are three factors influencing the intention to buy organic food in Ho Chi Minh City: (1) Ethical standards; (2) Reference Group and (3) Behavioral Awareness. Of the three factors above, the "Ethical Criteria" factor had the greatest impact on the "Intent to Buy" with a regression coefficient of 0.332, followed by the same impact factor as "Behavioral Awareness" with a standardized regression coefficient of 0.312, the least significant factor is the "Reference Group" with a standardized regression coefficient of 0.18. Regression results are expressed in the form of mathematics as follows:

The normalized regression equation has the form:

$$F = 0.156 + 0.322 * ES + 0.139 * RG + 0.279 * CB$$

Standardized regression equation has the form:

$$F = 0.332 * ES + 0.18 * RG + 0.312 * CB$$

We will examine the differences between consumers' intentions to buy organic food in different groups according to control variables. There are four qualitative variables used: income, hometown, marital status, expenditures.

Income includes 3 groups: 1. From 1 to 5 million; 2. From 5 to 10 million; 3. Over 10 million. To test the difference between the intention to purchase organic food from these three groups, the team used an ANOVA variance analysis with significance levels of sig. <0.05.

Hometowns come in three groups: 1. North; 2. Central Vietnam; 3. South. To test the difference between the intention to purchase organic food from these three groups, the team used an ANOVA variance analysis with significance levels of sig. <0.05.

Marital status includes 2 groups: 1. Single and 2. Married. To test the difference between the intention to purchase organic food between single and married individuals, the team used the average hypothesis test of the two genera using the Independent-sample T- Test) with significance level sig. <0.05.

Spending has three groups include: 1. From 100,000 to 500,000 VND; 2. From 500,000 to 1 million; 3. Over 1 million. To test the difference between the intention to purchase organic food from these three groups, the team used an ANOVA variance analysis with significance levels of sig. <0.05.

The results of this group-based study conclude that there is a difference in intention to buy organic food between different groups of control variables. From the results above, control variables found no difference in intention to purchase organic food between different groups of control variables.

## **5.2 Discussion of results**

### **5.2.1 Impact of Attitude**

The research hypothesis (H1) states that consumers' attitudes have a positive effect on the intention to purchase organic food. However, the analysis of survey data shows that attitudes have  $\text{Sig.} = 0.087 > 0.05$ . Thus the test results show that there is not enough evidence to confirm the hypothesis H1.

The results of this study contradict Masoud Yazdanpanah (2015), Arvolaa-M. Vassallob-M. Deanc (2008) and Chia-Lin Hsu, Chi-Ya Chang, Chutinart Yansritakul (2013) In Vietnam, the factor of attitudes about attitudes is not really appropriate.

### **5.2.2 Impact of Ethical standards**

Theory research H2: The subjective norm positively influences the mindset of consumers when buying organic food and H5: Moral attitude positively influences the consumer intention to purchase organic food. As expected, the analysis of the survey data showed Ethical standards with  $\text{Sig.} = 0.000 < 0.05$  and  $\beta_1 = 0.314 > 0$ . Thus H2, H5 was confirmed.

This proves that the growing social, human consciousness will be increasingly enhanced. They tend to follow what everyone in society called the norm, so to see that society is increasingly concerned about food issues dirty, food was not good health and are more likely to move through consumption of organic foods good for your health. They also intend to gradually rise to consumption of these foods, in order to protect the health of themselves, as well as their families. This result coincides completely with some previous studies of Masoud Yazdanpanah (2015) and Justin Paul, Ashwin Modi, Jayesh Patel (2016).

### **5.2.3 Impact of selling prices**

The research hypothesis (H3) states that the selling price has a negative effect on the intention to buy organic food. However, the results of the analysis of the survey data show that the price of the product has  $\text{Sig.} = 0.9 > 0.05$ . Thus the test results show that there is not enough evidence to confirm the H3 hypothesis.

Beta value of regression model  $< 0$  shows that consumers are not pay much attention to the selling price of organic food. Because they say that price and quality are always favorable, the better the product, the higher the price and vice versa. So they are willing to spend more money on a purchase so they can buy the best product for themselves. In addition, with a growth rate of 5.21% in 2016, plus per capita income in 2016, a \$ 106 increase over 2015, proving that the personal economy of consumers in Vietnam is also growing. And this result is the same with studies by Truong T. Thien et al. (2010), Anssi Tarkiainen et al. (2005), Bo Won Suh et al. (2008), Jay Dickieson et al. (2009), Victorya Kulikovski et al. (2010).

#### ***5.2.4 Impact of Perceived behavioral control***

Theory research (H4) announced that Perceived behavioral control has a positive impact on the intention to purchase organic food. As expected, the analysis of the survey data showed that Perceived behavioral control with Sig. = 0.000 <0.05 and  $\beta_6 = 0.3 > 0$ . Thus H4 was confirmed.

The above conclusion can be explained as follows. In Vietnam market, unsafe food appears too much and it seems that the authorities can not control this problem. They buy but do not know if they are buying safe or unsafe products. Therefore, when you know that organic food is good that provides a certain benefit to your health, it will tend to consume it. This result is exactly the same as previous studies on Organic Food by Masoud Yazdanpanah (2015), by Chia-Lin Hsu, Chi-Ya Chang, Chutinart Yansritakul (2013), and by Justin Paul and Plus (2016).

#### ***5.2.5 Impact of reference groups***

The research hypothesis (H6) states that the Reference Group has a positive impact on the intention to purchase organic food. As expected, the results of the survey data analysis showed that the Reference Group had Sig. = 0.013 <0.05 and  $\beta_3 = 0.171 > 0$ . Thus H6 has been confirmed.

This is an important factor that influences the user's consumption decision. Although this factor is not appropriate in some developed countries, for a developing country like Vietnam it is perfectly appropriate. Because the food market in Vietnam is currently not well controlled, consumers tend to believe in the people around them, believing their feelings. Have used the past, and they think it is the best way for them to check on the quality of the product before they buy. This result is perfectly consistent with the study by Robin Robert (2007), who also agreed that the reference group influenced the consumption decision of the country in which he was living.

#### ***5.2.6 Impact of environmental concerns***

The research hypothesis (H7) states that the more consumers are concerned about the environment, the more likely they are to buy organic food. However, the results of the analysis of the survey data show that the environmental concern has Sig. = 0.215 > 0.05. Thus the test results show that there is not enough evidence to confirm the hypothesis H7. The results of this study are consistent with research by Truong T. Thien et al. (2010). However, this result is inconsistent with the findings of A.H. Aman et al. (2012), study by Nguyen Phong Tuan (2011), study by B. Howlett, M. McCarthy et al. (2002). It proves that consumers in Vietnam now do not care much about environmental issues.

#### ***5.2.7 Impact of Health consciousness***

The research hypothesis H8 states Health consciousness among consumers positively influences their attitude toward organic food. However, the three observable variables are HF1, HF2, HF3 respectively in Cronbach Alpha, EFA runs. Thus the test results show that there is not enough evidence to confirm the hypothesis H8.



### ***5.3 Limitations of the study and scope for future research***

This study is limited to measuring the consumer's intention to buy organic food rather than measuring actual buying behavior. Although previous studies have advocated that intentions of action are positively correlated with actual behavior, it is still necessary to combine actual buying behavior with intent in future research. Furthermore, this study has measured organic food in general, whereas previous studies have shown that the consumption of organic food varies between different food products such as organic fruit, organic meat Muscle, organic milk etc., can limit the generalization of the findings. Future studies may test and compare consumer intentions and behaviors with respect to the different ranges of organic food products.

## **6 CONCLUSIONS**

### **6.1 Recommendations to managers and local entrepreneurs**

Based on the results of our research, we offer solutions to improve the consumer's intention to buy organic food:

The Ethical standards (including Subjective norm and Moral attitude) is one of the most important factors affecting the intention to buy organic food of consumers. Ethical standards are personal perception of the person's life to behave in accordance with the requirements of society. Therefore, the creation of a social tendency for the consumption of organic food will contribute to changing consumer perception of organic food. The most basic way is to use a mass media tool, a powerful tool to spread quickly and strongly. The use of media channels to introduce, educate consumers about organic food, its benefits in life today, or how to use it will strike the general psychology of society, social direction to the needs of the consumer. Take this kind of food. This has created a trend of consumer use.

Research also found that Perceived behavioral control also influenced consumers' intention to buy organic food. Awareness of executive control is related to a person's beliefs that are relatively stable in every situation. On the other hand, Perceived behavioral control can vary depending on the situation and the types of behaviors performed. A cognitive behavioral control is related to one's belief that one's success in doing something depends on one's own efforts. That is why businesses must build credibility with their own products to gain the trust of consumers. The introduction of quality products that meet the requirements of quality standards, in accordance with the needs of consumers is one of the requirements required to create the prestige of the company. Then consumers pay attention to the quality of organic products, and the core values within them will open up to accept new beliefs about organic food. In addition to communicating with the media, correct and accurate information about organic food is communicated, which helps to reduce false beliefs about organic food. Acting positively on the beliefs of food in their minds, increasing their purchasing intent. In addition, the study also pointed out that the reference group is also one of the factors that directly affect.

In addition to the positive actions of businesses, the State can also promote the production and consumption of organic food by considering and considering ways of affecting the macro environment of the country. Legally, the State has issued documents regulating the production and trading of food safety as detailed implementation of some articles of the Law on food safety; Circular 15/2012 / TT-BYT regulates the general conditions for ensuring food safety for food production and trading establishments; Circular 19/2012/TT-BYT guiding the

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regulation conformity announcement and compliance announcement of food safety regulations; Circular 45/2012 / TT-BCT regulates food safety inspection in the process of food production under the state management of the Ministry of Industry and Trade; Circular No. 75/2011/TT-BNNPTNT of the Ministry of Agriculture and Rural Development prescribes the registration and certification of food advertising contents under the management of the Ministry of Agriculture and Rural Development; Circular No. 59/2012 /TT-BNNPTNT of the Ministry of Agriculture and Rural Development regulates the safe vegetable, fruit and tea production management. The law, bringing these documents to the wide range of businesses as well as consumers. This has contributed to increased ethical awareness in the production of business as well as increased confidence in the safety of organic food.

At the same time, there are many enterprises in the market still lack of morality in production and business, taking advantage of the trust of consumers on organic food that trade in quality products are labeled real. Organic products. The state should intervene, inspect and strictly handle violations to ensure control of unqualified food that labels organic food.

The state should also take measures to support and encourage the production and sale of organic food, thereby enabling consumers to more easily access organic products.

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# The Relationship between Brand Equity and Consumer Responses: an Empirical Research on Vietnam's Smartphone Market

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## ABSTRACT

*In the emerging age of accelerated technological progress and race of innovativeness enhancements, firms' competitiveness has been increasingly grounded in the products' incremental value perceived by their consumers brought by brand equity, especially in the case of high-tech markets. This study aims at multi-dimensionally analyzing brand equity and quantitatively examining its effects on different measurable aspects of consumer responses which hopefully contributes further insights into the linkage between these two constructs to the related contemporary literature. This study focuses on Vietnam's smartphone market to test the proposed linkages in the context of an emerging economy. Findings indicate the valid inter-relation among components of brand equity, namely brand association, perceived quality and brand loyalty. The aggregate effect of these dimensions embedded in the overall brand equity construct on price premium, brand extension, brand preference and purchase intention is also empirically affirmed. Additionally, brand preference appears to be positively associated with purchase intention.*

**Keywords:** *Brand equity, brand extension, brand preference, price premium, purchase intention*

**JEL Classification:** M37

## 1 INTRODUCTION

The fast-paced ever-changing nature of competitive environment of high-tech markets, specifically the smartphone one, leads to the need of sustainable competitive advantage for firms who want to survive in such a cut-throat global marketplace (Gürhan-Canli et al., 2016; Swaminathan, 2016; Tornikoski et al., 2017) or even to be superior to their competitors (García-Ochoa and Bajo, 2016). The competition is now not located in the manufacturing factories or plants of firms but increasingly grounded in the perception of consumers, in other words, in the mind of downstream actors.

The key weapon competing firms can use in the “in-mind” battles is brand equity, which is considered as the value added to a product from its brand name (Yoo et al., 2000). Brand equity has growingly become the most valuable asset, in which firms have invested enormously to be more stably competitive against their rivals both at the domestic and international scale (Sharma, 2017; Steenkamp, 2017), contributing to the value creation of firms and improving that of consumers (Zhang et al., 2015), which then becomes one of the intangible resources of those firms on which they can capitalize to satisfy the market's needs and wants (West and Ibrahim, 2015). In many cases of global brands, the value of brands is the indicator of business success of the tangible products in which respective brands are embedded (Elliott, 2013).

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The value of a brand is perceived in the mind of consumers and reflected in their responses, in other words, brand equity can be measured through observing the ways consumers behave and act in the purchasing process of a specific product (Hoeffler and Keller, 2003), thereby the urgent needs for research on the linkage between brand equity and consumer responses (Wang et al., 2008; Broyles et al., 2009). The possible effects of brand equity on consumer responses include: Price premium regarding the price level that consumers are willing to pay due to the brand name of specific products rather than their physical attributes (Netemeyer et al., 2004); Brand extension implying that brands of higher equity can more successfully increase market presence than others due to the familiarity and trust brought about for consumers even if their knowledge about those brands are not sufficient (Milberg and Sinn, 2008); Brand preference relevant to the extent to which the consumers prefer a specific product to others due to the impacts of its brand name on consumers evaluations (Hoeffler and Keller, 2003) and purchase intention (Tolba and Hassan, 2009) demonstrating how eagerly the consumers want to make an actual purchase.

Managing the brand in the context of international competition has been becoming the central concern of practitioners and academics due to the different characteristics of heterogeneous markets encompassing participants from several countries, however, few of whose studies has been conducted incorporating this issue (Broyles et al., 2010; Buil et al., 2013). This research aims at taking the issue of heterogeneity of competitive markets into significant consideration, especially in the case of Vietnam's economy as it has been undergoing the transitional period towards completely opening domestic playing field for free competition. Furthermore, previous research published in recent years only used data collected in the advanced industrial countries' smartphone markets (Chung and Park, 2015; Mostert et al., 2016). In terms of the inter-relation among inherent constructs of brand equity, there were a limited number of studies considering this issue due to the dominant tendency towards a procedural hierarchy (Buil et al., 2013). This paper is going to test the effects existing among these dimensions on one another or a network inter-relation. An overall brand equity separately measured and incorporated as an aggregate mediator of the four dimensions to evaluate their effects on the firms' outcomes is also a noticeable point in this research. Then those outcomes will be observed by establishing insight of customer's perception towards the brand equity. Studying consumer responses can satisfy this strategic demand.

When previous research tried to inspect the causality between one of the dimensions and the consumer responses (Koll and Von Wallpach, 2014; Phillips et al., 2014) others focused on the effects of brand equity on one of the building blocks of consumer responses (Steenkamp et al., 2010; Khan et al., 2014) or the relationship between one dimension of brand equity and one aspect of consumer responses (Das, 2014; Calvo Porral and Lang, 2015). This study emerges as a promising work for drawing a comprehensive picture of brand equity and consumer responses.

## 2 LITERATURE REVIEW

### 2.1. Brand equity

Aaker (2009) defines brand equity as “a set of brand assets and liabilities linked to a brand, its name and symbol that add to or subtract from the value provided by a product or service to a customer”. There are a multitude of proposed concepts of brand equity, each of those was used in different contexts but can be grouped into two separate views. On the one hand, from the consumer perspective, it can be frequently used as “consumer-based brand equity” or

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strategy-based brand equity (Keller, 1993) stressing that brand equity is perceived or assessed by consumers as an incremental value (Netemeyer et al., 2004; Washburn et al., 2004; Šerić et al., 2016). According to this view, the brand equity is an integral part of the visible product but the value of this part is decided in the mind of the consumers and associated with the past investment in marketing activities (Keller, 1998). On the other hand, from the financial perspective or sales-based/firm-based perspective, brand equity can be measured by the amount of money brought about from the market for the firms possibly separately recorded in their accounts, this sometimes can be measured by the choice or share in the marketplace (Hoeffler and Keller, 2003; Keller and Lehmann, 2006; Datta et al., 2017). Although a financial method may provide a more exact insight into the valuation of brand, it may not be useful for brand managers to establish marketing strategies (Keller, 1993). The customer-based brand equity approach is more practical in a sense that the information offers a strategic vision of customer behavior and brand managers can develop many plans and strategies accordingly (Kim et al., 2008); therefore, with regards to this review, we implement customer-based brand equity perspective as an approach to measure the multidimensional brand equity of smartphones.

To better understand the brand equity and more radically evaluate its effect on the firm performance, previous literature has dismantled the brand equity into four constructs which are usually called dimensions (Yoo et al., 2000) existing in a hierarchical structure reflecting the causality among these constructs and constituting the step-by-step learning process of consumers (Konecnik and Gartner, 2007). They are brand awareness, brand association, perceived quality, brand loyalty and other proprietary brand assets. However, other aspects including trademarks, patents and distribution channel relationship are argued not relevant to consumer perception according to Yoo and Donthu (2001). They are ranged from the starting point in the mind of consumers about the presence of one brand, subsequently forming and strengthening related concepts and quality which then facilitating and nurturing the stickiness to that brand (Keller and Lehmann, 2006; Pike et al., 2010).

Brand loyalty is considered as the center dimension of consumer-based brand equity for management (Keller, 1993) since it reflects a customer's "deeply held commitment to rebuy or a preferred product or service consistently in the future, despite situational influences and marketing efforts having the potential to cause switching behavior" (Oliver, 1997). Zeithaml (1988) defines perceived quality as "the consumer's subjective judgment about a product's overall excellence or superiority". Perceived quality can be considered as personal customer's perception about product experience, unique needs and consumption situations; therefore, their perception will be involved in their decision making process. High perceived quality means that this brand has more probability of choosing instead of other competitor's brand, supporting a premium price, which in turn can create more profits for a firm to reinvest in brand equity (Yoo et al., 2000). Brand awareness plays an essential role in brand equity. It is defined as "the ability of the potential buyer to recognize and recall that a brand is a member of a certain product category (Aaker, 2009). The higher level of brand awareness for a brand, the higher probability of this brand can be involved in the buying decision making process of a customer (Hoyer and Brown, 1990; Nedungadi, 1990). Brand awareness with strong associations forms a specific brand image. Brand association is defined by Aaker (2009) as "anything linked in memory to a brand". Brand awareness combined with brand associations are significantly related to brand equity since they can be a signal of quality and commitment and they provide customer information about the brand at the point of purchase.

## 2.2. Relationships among brand equity dimensions

Despite the fact that dimensions of brand equity have been recognized and examined for years in the theory, there are still few empirical studies about their interrelations with one another (Kayaman and Arasli, 2007). According to Hsu et al. (2011), brand awareness is considered as a priority factor creating brand loyalty because consumers have a tendency to consider in their purchasing process and select a product or service that can be recognized and have a high-awareness; furthermore, when customers are aware and more familiar with a symbol or logo of a brand, they usually highly recommend that brand and willing to pay at high price (Huyn and Kim, 2011). In their research, Huyn and Kim (2011) conducted a test based on data collected from patrons of five chain restaurant brands in Korea. The results demonstrate that the four dimensions of brand equity are interrelated. The model indicates that the foundation of brand equity is brand awareness. However, while brand awareness influences brand loyalty formation, its impact is mediated by the effects of brand image and perceived quality. In addition, researchers have argued that brand awareness combined with brand association affects the formation and the strength of perceived quality (Keller and Lehmann, 2006). Thus, this brand equity dimension plays a dispensable part to perceived quality as the following hypothesis.

*H1: Brand awareness & brand association is positively related to perceived quality.*

The previous discussion points out that brand awareness and association is essential determinant contributing to brand loyalty (Sun and Ghiselli, 2010). One of the typical empirical studies examining the above relationship is the research of Kim et al. (2008) found out the significant impact of brand awareness combined with brand association on consumers' behavior loyalty namely customers' revisit intention to hotels. In the research of Romaniuk and Nenycz-Thiel (2013), it is also claimed that consumer brand association has a remarkable effect on behavior brand loyalty and the same results are presented in the study of Alexanderis et al. (2008). Based on the above discussion and previous research findings, the following hypothesis is presented:

*H2: Brand awareness & brand association is positively related to brand loyalty.*

Several studies have presented the empirical evidences for the positive influences of perceived service quality on customer loyalty. For example, Gallarza and Gil Saura (2006) have explored the relations between consumer perceptual constructs such as perceived value, satisfaction and loyalty. The results confirm the existence among perceived quality, customer satisfaction and customer loyalty. Whereas Nam et al. (2011) in their study, they investigate the mediating effects of consumer satisfaction on the relationship between consumer-based brand equity and brand loyalty in the hospitality industry. The research findings imply that consumer satisfaction partially mediates the effects of staff behavior, ideal self-congruence and brand identification on brand loyalty, while the effects of physical quality and lifestyle-congruence on brand loyalty are fully mediated by consumer satisfaction. Based on the above literature, the following hypothesis is presented:

*H3: Perceived quality is positively related to brand loyalty.*

In the line with previous research (Yoo et al., 2000; Bravo et al., 2007; Mohd Yasin et al., 2007; Jung and Sung, 2008; Buil et al., 2013), this research presents a separate construct



namely overall brand equity, which is to measure the incremental estimation of the central brand due to the brand name (Yoo et al., 2000). Scholars have argued that brand loyalty is the core component of customer-based brand equity because establishing strong brand loyalty can generate a lot competitive advantages for companies (Keller and Lehman, 2006). Loyal customers bring more favorable responses to a brand such as willingness to pay at premium price and less sensitive about the price, the cost of maintaining the existing customers is always less than that of attracting and looking the new ones (Alonso-Almeica and Bremser, 2013). The above discussion leads to the following hypothesis:

*H4: Brand loyalty is positively related to overall brand equity.*

#### **2.4. Overall brand equity effects on consumers' responses**

Strong brand equity can bring significant benefits to companies such as higher financial performance through revenue (Prasad and Dev, 2000; Kim and Kim, 2004) or through consumers' reaction on brand activities (Buil et al., 2013). This research makes further examination on the theoretical background suggested by Buil et al. (2013) on consumers' responses towards brands which includes four elements namely willingness of customers to pay a premium price for that brand, their attitude towards brand extension, brand preference and their purchase intention.

Homburg et al. (2005) defined the willingness to pay is the maximum amount of money that a customer is willing to pay for a product or service. In addition, Buil et al. (2013) put the above definition one step further when stating that the willingness of customers to pay premium price reflects the amount of money that a consumer is willing to pay for a particular brand compared with the other rivals in the market offering the same benefits. In the research of Netemeyer et al. (2004), they have confirmed that perceived quality, perceived value for the cost and brand uniqueness are the drivers of consumers' willingness to pay higher price for a brand and that willingness to pay premium price is a potential factor predicting brand purchase intention. On the other hand, Keller and Lehmann (2006) demonstrated that the influence of strong brand equity in the market includes price premiums, increased advertising elasticity, and decreased sensitivity to rivals' prices. Their study illustrated that leading brands can command large price differences and are more immune to price increases. Therefore, the following hypothesis is proposed:

*H5: Overall brand equity is positively related to customers' willingness to pay premium price.*

With regard to brand extension, Rangaswamy et al. (1993) indicated that brands with higher consumer utility extend better than brands with lower consumer utility. This finding suggested that highly valued brand names lead to favorable extension than brand names with lower value to consumers. One of the fundamental reasons is that adopting a new product category extension from a more well-known brand provides consumers a feeling of familiarity and trust that emphatically impact their attitudes towards the extension even they are relatively unfamiliar with that brand (Milberg and Sinn, 2008). Hence, in this situation, brands with higher or stronger equity are relied upon to create more positive purchaser reactions towards potential extension, as the below hypothesis postulate:

*H6: Overall brand equity is positively related to customers' attitude towards brand extension.*

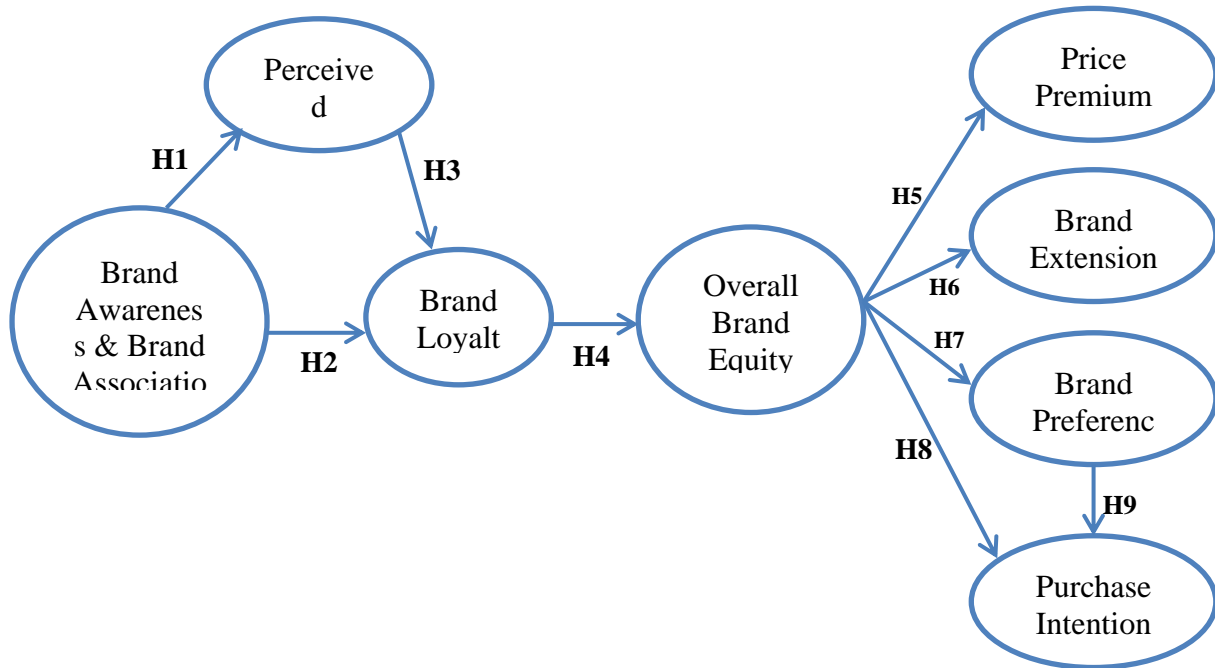
Studies have confirmed the positive relation between brand equity and brand preference as well as purchase intention. With regard to brand preference, researchers found that higher brand equity also brings a favorable influence on customers' attitude towards brand preference. Hoeffler and Keller (2003) indicated that on the product side, strong brands get special assessments of attribute and benefit information as well as higher general preference. Brand extensions of a more well-known brand are appeared to have higher preference levels. On the one hand, results from the work of Tolba and Hassan (2009) indicated that greater brand equity construct are the primary drivers of brand preference and intention to purchase among brand users. The study also proposed a relationship between two constructs namely brand preference and purchase intention. Hellier et al. (2003) used a structural equation model to present that customer purchase intention is influenced by seven important factors, one of which is brand preference and brand preference plays a mediating effect between customer satisfaction and purchase intention. Thus, the following hypotheses are drawn:

*H7: Overall brand equity is positively related to customers' brand preference.*

*H8: Overall brand equity is positively related to customers' purchase intention.*

*H9: Brand preference is positively related to customers' purchase intention.*

Figure 1 presents the proposed model of this study including two main parts. The former which is related to customer-based brand equity is adopted from the research of Yoo et al. (2000). The latter regarding to consumers' responses towards brand equity is derived from the outcomes of Buil et al. (2013). According to research of Yoo et al. (2000), brand equity is measured by three components, in which brand awareness was combined with brand associations as one factor. The given reason is that when brand awareness comes with a strong brand association, it will form a distinctive brand image. Washburn and Plank (2002) and Kim et al. (2008) have conducted studies to compare three-factor structure and four-factor structure with different brands. The results supported Yoo et al. (2000) findings which indicated the strongest and cleanest fit of the three-factor structure. Thus, this study will follow the results of Yoo et al. (2000) in establishing brand equity dimensions. Another reason needs to be mentioned is that the studies of Yoo et al. (2000) and Buil et al. (2013) also investigated in the consumer goods context, namely electronic devices like televisions, mobile phones, cameras and sport clothes. It is, therefore, suitable for the context of this study which is the smartphone market.



**Fig.1** - The proposed research model

#### 4. RESEARCH METHODOLOGY

In the context of this study, the scale for brand awareness combined with brand association, brand loyalty and overall brand equity developed by Yoo et al. (2000) is adopted because their scale has been most widely accepted and validated by several scholars (Washburn and Plank, 2002; Kim et al., 2008). For perceived quality, the scale of Pappu et al. (2006) is used since this scale has been developed in the case of electronic devices; therefore, it can be suitable to be applied to this study. The consumer willingness to pay a premium price is adopted from Netemeyer et al. (2004), the scale of customers' attitude towards brand extension is withdrawn from Salinas and Pérez (2009), and brand preference's is adopted from Sirgy et al. (1997) while purchase intention is extracted from Erdem et al. (2006).

This article applied two research methods namely qualitative research and quantitative research. First of all, qualitative research was conducted by group interview, specifically a number of ten interviewees divided into 04 groups were asked to provide their ad hoc advice and revisions for the proposed items. Subsequently, quantitative research was put into action. A pilot survey was first examined to make sure that the questionnaire did not contain any spelling and grammatical mistakes. The survey was conducted in about one month in Vietnam. A convenience sampling method was used with self-administered questionnaires distributed online and by surveyors at schools, universities and offices. The questionnaire comprised two major sections. In the beginning section, the participants were required to choose the brand of their currently used smart phones (including iPhone, Samsung or others). If the answer is others which means the customer is using another brand rather than iPhone or Samsung, the interviewee will stop answering the subsequent questions because this research aims to examine the two brands namely iPhone and Samsung. This section also included some demographic questions. The second section involved all of the 28 items of research including variables for brand awareness & association, perceived quality, brand loyalty, overall brand equity, price premium, brand extension, brand preference and purchase intention. All items in this study were measured based on 7-point Likert-type scale ranging

from 1 (strongly disagree) to 7 (strongly agree). Regarding to data analysis, all constructs were analyzed by Cronbach's Alpha Reliability Test and Explanatory Factor Analysis (EFA) with the support of SPSS software version 16.0 before implementing the Confirmed Factor Analysis (CFA) and Structural Equation Modeling (SEM) supported by AMOS software version 20.0 to evaluate the proposed research model and test the stated hypotheses.

## 5. RESEARCH FINDINGS

After of two weeks of surveying, 632 answer sheets were collected; however, there are only 525 ones were valid for the subsequent quantitative analyses, there were 107 responses excluded because of the problem of missing data and the interviewees had been using one of the two focal brands in this study which were iPhone and Samsung. Firstly, Table 1 presents the demographic breakdown of the selected sample. Up to 61.9% of the respondents are female; whereas the remaining 38.1% of the respondents are male accounting for just a little bit more than one third of the selected sample. Participants whose ages range from fifteen to thirty account for up to 93.3% of the total. The occupations of respondents are classified into two groups, the former is student group accounting for 57.9% and the latter is employed people group accounting for 42.1%. In the context of this research, we just examine the most popular smartphone brands in Vietnam which are iPhone (65.1%) and Samsung (34.9%).

**Tab.1** - Sample's Demographic Profile

Category	Sample n = 525	
	Frequency	Percentage %
Gender		
Male	200	38.1
Female	325	61.9
Age		
15-22	273	52.0
23-30	217	41.3
31-40	32	6.1
>40	3	0.6
Occupation		
Student	304	57.9
Employed	221	42.1
Mobile Brand		
iPhone	342	65.1
Samsung	183	34.9

Source: Authors' own calculations

Later, Table 2 illustrates the descriptive statistics of this research, the constructs reliability and some CFA results such as standardized loading value, CR and AVE. According to Nunnally and Bernstein (1994), if Cronbach's alpha does not reach the threshold of 0.7 and the corrected item-total correlations are below 0.3, the items lowering the construct reliability will be deleted to increase the alpha values. Then, all items of brand equity are put into the Explanatory Factor Analysis. The result indicates that the data is suitable to use in EFA.

Another issue is the method of extraction, if the analysis just stops at EFA, the method applied is principal components and the rotation method is Varimax. However, in the situation of this study, after EFA, the data will be put into CFA and SEM; therefore, it would be better if the methods deployed are Principal Axis Factoring and Promax, according to Gerbing and Anderson (1988). Hair et al. (2010) argued that factor loading should be more than 0.5 to get the empirical significance; hence, items whose factor loading below that threshold were deleted from the constructs.

Confirmatory Factor Analysis was performed to assess the fit of measurement model with AMOS software version 18.0. As can be seen from figure 2, the measurement model fit was satisfactory:  $\chi^2 = 717.095$ ,  $df = 322$ ,  $p=0.000$ ,  $\chi^2/df = 2.227$ ; root mean square error of approximation (RSMEA) = 0.048; goodness-of-fit index (GFI) = 0.912; Tucker & Lewis index (TLI) = 0.965; comparative fit index (CFI) = 0.970. In short, all of the indices demonstrated an acceptable fit for the measurement model. To assess the convergent validity, Gerbing & Anderson (1988) suggested that the standardized loading values must be over 0.5. As presented in Table 2, all the standardized loading values are over 0.5; therefore, the convergent validity was established. After that, the internal consistency of each latent variable and discriminant validity of each construct are based on the composite construct reliability (CCR) values and the average variance extracted (AVE). Because all constructs displayed the value greater than 0.7, an acceptable level of composite reliability (Fornell & Larcker, 1981), it was concluded that each construct has internal consistency. In general, the average variance extracted (AVE) should be greater than 0.5 (Fornell & Larcker, 1981) and the results were consistent with the conditions. All the results are presents in Table 2.

Table 3 presents the result after the SEM was utilized to test the proposed hypotheses. The overall fit of the structural model was  $\chi^2 = 981.733$ ,  $df = 341$ ,  $p = 0.000$ ,  $\chi^2/df = 2.879$ ; root mean square error of approximation (RSMEA) = 0.060; goodness-of-fit index (GFI) = 0.878; Tucker & Lewis index (TLI) = 0.947; comparative fit index (CFI) = 0.952. These findings also indicated an acceptable fit for the structural model. All proposed hypotheses were found to be significant ( $p<0.01$ ). According to the results, brand association has a greater influence on brand loyalty ( $\beta_2 = 0.408$ ) compared to perceived quality ( $\beta_3 = 0.193$ ). Moreover, brand loyalty proves to be the core dimension of brand equity when possess a regression coefficient up to 0.727. Lastly, overall brand equity is positively related to consumers' responses in the line with the literature review.

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**Tab.2 - Constructs reliability test**

Items	Mean	Cronbach's alpha	Factor loading	Standardized Loading value	CR	AVE
Brand awareness & Brand Association (BA)		0.888			0.890	0.619
BA1: I know what X looks like.	6.09		0.859	0.76		
BA2: I can recognize X among other competing brands.	6.24		0.853	0.824		
BA3: I am aware of X.	6.27		0.759	0.862		
BA4: Some characteristics of X come to my mind quickly.	5.94		0.750	0.726		
BA5: I can quickly recall the symbol or logo of X.	6.49		0.702	0.756		
Perceived Quality (PQ)		0.901			0.901	0.697
PQ1: Brand X offers very good quality products.	5.83		0.875	0.859		
PQ2: Brand X offers products of consistent quality.	5.67		0.873	0.889		
PQ3: Brand X offers very reliable products.	5.82		0.850	0.852		
PQ4: Brand X offers products with excellent features.	5.80		0.730	0.732		
Brand Loyalty (BL)		0.861			0.873	0.699
BL1: I consider myself to be loyal to brand X.	5.44		0.873	0.874		
BL2: Brand X would be my first choice when considering smart phone.	5.63		0.861	0.878		
BL3: I will not buy other brands of smartphone if brand X is available at the store.	4.95		0.762	0.75		
Overall Brand Equity (OBE)		0.926			0.927	0.761
OBE1: It makes sense to buy brand X instead of any other brand of smartphone.	5.10		0.916	0.848		
OBE2: Even if another smartphone brand has the same features as brand X, I prefer to buy it.	5.25		0.876	0.879		
OBE3: If there was another brand of smartphone as good as X, I prefer to buy X.	4.98		0.859	0.857		

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OBE4: If another brand of smartphone is not different from X in any way.	5.26		0.837	0.906		
Price Premium (PP)		0.937			0.939	0.837
PP1: The price of brand X would have to go up quite a bit before I would not consider buying it.	4.58		0.949	0.884		
PP2: I am willing to pay a higher price for brand X than for other brands of smartphone.	4.45		0.927	0.94		
PP3: I am willing to pay a lot more for brand X than for other brands of smartphone.	4.41		0.861	0.92		
Brand Extension (BE)		0.844			0.851	0.658
BE1: Favorability of the extension.	6.01		0.893	0.798		
BE2: Perceived quality of the extension.	5.86		0.812	0.888		
BE3: Likelihood of trying the extension.	5.53		0.717	0.74		
Brand Preference (BP)		0.935			0.936	0.829
BP1: I like brand X better than other brands of smartphone.	5.58		0.923	0.915		
BP2: I would use brand X more than other brands of smartphone.	5.56		0.908	0.903		
BP3: In smartphone, brand X is my preferred brand.	5.53		0.901	0.913		
Purchase Intension (PI)		0.948			0.948	0.858
PI1. I would buy brand X.	5.44		0.947	0.95		
PI2. I would seriously consider buying brand X.	5.45		0.929	0.904		
PI3. It is very likely that I would buy brand X.	5.57		0.903	0.925		

*Source: Authors' own calculations*

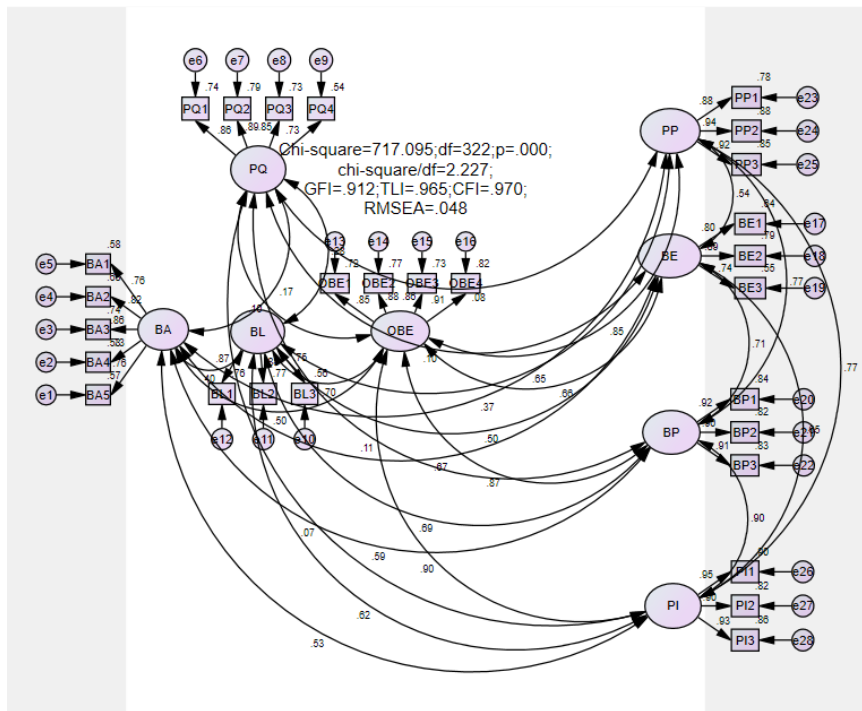


Fig.2 - Confirmatory Factor Analysis Results

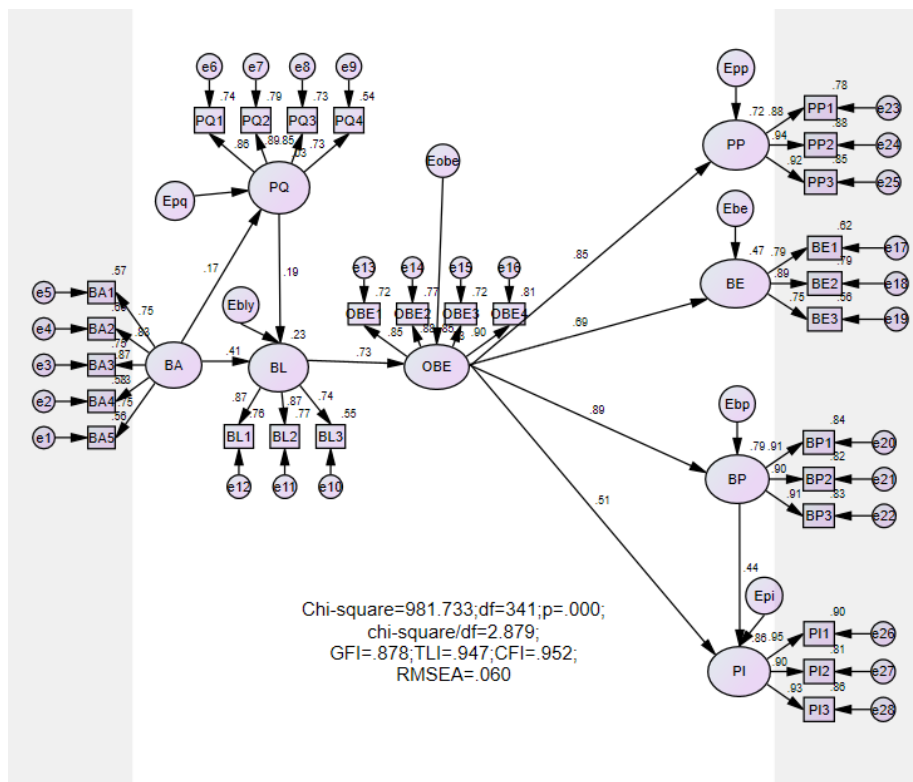


Fig.2 - Structural Equation Modeling Results



**Tab.3** - Standardized structural equation modeling of the proposed model

	Standardized estimate	t-value	p-value	Hypotheses
Brand Association → Perceived Quality	0.171	3.549	***	Supported (H1)
Brand Association → Brand Loyalty	0.408	8.167	***	Supported (H2)
Perceived Quality → Brand Loyalty	0.193	4.266	***	Supported (H3)
Brand Loyalty → Overall Brand Equity	0.727	14.728	***	Supported (H4)
Overall Brand Equity → Price Premium	0.851	21.377	***	Supported (H5)
Overall Brand Equity → Brand Extension	0.685	14.317	***	Supported (H6)
Overall Brand Equity → Brand Preference	0.891	23.793	***	Supported (H7)
Overall Brand Equity → Purchase Intention	0.514	8.85	***	Supported (H8)
Brand Preference → Purchase Intention	0.441	7.726	***	Supported (H9)

*The significant level is  $p < .01$ , source: Authors' own calculations, \*\*\* means that the p-value is significant at the level of 0.01*

## 6. CONCLUSIONS AND IMPLICATIONS

With regard to the inter-relationships among the three dimensions of brand equity, the research indicated that brand awareness combined with brand association and perceived quality can be the drivers of brand loyalty. This discovery is similar to and supported by Aaker's argument (2009) that customers who have high level of brand awareness of a particular brand tend to be faithful to this brand and less influenced by rivalries'. Thus, brand loyalty would probably show up when a customer positively perceives a specific brand to have a higher quality than competing brands. Furthermore, brand loyalty has a remarkable effect on overall brand equity. This finding is in accordance with many previous studies (Yoo et al., 2000; Bravo et al., 2007; Buil et al, 2013). The research findings also give information about the positive relationship between brand equity and consumers' responses, which is also proposed and tested in the study of Buil et al. (2013). This study empirically illustrates the willingness of users to pay at a high price for their smartphone will be influenced by mobile phone brand equity. In addition, overall brand equity does not only promote a favorable acceptance of brand extension and brand preference but also leads to customer purchase intention. Finally, perceived preference of customers towards a specific brand affects significantly the intention of buying.

The findings of this study provide managers with a useful and reliable guidance for orienting their business strategies which confirms the valid relationship between brand equity and consumer responses and highlights the magnitude of the effects of the former construct on the latter one. These dominant effects suggest the fertile area for firms' capital investment to gain the highest returns from market. This means that firms should target brand equity as an item

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firstly prioritized in their long-term investment portfolio and include building brand equity in the firms' competitive strategy planning to be more strongly pulled by the market. Also, the findings imply that overall brand equity is mostly influenced by brand loyalty opening a new shifted strategic direction towards enhancing this component instead of other focuses on the remaining dimensions. Specifically, it is advisable that firms should design special offers to obtain greater consumers' stickiness to their products and creating potential fans in the future as a solution to market expansion. To consolidate radically the close links with incumbent consumers, their quality perception about firm's products also needs to be well established and continuously maintained. Marketing mix activities should be combined smoothly in the deploying process in order to connect the possessed brands with consumer' mind positively.

The latter part of the tested model of this research has shed light on the ways firms can be able to benefit from their previous investments on brand equity. According to the findings, brand preference is the largest possible gain which a brand with high value can earn from its consumers. Furthermore, the two-fold effect of overall brand equity on purchase intention is confirmed which magnifies the eagerness of consumers to buy products. This makes managers' decisions on launching new ranges of products more persuasive and well-oriented. Additionally, firms of well-established brands could think further of a more profitable prospect as the findings affirm the strong relation between its value and the likelihood of a price increase not entailing a resultant drop on sales or revenues.

## 7. LIMITATIONS AND FURTHER RESEARCH

This study also has some limitations that should be tackled in further research. First, the findings of this study are from a sample in Vietnam, so generalization of the findings is limited. Future research should consider the applicability of the proposed model in other countries and cultures or other services, products and brands. Secondly, additional outcomes of a brand should be included in the research model to have a better understanding of brand equity and its consequences. Future research should examine customer brand equity in both customer-based and financial-based perspective to link these perceptual measures with behavioral outcomes and financial performance to surmount this limitation.

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## Understanding the Customer Participation in ICT Consulting Service

*Nguyen Giang Do*

### ABSTRACT

*Customer participation has become a critical issue in recent marketing literature. That the developments in marketplace are going to digitalized and innovative service, requires researchers and practitioners need more investigating the customer participation in ICT service related context.*

*In the light of Service Dominant Logic, this paper is to analyse how customers participate in the service offerings impact on both satisfaction and loyalty, a combine of these two outcomes have not been simultaneously investigated in a participation model yet. While how each social exchange factor is influencing on customer participation is examined throughout, extant studies are not paid much attention on collective factors and entirely absent of the role of customer innovativeness. Our proposed model is set to fill this gap by advancing customer participation with novel approach, focuses on the impact of customer innovativeness, as direct and moderating factor of customer participation. The findings of moderating role of innovativeness bring new insights into customer participation, as co-creation and innovative process, leading to value outcomes for customers and service firms. The suggested model is expecting validated in ICT consulting service context, the managerial and theoretical implications are given lately, followed by the test result analysing.*

**Keywords:** *customer participation, service-dominant logic, ICT consulting, expertise, innovativeness, (co)creation, satisfaction, loyalty.*

**JEL Classification:** M31

### 1 INTRODUCTION

Customers progressively could take part in production and delivery offerings to their needs. The participation in the service offerings is an inevitability, since the producing and consuming of services are simultaneous and improved through the motivative integration of customers' resources. Recently the importance dedicated to customer participation (CP) was studied, resulting in respected academic researches (Lovelock and Young, 1979; Bitner et al., 1997; Ennew and Binks, 1999; Prahalad and Ramasmamy, 2000 and 2004; Dong et al., 2008 and 2014; Yen 2005; Auh et al., 2007; Payne et al., 2008; Etgar 2008; Grönroos and Voima, 2013; Ngo VL and O'Cass, 2013; Mustak et al., 2013; Nambisan et al., 2017). Customers are no longer passive consumers who receive offerings by service firms but co-creators of the offering process (Prahalad and Ramasmamy, 2004; Vargo and Lusch, 2004). It is claimed that the value outcomes of CP do not emerge in the firm sphere neither the customer sphere, but emerge through co-creation (Vargo and Lusch, 2004; Ostrom et al., 2016), or in the various activities performed in one or more of these stages of activity network chain (Etgar 2008). These various activities involve the intellectual work of initiating and designing,

resource aggregating and processing activities up till ensuring delivery and executing use (consumption).

CP studying on ICT professional consulting service is uncommonly rare. Amongst published works, there are some such as Das et al., (1999) and Yoon and Suh, (2004)). The above-mentioned articles take a solely firm-centric perspective which became outdated with the dawn of the service-dominant logic or SDL (Vargo and Lusch, 2004, and 2016) and do not fully cover all relevant facets in the context (e.g. customer and firm resources integration and value co-creation). The integration and relationship between firms and customers in the co-creation process and the co-innovation as one of top research priorities according to Hoyer et al., (2010) and Ostrom et al., (2016).

In line of CP investigations, Auh et al., (2007) focus on explaining the impact of co-production on loyalty behavioral and attitudinal, Yi and Gong (2007 and 2013) provide empirical evidence from customer *social exchange* and behavior (in-role and extra-role) showing CP is significantly linked to value creation. Scholars evaluate the relationship between CP behavior and customer perceived value (process and outcome) leading to customer satisfaction. However, there are so few approaches of how the innovativeness factor effects on CP (Hurt et al., 1977), except only a study of Manzano et al., (2008) which explain the perceived outcome value in e-banking and consider customer innovativeness as a predictor of adoption e-banking service.

Thus, extant works investigate on limited facets of CP and on separately selected outcomes, within merely particular business contexts. Based on those starting points, we attempt (1) addressing the inquiry gap to get more insight the CP impacts outcome values (i.e. simultaneously both satisfaction and loyalty) in the light of SDL perspective, (2) uncovering consistent CP integrated antecedents by applicability of powerful theories to customers (e.g. *Social exchange* theory (Blau 1964)) (3) Procuring customer innovativeness, an significant factor in the digitalization services on CP. Influence of customer innovativeness on CP is investigated by direct effect and specially by moderating effect which bring more understandings about CP in service offering.

In short, to ensure that customers participate appropriately and timely in service offering, the purpose of this study is to determine and propose the framework model, including antecedents and consequences of CP in concrete manner to explain the related factors of value creation for customers and service firms, as multiple actors and for whole service ecosystem.

The remainder of this article is organized as follows: First, we review literature including on ICT consultancy service, on CP and on how participation leads to both customer satisfaction and loyalty. Second, we consider integrated antecedents including customer innovativeness, and to analyze the nature of CP, based on the light of theoretical concept of SDL and dedicated theories. We consider the relationship between factors and suggest the framework model. Third, outlook is discussed, as well as theoretical and managerial implications and ongoing research directions.

## 2 LITERATURE REVIEW

This study is grounded mainly in SDL and customer perspective. SDL defines service “as the application of specialized competences (knowledge and skills) through deeds, processes, and performances for the benefit of another entity or the entity itself” (Vargo and Lusch 2004, p.



2). In SDL perspective, goods are a distributing mechanism for services because a service represents the fundamental unit of exchange (Vargo and Lusch, 2004 and 2016). SDL and related perspectives, such as service logic (Grönroos 2006) and service science (Lusch et al., 2007; Vargo et al., 2008) stress on transactions in which specialized competences, such as knowledge and skills, are exchanged and describe the mutual interaction between the firm (provider) of service offerings with its customers. Additionally, based on SDL, we acknowledge such assumptions as “all economies are service economies” (Vargo and Lusch 2004, p.10) and “enterprises cannot deliver value, but only offer value propositions” (Vargo and Lusch 2008, p. 7). Therefore, the role of the customer and customer resources has become such meaningful. In this paper, within the co-creation and SDL context, the term “service offering” is to represent products, services and solutions, meanwhile the terms “consumer” and “customer” are used interchangeably due to the similarity of meaning of participation in stages of service process.

Yet, Nordic school of thoughts places concept Customer Dominant Logic or CDL far more customer-centric than SDL (Heinonen and Strandvik, 2015) integrates customers “as employed by the company or as a partner” (Heinonen et al., 2010, p. 533). It also states that “the center of interest is not exchange and service as such, but how a company’s service is and becomes embedded in the customer’s contexts, activities, practices, and experiences, and what implications this has for service companies” (Heinonen et al., 2010, p. 533). Acknowledged CDL and mentioned views of the positions of the customer and the service offerings, in our study paper, we focus on the service offerings and the CP in the process of service offerings.

### **Solution business and consulting service**

Five decades ago, the solution business is discussed by some researchers, as Ansoff and Stewart, (1967) and Brady et al., (2005). Further some are based on the degree of customization (Pralahad and Ramaswamy, 2004; Etgar, 2008) and integration with the customer and the packaging (bundling) of products and services. The sense of solution business is quite different from that of product business: it requires a more collaborative management, business planning needs to involve customers more (Kaj Storbacka, 2011). Firms that move towards becoming providers of integrated solutions develop new capabilities, such as business consulting capabilities and financing capabilities (Brady et al., 2005). Researchers also see business solutions as “comprehensive bundle of products and/or services that fully satisfies the needs and wants of a customer related to a specific event or problem” (Stremersch et al., 2001, p. 2).

Discussion on the solution business is occurred also from the nature of the variety of industries that offer solutions, including technology, manufacturing and professional services (Aarikka-Stenroos and Jaakkola, 2012; Jacob, et al., 2014). Sharma and Patterson (1999) indicate that the professions offer highly complex and customized services which are created and delivered by qualified personnel over a continuous stream of transactions (service encounters) and collaboration with customers. Those professions are accounting, legal, psychotherapy, financial planning, advertising services (Crosby et al., 1990). For CP, product design and development was discussed quite early in the context of IT-products and services (e.g. McKeen et al., 1994), gradually extending to other types of offerings (e.g. Milewa, 1997; Kajri, 2002). Those various explanations and definitions concede that the contributions of the customer and the firm through collaboration or participation in solution business, and that a consulting business is one of the professional industries established

principally from common field. It is noted that we prefer to use term ICT, which is more widely but exchangeable with IT in entire our paper.

### **Customer participation and service offering process**

In service perspective, customer participation and/or coproduction play a significant role in service quality, customer satisfaction and other value outcomes (Uzkurt, 2010; Mustak et al., 2013). Consecutively more empirical and theoretical studies are being carried out into this broad subject. Various terms have been used to describe CP (Chan, Yim, and Lam 2010 and 2012), coproduction (Bendapudi and Leone 2003), resulting in a lack of conceptual clarity (Mustak et al., 2013). In this paper, we employ the phrase “Customer participation” or “CP” thanks to its prevalence in the extant literature, much broader conceptual domain covering various customer roles and behaviors such as interactioning, collaborating, sharing information and preferences and providing labor, and its wide coverage of CP spectrum consisting of firm, joint, and customer production (Mustak et al., 2013). That the degree of participation varies depending on the service type of industries is explained that service offerings have different service settings, with the level of participation for both customers and firm personnel differing among services. Service firms can regulate the degree of CP dimensions, and increase both the level of CP and the quality of the service process (Uzkurt, 2010).

According to Raaij and Pruyn (1998), the service process consists of three stages: (1) the input stage, where the service specifications are determined (2) the realization stage, or throughput stage: the service is created (prepared and offered) and (3) the outcome stage or output stage: the customer perceives the benefits of the service. Raaij and Pruyn (1998) also claim that there are 2 critical factors in service production are service validity (is the correct service produced?) and reliability (is the service correctly produced?). Customers play important roles at every stage of the service process. For some services (especially highly participatory services), customers’ active participation is necessary in the process (Uzkurt, 2010).

Bitner et al., (1997) classify three levels of service participation: high, moderate and low service participation. For the low levels of participation, just only customer’s physical presence is mandated. Next, moderate levels of participation, customer input information as well as effort or physical possessions are required to contribute the service firm to create service offerings. And in the elevated levels of participation, customers can be involved in co-creating the service. Bitner et al. (1997) also indicate that customers are not only information resources; they also contribute to quality, satisfaction and value and are competitors to the service organization. Service firms see the customer a partner in the creation of value and need to learn how to connect customer competencies (Prahalad and Ramaswamy, 2000). Customers participate in the stages of the service process by providing information or knowledge, through physical effort or behaving responsibly and showing their feelings through their actions (Ennew and Binks, 1999). Additionally, customers are must be accepted as partial service providers because of their unavoidable participation in and contributions to the service process (Mills and Morris, 1986). It is important to identify the conditions necessary for sufficient level of participation and to investigate the antecedents for CP in the service offerings as well as these antecedents’ effect on participation.

### **Customer role and behavior**

The dominant view is that CP in service offering brings principal benefits. First, it lower costs for firms, and the consumer can expect a reduction in price. This economic rationale provides the focus for most early literature on participation or co-production (e.g., Lovelock and Young 1979) and so, CP can lead to dramatic gains in productivity for firms. Second, CP enables the firm to customize its offerings to customers' needs. The encounter between the customer and the firm thus represents a critical component of a service offering process in which the customer has direct input into the production of the final service offering. Highly participatory services, such as solution or consulting business, are defined by a high degree of coupling (i.e., continuous, immediate impact of contact), interdependence (i.e., service quality is contingent on inputs from each party), and information richness (i.e., the value of information passed between parties). Thus, co-creation can be understood as the "benefit realized from integration of resources through activities and interactions with collaborators in the customer's service network" (Vargo, et al., 2012, p. 7). There are three key customer factors specified: clarity of the task, ability or competence, and motivation (Bettencourt 1997; Lengnick-Hall 1996; Lovelock and Young 1979; Meuter et al. 2005). As SDL states, CP may happen with "shared inventiveness, co-design, or shared production of related goods." Lusch and Vargo (2006, p. 284). Service perspective studies consider that through participation, customers integrate tangible and intangible resources, into their consumption or usage process, thereby accruing value. Therefore, based on extant researches, CP from a starting point as the interference in service production activities becomes as mandatory integral co-creators of resources for value creation in service offering process (Grönroos and Ravald, 2011).

### **Customer Innovativeness**

Researchers define concept customer innovativeness in various meanings. In our study, it is used solely innovativeness with reference to customer rather consumer due to the nature of value creation in the participation process of service offering. According to Midgley and Dowling (1978), innovativeness is "consumption of newness," or is the tendency to buy the new products more often and more quickly than other people. Following the distinction made also by Midgley and Dowling (1978) between actualized (actual innovative behavior) and innate innovativeness (a trait possessed by every human being). There are four explanations have been proposed under concept of innate innovativeness: (1) stimulation need, (2) novelty seeking, (3) independence toward others' communicated experience and (4) need for uniqueness. Hurt (1977) considers that a definition of innovativeness as a normally distributed, underlying personality construct, which may be interpreted as a willingness to change, is an intuitively more accurate interpretation of innovativeness. Manzano et al. (2009) believe that consumer innovativeness, understood as the tendency to willingly embrace change and try new things and buy new products more often and more quickly than others. According to Mazano et al, (2009), it can be distinguished: innovativeness in general and innovativeness applied to a specific domain. General innovativeness reflects openness and an individual's search for new experiences, and Domain specific innovativeness (DSI) is the individual's tendency to try innovations in services or processes of interest. Barrutia and Gilsanz (2013) see that consumer innovativeness belongs to personality-related resources, including energy and openness in relation to certain activities. SDL logic explains innovation and innovativeness largely by systematic service ecosystem approach as the process of value creation beyond a firm's operational activities to include the active participation of multiple

actors, including customers a whole (Akaka et al. 2017). Through SDL lens innovation is a collaborative process, which requires participation of all value co-creating parties and social, as well as technical, developments ((Akaka et al. 2017). Vargo and Lusch, (2008) states that value is always co-created, and this offers a holistic and contextual view to understand value creation, and innovation (Vargo and Lusch, 2008). CP per se is not new, but to the extent that CP reaches, it may recently justify the effect of innovation capability of personal customers, the innovativeness This paper focus on a specific customer personality trait, the innovativeness that has shown to be critical in solution service context. Innovativeness refers to a tendency to be a technological and non-technological (Ngo VL and O’Cass S, 2013) pioneer or leader and innovativeness affects a customer willingness to use new solution or technology for achievement (Parasuraman, 2000). Lusch and Vargo (2006a, p. 284) stated, customer participation in the creation of the core offering itself can occur through “shared inventiveness, co-design, or shared production of related goods”. So, it is argued that innovativeness as well as other consumer resources such as consumer expertise (knowledge and skills), communication and motivation have impact on CP leading to positive value outcomes.

### **Customer satisfaction and loyalty**

Oliver and Westbrook (1980) has proposed that satisfaction results from the customer’s comparison of expectations with performance, according to discrepancy gap or consumer-satisfaction models, a positive gap (the service realization is better than expected) results in satisfaction, whereas a negative gap results in dissatisfaction. Bitner et al. (1997) proposes customer participation lead to increase customer satisfaction (as well as enhance productivity and improve service quality). Scholars argue that customer satisfaction research is mainly influenced by the disconfirmation paradigm (Parasuraman et al. 1988), however, Eggert and Ulaga (2002) states that the customer’s feeling of satisfaction based on comparison between perceived performance and a comparative standard (i.e. expectations). In the marketing literature, customer satisfaction has been defined as the customers’ cognitive state and emotional response to the consumption experience (Oliver, 1997). The customer is satisfied when the product’s performance is equal to what was expected. If the product’s performance exceeds expectation, the customer is very satisfied (positive disconfirming). According to Oliver (1997), satisfaction is a post-usage phenomenon, purely experiential, and results from comparative processes. It is argued that satisfaction is the consumer’s fulfillment response, which is a judgment that a product or service feature, or the product or service itself, provided (or is providing) a pleasurable level of consumption-related fulfillment, including levels of under/over fulfillment. The fulfillment represents either the affective (liking/pleasure) or cognitive (thinking/judging) components (Oliver, 1997).

Loyalty is defined as “a deeply held commitment to re-buy or re-patronize a preferred product/service consistently in the future, thereby causing repetitive same-brand or same brand-set purchasing...” (Oliver, 1999, p. 34). Scholars argue that in its most initial stage of conception, customer loyalty is perceived as the combination of activities and behaviors: repeated purchases (service/ product/ brand) from one service provider, price insensitivity, resistance to counter persuasion, and recommendation to others. More recently, Rai and Srivastava (2013) defined customer loyalty as psychological character of the customer coupled with emotional attachment formed with the service firm, leading to a state of willingly and consistently being in the relationship with preference, patronage and premium. Auh et al. (2007) suggest that co-production leads to stronger perceptions of customization

and cost reductions, which in turn lead to more favorable assessments of the firm and increase customers' intentions to spend and actual spending with the firm, and that this expression of loyalty.

### **3 CONCEPTUAL DEVELOPMENT**

After having reviewed the theoretical backgrounds and previous works related to the CP and its outcome values, we now develop our propositions to investigate the participation of customers in the ICT consultancy service. Our foci are the customer satisfaction and the loyalty to the consulting service offered by the firm. These outcomes of the service offering are perceived by the individual customer and thus, the unit of analysis is the discrete participation between a customer and a service firm. The proposed model for the CP consists of considerate CP combined antecedents by inventive applicability of resourceful theories to customers (e.g. Social Behavior as Exchange (Homans, 1958) *Social exchange* theory, (Blau, 1964); Person-Organization Fit theory, (Kristof, 1996), and Unified Services theory (Sampson and Froehle, 2006)). These factors are communication, task clarity, customer expertise, and customer motivation (Lengnick-Hall 1996), which are proposed to have direct impact on CP. Specially in this study, customer innovativeness (Hurt et al., 1977) is proposed to have direct and moderating force on CP in ICT solution service context. The derived value outcomes of the proposed model are customer satisfaction and loyalty.

To propose the hypothesized model, our study is inspired by prior prominent valued works such as Auh et al. (2007), Yi and Gong (2013), Nambisan and Baron, (2010), Ngo LV and O'Cass A, (2013), and Barrutia and Gilsanz (2013). Yet, this study is consistent with SDL logic and other service perspectives.

In our notion, we adopt the view of Auh et al. (2007) of the co-production as core model, in which co-production reflects "engaging customers as active participants in the organization's work" (Lengnick-Hall et al. 2000, p. 359), and such, that is CP. The model consists of factors of *social exchange* relationship (Yi and Gong, (2013); Blau 1964) in customer sphere (Grönroos and Voima 2013), customer innovativeness (Barrutia and Gilsanz, 2013; Hurt et al., 1977). In this proposed model, dependent variables 'satisfaction' and 'loyalty' are the outcomes of CP, mainly from the firms' perspectives. We thus propose a model that is expected to explain the customer satisfaction and loyalty (Oliver, 1997 and 1999; Ennew and Binks, 1999; Rai and Srivastava, 2013) to ICT consulting services in customer sphere as well as the CP itself in the process of ICT consulting offering.

#### **CP with satisfaction and loyalty**

Due to the professional solution offering of ICT consulting services, there are always multiple actors from parties participated in the consulting offering, customers are viewed as co-creators, co-producers, at least as partial employees (Lengnick-Hall et al. 2000; Vargo and Lush 2004 and 2008). It is argued that customer value is the foundation for all activities we carry out in marketing, and customer satisfaction is broadly accepted as a strong predictor for outcome behavior variables such as repurchase intention, word-of-mouth, or loyalty (Ravald and Grönroos, 1996; Eggert and Ulaga, 2002). It is suggested that customers are partial employees (Claycomb, Lengnick-Hall, and Inks, 2001) and partial service providers (Mills and Morris, 1986). This theory proposed by Edward (1991), person-job (P-J) fit is classified into Demand-abilities perspective and Needs-supplies perspective; From the Demand-

abilities perspective, the fit could be achieved when customers contribute sufficient knowledge, skill and abilities (customer resources) to fulfill the job demand. For the Needs-supplies perspective, the fit exists when the supplies (firm resource) offered from jobs are suitable to the needs, preferences and desires of customers. Therefore, customers would be satisfied with the job when the firm (and firm resources) fulfill customer preferences (Kristof, 1996). According to Chatman (1989), person-organization (P-O) fit is defined as the congruence between the norms and values of firms and the customer value. As for the ICT consulting service context, we argue that the fit of good customer-task arises when customers are willing and ready for the participation tasks, so the fit leads to positive service outcome as satisfaction. We propose:

*P1: The CP has a positive effect on the customer satisfaction with the service offering.*

In general, when customers participate or engage in the service offering process, their perceptions of belonging to the company reflect on their satisfaction and their loyalty with the service company. In this study, we concentrate on customer satisfaction with and customer loyalty toward the ICT consulting service company. The loyalty is specified as “a deeply held commitment to re-buy or re-patronize a preferred product or service consistently in the future” (Michels and Bowen, 2005, p.6). According to Eisingerich and Bell (2006), CP is defined as customer willingness to make positive to improve service offerings that is loyalty as intention to stay with the firm, can reduce customer switching behavior, can be a vital source that allows firms enhance business. It is suggested that participation leads to stronger perceptions of customization and cost reductions, which in turn lead to more favourable assessments of the organization and increase customers’ intentions to spend and actual spending with service firms. In short, in this study, customer loyalty refers to the customers’ revisit and recommendation intentions. We propose:

*P2: The CP has a positive effect on the customer loyalty with the service offering.*

Marketing literature consider customer satisfaction as a vital antecedent to loyalty (Fornell, 1992). In the context of service industry, customer satisfaction has been identified as a significant factor in determination of customer loyalty (Lam et al., 2004). Lam et al., (2004) point out that satisfaction can affect customer attitude to a degree where he/she not only feels motivated to re-buy but also offer recommendations to the firm. Firms give highest priority to customer loyalty as re-buy products and services, helping achieve success and profitability. We propose:

*P3: The customer satisfaction has a positive effect on the customer loyalty with the service offering.*

### ***Social exchange relationships and Customer participation***

CP conceptualizations have gradually evolved to include a customer roles, behaviours, and resources during the service offering process (Mustak et al., 2013). Current research flow identifies a variety of positions that customers could assume in the service offering process, such as, partial employee (Claycomb, Lengnick-Hall, and Inks 2001), co-producer (Kelley et al., 1990), decision maker (Bitner et al., 1997), quality evaluator (Ennew and Binks, 1999), co-creator (Vargo and Lush, 2008 and 2016). CP is considered to include various behaviors, such as preparation, relationship building, information exchange, quality assurance, and assessment behaviors (Kellogg et al., 1997; Youngdahl et al., 2003).

*Social exchange* theory (Blau, 1964) claims that individuals direct their reciprocation efforts towards the source from which benefits are received. According to Blau (1964, p. 93, p.89), ‘individual who supplies rewarding services to another obligates him. To discharge this obligation, the second must furnish benefits to the first in turn’. So, when an individual does for another a favor, he expects the future return. In the relationship between the firm and customers, this reciprocity norm is expectedly employed, leading to mutually beneficial outcomes. There are three types of *social exchanges*: (1) firms and customers, (2) firm employees and customers, and (3) customers and customers. It is likely to notice that “communication” between three types of exchanges, is a reciprocal channel (Solomon et al., 1985; Rosenbaum et al. 2005). Based on the relationship with service firm through firm employees, customers believe that the firm values their contributed participation and cares about their well-being (Eisenberger et al., 1986), customers might feel well about the firm, rewarded about their participation, and finally be satisfied and loyal with the firm service.

### **Customer communication**

Sharma and Patterson’s (1999) defines communication effectiveness as the formal and informal sharing of meaningful and timely information between a service customer and employee of the professional firm in an empathetic manner, the goal of which is to guide and keep clients informed about their highly tailored made solution in a language that customers can understand. The nature flow of communication, in the ICT consulting service context of this research, emphasizes on exchanging information of technical trends, operational performance, explaining technological concepts and OPEX-CAPEX leverage, and finalizing the service offering package. Thus, communication flow is central to the establishment of strong relationships; it builds trust by resolving clients’ queries and concerns and managing their expectations (Sharma and Patterson 1999). Thanks to continuous communication with the firm, customers can perceive entirely structural sophisticated service solution designated for offering, and more important, perceive the clarity of the professional tasks (Lengnick-Hall, 1996), which customers should necessarily joint-perform. Task clarity refers to the extent to which customers understand what is required of them in service participation. The clearer a customer scope of role, the greater is the possibility that the contribution will lead to value outcomes of offerings (Mills and Morris, 1986). Employing *social exchange* theory, communication is obviously more than two-way reciprocal relationship, by which the firm and customers exchange information (potentially sensitive), integrate resources in the participation to co-create value. In the same way, we employ role theory to dyadic interaction of service offering (Solomon et al. 1985) to suggest that service outcomes will be as high when customers and the service firm attached to their clearly predefined roles and responsibilities. Hence, communication in social relationship is vital role to exchange information and integrate resources the service firm and customers to create value, and ultimately leads to task clarity required in effective participation norm. We suggest that communication as an antecedent of participation and propose:

*P4: Customer communication has a positive effect on the CP in service offering.*

### **Customer expertise**

Scholars refer to customer expertise as to indicate ability and competence, because expertise facilitates efficient and effective service transactions, in that customers are better able to provide accurate and pertinent information to firm employee (Kelley et al. 1990). There are

points help to explain how customer expertise likely increases CP. First, as customers advance sufficient expertise, they could evaluate and make valuable contributions to service offerings, and seem more likely to participate. Second, inexperienced service customers perceive higher decision-making risk and are less likely to participate because of fearing suboptimal outcome. Last, expert customers, who can “strip down” attributes of service offerings (Brucks 1985), likely have a greater need for control in the service offering process. It is also believed that customer experience impacts on the CP in the process of service offering, affects the relative importance of the *social exchange* relationship, and leads to customer satisfaction.

The conceptualization of CP has recently evolved to center customers as integrators of all kind of resources including tangible resources, information, codified and tacit knowledge, and customer claims that competencies into their consumption or usage process for value creation (Lusch and Vargo, 2006b; Heinonen et al., 2010; Grönroos and Ravald, 2011). In ICT consulting context, based on SDL, customers, as co-creators, need expertise which consist of resources such as information, knowledge, personal expert skill, experience, business and family relationships, openness in relation to certain activities and so on in the ICT sub domain. (Hoffman, 1998; Barrutia and Gilsanz 2013). Within ICT consulting solution service, an IT professional service recipient, should obtain sufficient ICT acquaintance himself or should be struggling to engage his team-workers with ICT knowhow and technique to collaborate, and operate the ICT solution offered by the ICT consultancy firm. Together to reasonings of Barrutia and Gilsanz (2013), we employ the narrower concept customer expertise, which is defined as the ability to perform product-related tasks successfully and the familiarity and knowledge about the firm service offering (Alba and Hutchinson 1987). Recently, researchers point out that social resources, as operant resources of customers, may consists of interpersonal trust, know-how exchange, perceived pressure, relationship proneness, and social expertise (Arnould et al. 2014; Paredes et al. 2014). Therefore, we propose:

*P5: Customer expertise has a positive effect on the CP in service offering.*

### **Customer Motivation**

Level of participation of customers may differ due to customer characteristics and differences can also be seen in their willingness to participate (Harris et al., 2000), and customers enjoy different approaches to the demonstration of participation (Bitner et al., 1997). In addition to being able to participate, customers must be willing to get involved, have a motivation to do a work (Lengnick-Hall, 1986). Applying the view of employee-ownership concepts of equity to customer “partial employee” and an employee- focused definition of affective commitment can generate a strong commitment to CP (Lengnick-Hall, 1986). It is also claimed that employees with strong affective commitment feel more motivated to contribute meaningfully to firm outcomes than do those who have lower. Eisingerich and Bell (2006) defines CP as willingness to make constructive enhancement to the service offerings. Works such as Meuter et al. (2005) and Uzkuurt (2010), show that, customer motivation can be defined as the desire, willingness, commitment and ability to effectively participate in the service offering process. Drawing on *social exchange* theory (Blau 1964) the customer motivation to become involved in participation is specified by the affective commitment to the firm and customer perceptions of interactional justice. Uzkuurt (2010) suggests that the willingness and ability to participate in the service process as the component of CP and if the motivation and encouragement which demonstrate the customers emotions for participating cognitively and actively



(Nambisan, 2002) are high, the level of participation increases. Subsequently, to raise the effect on service process participation, customer willingness and ability must be raised. Thus, we propose:

*P6: Customer motivation has a positive effect on the CP in service offering.*

### **Customer Innovativeness**

Hurt et al. (1977, p. 59) purely define innovativeness as “willingness to change”. According to Mazano et al., (2009), it can be distinguished: innovativeness in general and innovativeness applied to a specific domain. General innovativeness reflects openness and an individual’s search for new experiences and Domain specific innovativeness (DSI) is the individual’s tendency to try innovations in services or processes of interest. DSI measures are more predictive than global innovativeness. According to Akaka et al. (2017), SDL logic explains innovation and innovativeness by systematic service ecosystem approach as the process of value creation beyond a firm’s operational activities to include the active participation of multiple actors, including customers. Through SDL lens innovation is a collaborative process, which always involves the participation of all value co-creating parties and social, as well as technical, developments. Since multiple-role customers are willing to participate to change work processes and/or service solution, in context of ICT consulting service, this professional task, which is assigned to customers, is to develop innovative service solution. Parasuraman (2000, p. 308) proposes a “technology readiness” construct, which refers to the “propensity to embrace and use new technologies for accomplishing goals in home life and at work”. According to Nambisan and Baron (2010), drawing on expertise and innovativeness, customers realize “sense of partnership” with the firm and expectations of earning private rewards from those interactions assume relevance. From the concept of “sense of partnership”, customers role as the firm “innovation partner” can critically shape the extent of their contributions (participation) to the company (Nambisan and Baron, 2010. p.560). According to Ngo VL and O’Cass A (2013), that service quality (e.g. service outcome) and innovations maintain a relationship and firms should engage in CP activities. Nambisan et al., (2017, p.226 ) argue that “innovation problems are primarily associated with unidentified and latent needs of users, customers or other stakeholders, while solutions refer here to digitized artifacts their features, functionalities, and user affordances and the surrounding sociotechnical contexts”, so CP seems an innovation process, which requires the customer innovativeness to create innovative ICT professional solution. In light of the digitization of services, the innovativeness and the willingness to change, to participate in the innovation process of ICT consulting service is crucial. In short, customer innovativeness seems to influence positively on the relationships between three *social exchange* factors and CP as much as innovativeness factor could leverage resource, social behaviors, and perception of customers, which are hypothesized to impact on CP. So, if service customers are willing to change, adopt, and use offered ICT solutions, the more innovativeness, the more customers participate in the process of offering. Additionally, innovativeness is proposed to function as moderator on relationships between CP and three antecedents: communication, customer expertise, customer motivation. We propose:

*P7: Customer innovativeness has a positive effect on CP in service offering.*

*P8: The higher customer innovativeness, the stronger the effect of communication on CP in service offering.*

*P9: The higher customer innovativeness, the stronger the effect of customer expertise on CP in service offering.*

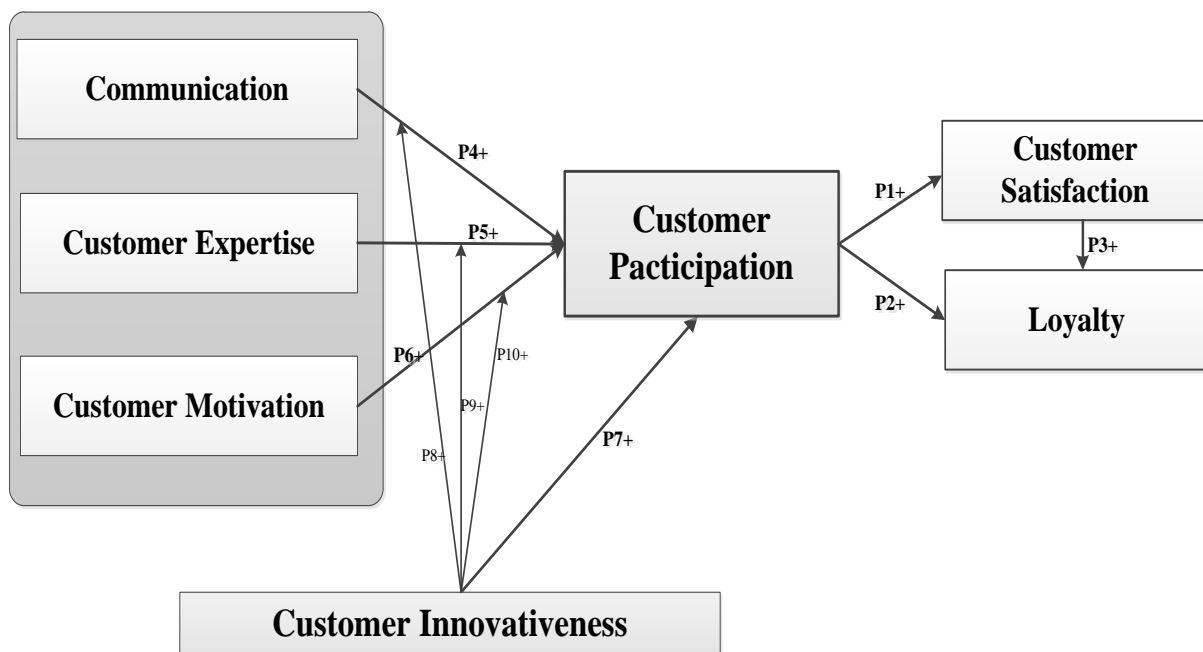
*P10: The higher customer innovativeness, the stronger the effect of customer motivation on CP in service offering.*

#### 4 FRAMEWORK MODEL AND CONSTRUCTS

Summarizing, we propose that the four antecedents of customer participation of the offering process. There is a combination of communication, customer expertise, customer motivation, and customer innovativeness, which are proposed to positively influence customer participation. Amongst those, customer innovativeness is proposed to influence direct on CP, and to moderate influences of three factors on CP. Figure 1 gives an overview of the derived framework model.

Conceptualization for the constructs of our proposed framework model have been discussed in preceding studies. Table 1 shows a summary of constructs.

To the extent of our presented framework model, we analyse and explain CP through the lens of SDL, where customers are as cocreators, and participation are as service exchange, value cocreation and innovative process. The customer should integrate resources in the professional ICT consulting service. Focusing on influence of CP on customer satisfaction and loyalty with digitalized solution service of our study context, which is especially meaningful for theoretical and managerial implications in transforming to the age all-digitalized service (Nambisan, 2013 and Nambisan et al.,2017) offering.



**Fig.1 - Proposed framework model for investigating Customer participation**

**Tab.1** - Roots for conceptualized constructs

No	Construct	References
	Communication	Sharma and Patterson (1999);
	Customer expertise	Sharma and Patterson (2000); Eisingerich and Bell (2006)
	Motivation	Raaij and Pruyn (1998), Bendapudi and Leone (2003), Rosenbaum et al. (2005); Uz Kurt (2010)
	Customer Innovativeness	Hurt (1977); Barrutia and Gilsanz (2013); Meuter et al. (2005); Nambisan and Baron (2010)
	Customer participation	Bettencourt (1997); Uz Kurt (2010); Yi and Gong (2013).
	Customer satisfaction	Eggert and Ulaga (2002); Srivastava (2015);
	Loyalty	Zeithaml et al. (1996); Eisingerich and Bell (2008); Rai and Srivastava (2012)

Employing *social exchange* and other dedicated theories to customers, we advance to investigate CP by integration of antecedents as customer roles, behaviours and interactions. Additionally, innovativeness, seen as the willingness to change and to participate in the cocreation and innovation process, is vital to overcome beyond one's current view, to accept the offered solution and to uninterruptedly deploy offered solution.

## 5 CONCLUSION AND OUTLOOK

Lastly, we present a framework model with which we drive to investigate the customer participation in ICT consulting service context, its influence on both the customer satisfaction and loyalty with the service offering. Acknowledging the limitation of extant works which investigate CP only in inadequate facets and not yet covered the dominant role of customer innovativeness, we interpret and employ theoretical establishment from psychology, marketing and service research into the ICT consulting domain to build up an inclusive, yet parsimonious framework model. Based on SDL, where the equality of all multiple actors is widely endorsed, our proposed framework development is stressed on the co-creation - participation through entirely service offering. Construct and a combine of constructs, grounded on known published references, are operationalized by new integrative approach, support the foundation of ongoing empirical validation.

To conclude this outlaying paper, we would confer some directions of future study, highlight our contributions to both theory and practice, and discuss the limitations of our study. Meanwhile, so far, our study is only a deductive framework, there are not yet any empirical test results, as to how far proposed concepts echo the practical business environment and as to how robust the proposed relationships between constructs are. Hence, this framework model is deductively developed on theoretical basics, the empirical validation logically continues for ongoing research. Considering more aspects, we might make clear that our foci are on customer participation, which is on customer sphere (Grönroos and Voima, 2013), and can be reckoned as a crucial determining factor of ICT consulting service outcomes. Satisfaction and loyalty, signs of successful business firm, may also be influenced by additional factors such as political environment, economical level and sector, firm price and sale policy, and which, however, remain beyond the scope of our study yet. The future study should reach into the propensity of virtual environment and digital platform, which facilitate

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customer participation to co-create and co-innovate (Nambisan et al., 2017, Ostrom et al., 2015)

Moreover, to keep our conceptual framework model purely on customer participation, we tend to exclude strange relationships that would occur from a lively and dynamic perspective of how consulting service are offering, between the customer and the firm to enable a subsequent operationalization.

For next steps in this study effort, we are advancing to empirically validate our proposed model by quantitative test as most appropriate to confirm our robustness of proposed model. Our measure scale is based on the preliminary operationalization suggested in the above Table 1. A survey instrument with is developed with a suitable questionnaire for our ICT consulting context to collect sufficient quantitative-empirical data, and finally analyse the data using a selected appropriate tool as SEM. The limitations and expected-to-accomplished parts are remained, our study contributes to both theory and practice. Having done the complete research, our purpose is the contribution for the theoretical conception and the empirical validation on the influence on both value outcomes, satisfaction and loyalty, by CP, which is impacted by number of factors extracted from *social exchange* view.

By proposing a group of antecedents as a combination of factors, with the inclusion of customer innovativeness, we aim for more insights in differentiated view of the CP with which we go far beyond previous approaches.

Additionally, we reason for the participation model in SDL perspective and within ICT consulting service context that has mostly been ignored by related researches. For a view of managerial implication, it is believed that our proposed model would go through empirical validation to be a useful framework to analyse and foresee value outcomes with IT consulting services both for the firm and customers. Finally, based on our results, as well as on new insights of customer participation, ICT consulting firms attain new supportive suggestions to transform production and cultural policy, from internal structural management, more toward customers and strive to lead the market.

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# The Influence of Attitude, Control on Availability, Subjective Norm and Green Trust on Young Vietnamese Consumers' Organic Cosmetic Purchase Intention

*Thi Hong Nguyen, Thi Minh Nga Phan, Thi Thuy Phuong Le*

## ABSTRACT

**Objective** – The goal of this paper aims to understand young Vietnamese consumer's purchase intention towards organic cosmetic based on Theory of Planned Behavior (TPB). This study also attempts to definite variables that influence young consumer's organic cosmetic purchase intention. **Design/methodology/approach** - In this study, the online survey was conducted using. Besides online survey, we have directing collect the data from students at Ton Duc Thang university in Ho Chi Minh city. The statistical analysis method conducted in this paper is Factor analysis using SPSS 20.0 version software. **Findings** – Result indicate that attitude, control on available, subjective norm and green trust played important role influencing young consumer's purchase intention of organic cosmetic. **Research Limitations** – the sample was limited in Vietnam and sample size may not represent the population of organic cosmetic consumers. **Implications** – Vietnamese become more and more concerned about environment, especially young Vietnamese, so that the green consumption will continue to grow. Now, young Vietnamese consumers independent on making decided and shopping. So Enterprises must recognize this to design the products attract consumers as well as planning more efficient and effective business plan targeting at young consumers. We hope that the finding would provide a basic for understanding green purchase intention of young consumer in Vietnam.

**Keywords:** Attitude, Organic Cosmetic, Green consumers, Green trust, Perceived behavioral, Vietnam.

**JEL classification:** M30

## 1 INTRODUCTION

### 1.1 Problem discussion

Since the early 1990s, awareness of the destruction of natural resources has raised the issue of environmental protection, which in turn has created eco-friendly consumption called “green consumerism” (Moisander, 2007). According to Pujari and Wright (1996), protection of the planet's resources is one of the central issues facing the world. Because the environmental issue has increased consumers' interests in purchasing green products, business firms have devised marketing strategies, known as green marketing (Reed, 2003). As green products have gained popularity in the market, more consumers have looked for greener products (Nimse, Vijayan, Kumar, & Varadarajan, 2007).

The personal care sector offers dietary supplements and natural and organic products (National Marketing Institute, 2007). D'Souza, Taghian, Lamb, and Peretiatkos (2006) claim that consumers' ecological concerns may be key factors in the marketing of cosmetic

products. Although the fast growth in sales of organic and natural care products has intrigued researchers' interests, they have primarily only examined marketing strategies used by firms in this industry (Johri & Sahasakmontri, 1998; Todd, 2004). Few have examined consumer behavior regarding organic personal care products (Rajagopal, 2007). Without in-depth understanding of consumer behavior for this product category, it is difficult to devise effective marketing strategies. Furthermore, although there are numerous studies regarding consumers' attitudes and purchase behaviors regarding organic products (Chen, 2007; Lockie et al., 2004; Magnusson, Arvola, Hursti, Åberg, & Sjöden, 2001; Padel & Foster, 2005; Zanolli & Naspetti, 2002; D'Souza et al., 2006).

In order to fill the gap in the literature regarding the organic personal care industry, the current study will examine the Vietnamese consumer's decision-making process for organic cosmetic based on the Theory of Planned Behavior (TPB). The TPB has been applied to predict an individual's behavior across a broad array of contexts (Thorbjørnsen, Pedersen, & Nysveen, 2007) and has explained an individual's eco-friendly behavior (Bamberg, 2003; Chan & Lau, 2001). It postulates that an individual's actual behavior is determined by his/her intention to perform the behavior, which in turn is influenced by the individual's attitude toward the behavior, his/her motivation to comply with subjective norms, and the perceived control he/she has over the behavior.

## **1.2 Research question**

What are the factors affecting young consumers' attitude and their purchase intention toward organic cosmetic?

## **1.3 Purpose of this study**

The main objective of this study to identify the factors influencing young consumer's purchase intention of organic cosmetic. This study also aims to understand young consumer's purchase intention of organic cosmetic based on TPB theory. In addition, the finding of this study might provide helpful basic understanding green purchase intention of young consumers, it will help the Enterprises having more effective business plan targeting young consumers based on their need, what they want and what affect their decision on buying green products.

## **1.4 Limitation**

There are some limitations in this study. First, the student sample is taken from particular location. Secondly, the sample size might not present for organic cosmetic consumption.

## **2 LITERATURE REVIEW**

### **2.1 Academic research on the organic personal care industry**

A large number of researches on personal care products but mainly focused on the environment and chemistry (Shane A. Snyder, et al., 2004; Daniela Sotirchos de Oliveira, et al., 2009; Diane Koniecki, et al., 2011; C G Daughton and T A Ternes, 2000; M. F. Rahman, E. K. Yanful, S. Y. Jasim, 2009; *E. Eriksson, et al., 2003*). In additions, there are numerous studies regarding consumers' attitudes and purchase behaviors of green products

(Chen, 2007; Magnusson et al., 2001; Padel and Foster, 2005; Zanolli and Naspetti, 2002) and these studies have concentrated on organic food products. In the field of organic personal care products, only study of Hee Yeon Kim & Jae-Eun Chun (2011) mentions to the factors affecting to consumer's purchase intention, which is applied the TPB model.

## 2.2 Theoretical Framework

### 2.2.1. Theory of Planned Behavior

The Theory of Planned Behavior (TPB) is one of the most widely researched models for predicting behavioral intentions by social psychologists (Armitage & Conner, 2001). TPB is built on attitude and personality theory (Ajzen, 1988), together with its forerunner the theory of reasoned action (TRA) (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975). There are many consumer researches used TPB as the research model, including the study of organic products purchase behavior (e.g. Bamberg and Moos, 2007; Manning, 2009; McEachan et al., 2011; Arvola et al., 2008; Tarkiainen and Sundqvist, 2005; Thøgersen, 2009). If the TRA theory was formed for behaviors where the individual has full control of the behavior, the addition included in the TPB, in conjunction with the concept of perceived behavioral control, extends to those situations where consumers lack complete control over their behavior (Ajzen, 1988, 1991). Researchers have most frequently relied on the TPB to explain various consumer issues on ethical (Culiberg, 2014; Shaw & Shiu, 2002), smoking (Topa & Moriano, 2010), speed driving (Elliott, Armitage, & Baughan, 2007), drug abuse (Bashirian, Hidarnia, Allahverdipour, & Hajizadeh, 2012), organic food (Yanfeng Zhou, John Thøgersen, & Yajing Ruan Guang Huang, 2013), and personal care products (Hee Yeon Kim & Jae-Eun Chun, 2011).

*Attitude* (ATT), a key concept in social psychology, is defined as the psychological emotion and the positive or negative evaluation that arise when an individual engages in certain behaviors (Eagly & Chaiken, 1993). It is well documented that attitudes influence behavior (Kraus, 1995), that when confronted with many choices people tend to take the one with highest score in overall appraisal of attitude (Arvola et al., 1999). It also has been shown that the more closely the attitude corresponds to a certain behavior, the more predictive the attitude is of the behavior (Ajzen and Fishbein, 1977; Heberlein and Black, 1976). Therefore, the attitude toward the behavior is a more effective predictor of the behavior than a more general attitude (Ajzen and Fishbein, 1977). However, research on the attitude-behavior relationship has displayed that this relationship is not perfect and more variables need to be considered in order to predict behavior (Eagly and Chaiken, 1993; Fishbein and Ajzen, 2005). For example, the TPB model includes social norms and perceived behavioral control as complementary elements and behavioral intentions as an intermediate variable between these three antecedents and consumer behavior.

*Subjective norms* (SN) are the perceived opinions of significant others who are close or important to an individual, who influence his/her decision to engage or not to engage in a behavior (Ajzen, 1991). However, behavior not only depends on motive but also ability, it is called behavioral control.

*Perceived behavioral control* (B) refers to an individual's perception of possible difficulty when performing a specific behavior including resources and opportunity (Ajzen, 1991). The resources and opportunity to take certain behavior exist objectively, but a person's decision making are more influenced by his/her perception of control over the behavior (Ajzen, 1989). Thus when a consumer feels a lack of ability, resources or chances to perform the action,

he/she is not likely to have strong intention to do so, irrespective of the objective conditions (Ajzen, 1989; Schifter and Ajzen, 1985). Perceived behavioral control can be understood from two aspects: the inner self-efficacy of an individual and the perceived barriers (Sparks et al., 1997, cited at Yanfeng Zhou, et al.,2013).

### 2.2.2. Application to this study

Past literature theorizes that customer trust is a factor of consumer purchase intentions (Schlosser et al., 2006). Green trust would affect consumer’s purchase behaviors in the environmental era Chen (2010). Thus, buyer trust is an antecedent of customer purchase intentions. Customer trust would positively influence customer purchase intentions (Schlosser et al., 2006) earlier research shows.

**Tab.1** - Hypotheses to be tested

Concept	Hypotheses
Collectivism	<i>H1a</i> : Collectivism will be positively related to self-transcendence values. That is, people who are more collectivism will support self-transcendence values more strongly. <i>H1b</i> : Collectivism will be negatively related to self - enhancement values. That is, people who are more collectivist will de - emphasize self - enhancement values.
Personal value	<i>H2a</i> : Self-transcendence values will be positively related to environmental attitudes. <i>H2b</i> : Self-enhancement values will be negatively related to environmental attitudes.
Attitude	<i>H3</i> : There is a relationship between attitude and intention to purchase organic cosmetic.
Perceived behavioral Control	<i>H4a</i> : There is a positive relationship between the control on availability of ecological fashion and purchase intention for those products. <i>H4b</i> : There is a positive relationship between perceived consumer effectiveness and purchase intention for organic cosmetic.
Subjective norm	<i>H5</i> : There is a relationship between subjective norm and intention to purchase organic cosmetic.
Green trust	<i>H6</i> : There is a relationship between green trust and intention to purchase organic cosmetic.

Recently some companies exaggerate the green performance of their products, and thereby customers are reluctant to trust them any more (Kalafatis and Pollard, 1999). Thus, Chen (2010) says that green trust would impact on consumer’s purchase behaviors to buy green products. Past literature recommends that green trust is a determinant of green purchase intention (Schlosser et al. 2006). Recently, customers are unwilling to trust on few companies due to overemphasizing the environmental performance of their product (Kalafatis and Pollard, 1999). So this study with organic product suggest that green trust has positive influence on purchase intention.

The purpose of this study is to integrate relevant literature and develop a research model of organic product purchase intention and to identify the interrelationship among relevant constructs including collectivism, attitude toward organic product purchase intention, perceived behavioral control, subjective norm, green trust, and purchase intention.

Based on the literature review, this study develops a research model as shown in Figure 2.1. It suggested that attitude, purchase intention control, subjective norm, green trust have an impact on organic cosmetic purchase intentions.

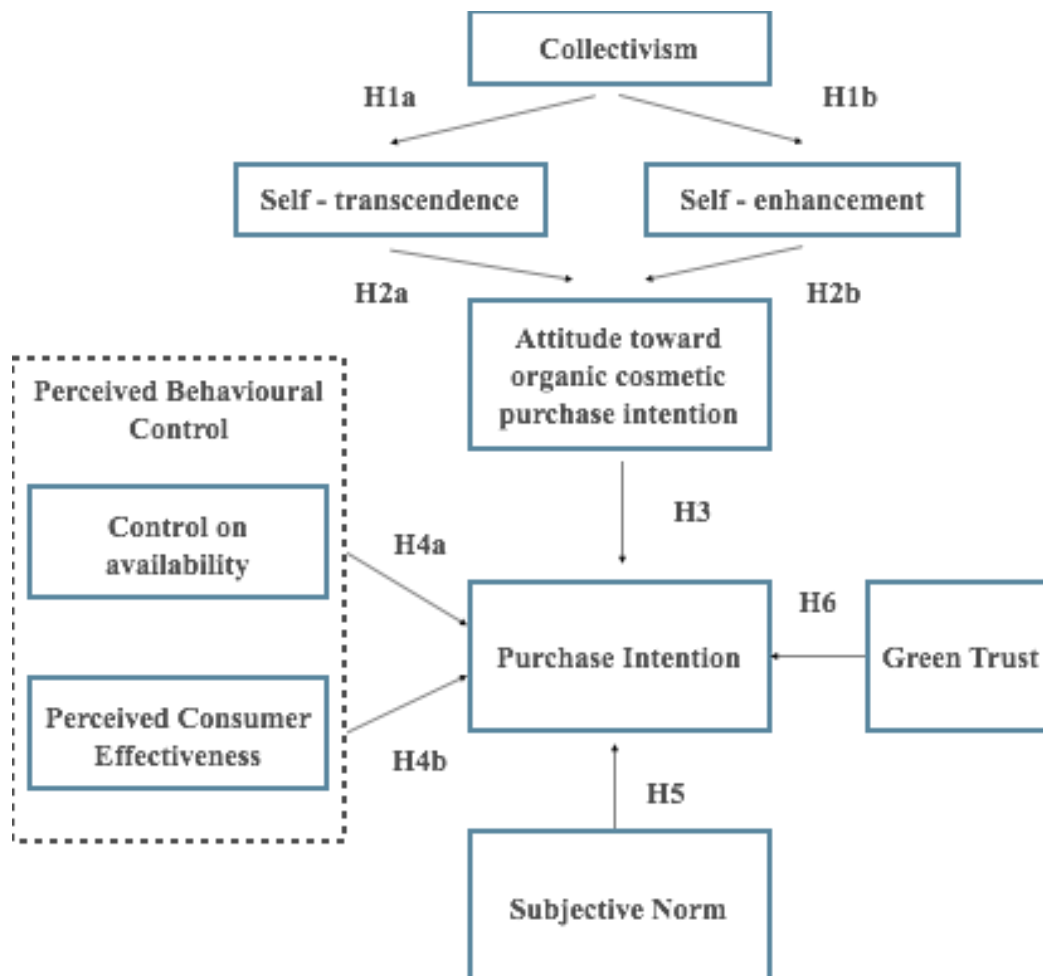


Fig.1 - The Proposed Model of this research

### 2.3 Term definition

The terms used in the present study are defined as follows:

*Organic personal care product*: a personal care product that contains natural ingredients grown without or with a minimum use of conventional pesticides and artificial fertilizers (National Organic Program, 2008).

#### *Green Consumerism*

Green consumerism means the buying habits of a consumer that are environmental friendly products and services and not harmful for the environment. The rising demand for purchasing

green products inspired the marketers to adopt green consumerism strategy (Prothero, 1990, p.95).

#### *Collectivism*

Personal or social or orientation that emphasize the good of the group, community, or society over and above individual gain. (Collectivism, business dictionary).

#### *Self - enhancement*

Enhancing one's own personal interests (even at the expense of others). (Defining the higher - order Values, ESS eduNet).

#### *Self - transcendence*

Transcending one's selfish concerns and promoting the welfare of others, close and distant, and of nature. (Defining the higher - order Values, ESS eduNet).

#### *Green trust*

Trust of the consumer about green products is the intention to accept susceptibility based on positive expectations of the truthfulness and potential of another one (Lin et al., 2003; Rousseau et al., 1998). Green Trust is based on three beliefs; aptitude, truthfulness, and compassion; which shows the expectation of the consumers in words, statement and the promise on which can be relied on (Rotter, 1971; Schurr and Ozanne, 1985).

### **3 METHODOLOGY**

The survey is constituted by 4 item statements that represent 1 dependent variable assumed as “organic cosmetic purchase intention” and 6 independent variables referred to internal, external, situational and social perspectives. Quantitative measure, in conjunction with five-point Likert scale (1= total disagree to 5= total agree), is used to measure responses/ rating of participants to all survey items. Data were collected from a convenience consumer sample and the sample size is 300 respondents. SPSS software is used for the data analysis. Set of statistical data analysis methods include descriptive analysis, principal component and reliability analysis and Pearson correlation test and Regression analysis.

### **4 RESULT**

#### **4.1 Descriptive Analysis**

##### **4.1.1 Data Collection**

The research analysis is conducted based on the collected data of valid 300 respondents with different characteristics as mentioned in the Tab. 4.1. The data is collected directly survey with the 315 respondents coming from Ton Duc Thang University in which 15 samples are invalid due insufficient answers or answers with the same scale of all variables.



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**4.1.2 Characteristics of Sample Respondents**

**Tab.2 - Characteristics of Sample Respondents**

Demographic Variables		Frequency (n=300)	Valid Percent
Gender	Male	108	36.0
	Female	192	64.0
Age	Under 18	63	21.0
	From 19 to 25	236	78.7
	From 26 to 30	1	.3
Income	Under 500 USD	79	26.3
	From 500 to under 1000 USD	95	31.7
	From 1000 to 1500 USD	65	21.7
	Above 1500 USD	61	20.3
Education	High school Graduate	4	1.3
	Bachelor Degree	280	93.3
	Advanced Degree	16	5.3
Having concept of organic cosmetic	Yes	117	39.0
	No	183	61.0
Considering there are differences between organic cosmetic 1 and normal cosmetic	Yes	257	85.7
	No	43	14.3
Considering using organic cosmetic will protect environment.	Yes	272	90.7
	No	28	9.3

**Tab.3 - Sources of Organic cosmetic information**

	Frequency	Valid Percent
Newspaper and Magazines	72	24.0
Internet	158	52.7
Friends, Colleagues, Family	75	25.0
Outdoor and Transit Advertising (Billboards, Public transportation).	90	29.7
TV programs	108	36.0
Others	12	4

## 4.2 Factor Analysis and Reliability Test

### 4.2.1 Collectivism

**Tab.4 - Factor Analysis and Reliability Test of Collectivism**

Research Items	Factor loading	Eigen Value	Accum. Explanation %	Item-to-Total-Correlation	Cron-bach's alpha
Collectivism (KMO=.721 ;Barlett=.000)		2.218	73.919		.820
[COL1] I maintain harmony in my group.	.857			.674	.761
[COL2] I respect the majority's wish.	.860			.679	.752
[COL3] I sacrifice self-interest for my group.	.862			.682	.745

### 4.2.2 Self-transcendence

**Tab.5 - Factor and Reliability Analysis of Self-transcendence**

Research Items	Factor loading	Eigen Value	Accum. Explanation %	Item-to-Total-Correlation	Cron-bach's alpha
Self-transcendence (KMO=.787 Barlett=.000)		2.491	62.278		.795
[ST1] Honest: free of deceit and untruthfulness; sincere; morally correct or virtuous	.760			.570	.764
[ST2] Helpful: giving or ready to give help.	.838			.677	.709
[ST3] Protecting the environment.	.762			.571	.761
[ST4] Honoring of parents and elders.	.794			.613	.741

#### 4.2.3 Self-enhancement

**Tab.6 - Factor Analysis and Reliability Test of Self-enhancement**

Research Items	Factor loading	Eigen Value	Accum. Explanation %	Item-to-Total-Correlation	Cron-bach's alpha
Self-enhancement (KMO=.636; Barlett=.000)		2.435	81.178		.883
[SE1] Wealth: the state of being rich; material prosperity	.872			.719	.881
[SE2] Authority: the power or right to give orders, make decisions, and enforce obedience	.873			.721	.880
[SE3] Social power: The degree of influence that an individual or organization has among their peers and within their society as a whole.	.956			.887	.728

#### 4.2.4 Attitude

**Tab.7 - Factor Analysis and Reliability Test of Attitude**

Research Items	Factor loading	Eigen Value	Accum. Explanation %	Item-to-Total-Correlation	Cron-bach's alpha
Attitude (KMO=.872; Barlett=.000)		3.430	68.609		.885
[AT1] I like the idea of organic cosmetic purchase.	.834			.733	.857
[AT2] Organic cosmetic purchase is a good idea.	.859			.767	.850
[AT3] I have a favourable attitude toward organic cosmetic purchase.	.811			.700	.865
[AT4] Organic cosmetic purchase is wise.	.812			.702	.864
[AT5] I like using organic cosmetic.	.825			.717	.861

#### 4.2.5 Subjective norm

**Tab.8** - Factor Analysis and Reliability Test of Subjective Norm

Research Items	Factor loading	Eigen Value	Accum. Explanation %	Item-to-Total-Correlation	Cronbach's alpha
Subjective norm (KMO=.639 Barlett=.000)		2.092	69.746		.772
[SN1] My friends expect me to engage in organic cosmetic usage behavior.	.849			.617	.685
[SN2] My family expects me to engage in organic cosmetic usage behavior.	.899			.717	.753
[SN3] My society expects me to engage in organic cosmetic usage behavior.	.750			.509	.818

#### 4.2.6 Control on availability

**Tab.9** - Factor Analysis and Reliability Test of Control on availability

Research Items	Factor loading	Eigen Value	Accum. Explanation %	Item-to-Total-Correlation	Cronbach's alpha
COA (KMO=.698 Barlett=.000)		2.405	60.133		.779
[COA1] I am familiar with the availability of organic cosmetic in my locality	.800			.610	.710
[COA2] I can easily get organic cosmetic whenever I need them	.826			.646	.691
[COA3] I have control on affordability toward organic cosmetic	.719			.519	.757
[COA4] I have control on the time spending for searching and using organic cosmetic	.752			.557	.738

#### 4.2.7 Perceived consumer effectiveness

**Tab.10** - Factor Analysis and Reliability Test of Perceived consumer effectiveness

Research Items	Factor loading	Eigen Value	Accum. Explanation %	Item-to-Total-Correlation	Cronbach's alpha
PCE (KMO=.511; Barlett=.000)		1.528	50.943		.382
[PCE1] It is valuable for any individual consumer to do something about pollution.	.857			.342	.119
[PCE2] One person cannot have any effect upon pollution and natural resources problems, but many people together can make difference	.270			.096	.668
[PCE3] Each consumer's behaviour can have a positive effect on society by purchasing organic cosmetic.	.849			.313	.162

#### 4.2.8 Green Trust

**Tab.11** - Factor Analysis and Reliability Test of Green trust

Research Items	Factor loading	Eigen Value	Accum. Explanation %	Item-to-Total-Correlation	Cronbach's alpha
Green trust (KMO=.768; Barlett=.000)		3.106	62.130		.847
[GT1] I believe that this product's environmental image is generally reliable.	.809			.679	.808
[GT2] I think that this product's environmental functionality is generally dependable.	.803			.672	.810
[GT3] This product keeps promises for environmental improvement.	.788			.652	.816
[GT4] This product's environmental performance meets my expectations.	.740			.600	.831
[GT5] Overall, I believe that this product's environmental claims are trustworthy.	.800			.672	.810

#### 4.2.9 Organic cosmetic Purchase Intention

**Tab.12** - Factor Analysis and Reliability Test of Purchase Intention

Research Items	Factor loading	Eigen Value	Accum. Explanation %	Item-to-Total-Correla-tion	Cronbach's alpha
Intention (KMO=.802 Barlett=.000)		2.619	65.482		.823
[PI2] I intend to switch to other brand for ecological reasons	.770			.596	.800
[PI3] When I want to buy a product, I look at the ingredient label to see if it contains things that are environmentally damaging	.795			.629	.787
[PI4] I prefer organic cosmetic over non - organic cosmetic when their product qualities are similar	.831			.677	.764
[PI5] Over the next one month and for the purpose of personal use, I intend to buy organic cosmetic because they are environmentally friendly	.839			.690	.757

#### 4.5. Hypotheses Testing

##### 4.5.1 The influences of Collectivism on self - transcendence and self – enhancement

**Tab.13** - Relationship between Collectivism and Self - transcendence, Self – enhancement

Independent Factor	Dependent Factor- Self - transcendence (ST)	Dependent Factor- Self - enhancement (SE)
	Model 1	Model 2
	Beta ( $\beta$ )	Beta ( $\beta$ )
<i>Collectivism (COL)</i>	.455	.173
R <sup>2</sup>	.207	.030
Adj-R <sup>2</sup>	.205	.027
F-value	77.935	9.174
P-value	.000	.003
D-W	2.175	2.007
VIF Range	1.000	1.000

Relationship between Collectivism and Self - transcendence: From Table. 4.12, the result shows that Collectivism impacts positively ( $\beta=0.455$ ) and significantly on the Self - Enhancement ( $R^2= 0.207 > 0.1$ ,  $F=77.935 > 4$ ,  $P < 0.05$ ,  $D-W=2.175 \in (1.5-2.5)$ , and  $VIF= 1.000 < 3$ ). Therefore, the hypothesis  $H_{1a}$  is strongly supported.

Relationship between Collectivism and Self - enhancement: From Tab. 4.12, the result shows that  $R^2= 0.027 < 0.1$  (not meet the criterion). Thus, the hypothesis  $H_{1b}$  is not supported.

#### 4.5.2 The influences of Self - Transcendence and Self - Enhancement on Attitude

**Tab.14** - Relationship between Self - Transcendence, Self - Enhancement and Attitude

Independent Factor	Dependent Factor- ATTITUDE (AT)		
	Model 1	Model 2	Overall Model
	Beta ( $\beta$ )	Beta ( $\beta$ )	Beta ( $\beta$ )
<i>Self - transcendence (ST)</i>	.461		.455
<i>Self - Enhancement (SE)</i>		.178	.015
$R^2$	.212	.032	.213
Adj- $R^2$	.210	.028	.207
<i>F</i> -value	80.330	9.705	40.080
<i>P</i> -value	.000	.002	.000
D-W	1.880	1.892	1.880
VIF Range	1.000	1.000	1.145

Relationship between Self - Transcendence and Attitude: From Tab. 4.13, the result shows that Self - transcendence impacts positively ( $\beta=0.461$ ) and significantly on the Attitude ( $R^2= 0.212 > 0.1$ ,  $F=80.330 > 4$ ,  $P < 0.05$ ,  $D-W=1.880 \in (1.5-2.5)$ , and  $VIF= 1.000 < 3$ ). Therefore, the hypothesis  $H_{2a}$  is strongly supported.

Relationship between Self - Enhancement and Attitude: From Tab. 4.13, the data of model 3 comes up with  $R^2=0.032 < 0.1$  (not meet the criterion). Therefore, the hypothesis  $H_{2b}$  is not supported.

Overall relationship between Self - Transcendence, Self - Enhancement and Attitude. The overall model shows that attitude is influenced by self - transcendence, not by self - enhancements. Therefore, there is the relationship between the attitude and self - transcendence.

**4.5.3 The influences of Attitude, Control On availability, Perceived Consumer Effectiveness, Subjective Norm, Green Trust on Purchase Intention**

Relationship between Attitude and Purchase Intention: From Tab. 4.14, the result shows that attitude impacts positively ( $\beta=0.586$ ) and significantly on the purchase intention ( $R^2=0.344>0.1$ ,  $F=156.21>4$ ,  $P<0.05$ ,  $D-W=1.777\epsilon$  (1.5-2.5), and  $VIF=1.000 <3$ ). Therefore, the hypothesis  $H_3$  is strongly supported.

**Tab.15** - Relationship between Attitude, Control On availability, Perceived Consumer Effectiveness, Subjective Norm, Green Trust

Independent Factor	Dependent Factor- Purchase Intention (PI)				
	Model 1	Model 2	Model 3	Model 4	Overall Model
	Beta ( $\beta$ )	Beta ( $\beta$ )	Beta ( $\beta$ )	Beta ( $\beta$ )	Beta ( $\beta$ )
<i>AT</i>	.586				.230
<i>COA</i>		.480			.232
<i>SN</i>			.618		.244
<i>GT</i>				.541	.244
$R^2$	.344	.231	.382	.293	.529
Adj- $R^2$	.342	.228	.380	.291	.523
<i>F</i> -value	156.212	89.398	184.178	123.449	82.855
<i>P</i> -value	.000	.000	.000	.000	.000
D-W	1.777	1.810	1.862	1.924	1.820
VIF Range	1.000	1.000	1.000	1.000	1.325 ~ 2.078

Relationship between Control on availability and Purchase Intention: The data of model 2 comes up with a conclusion that there is the relationship between Control on availability and purchase intention is fully significant ( $R^2=0.231>0.1$ ,  $F=89.398>4$ ,  $P<0.05$ ,  $D-W=1.810\epsilon$  (1.5-2.5), and  $VIF=1.000 <3$ ). Therefore, the hypothesis  $H_{4a}$  is strongly supported.

Relationship between Perceived consumer effectiveness and Purchase Intention: From table 4.14, the three items of perceived consumer effectiveness not pass criterion and cannot use for further analysis. Thus, the hypothesis  $H_{4b}$  is not supported.

Relationship between Subjective Norm and Purchase Intention: The data of model 3 comes up with a conclusion that there is the relationship between Subjective Norm and purchase intention is fully significant ( $R^2=0.382>0.1$ ,  $F=184.178>4$ ,  $P<0.05$ ,  $D-W=1.862\epsilon$  (1.5-2.5), and  $VIF=1.000 <3$ ). Therefore, the hypothesis  $H_5$  is statistically supported.

Relationship between Green Trust and Purchase Intention: The data of model 4 comes up with a conclusion that there is the relationship between Subjective Norm and purchase intention is fully significant ( $R^2=0.293>0.1$ ,  $F=123.499>4$ ,  $P<0.05$ ,  $D-W=1.924\epsilon$  (1.5-2.5), and  $VIF=1.000 <3$ ). Therefore, the hypothesis  $H_6$  is strongly supported.



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Overall relationship between attitude, control on availability, perceived consumer effectiveness, subjective norm, green trust and purchase intention: The overall model shows that purchase intention is influenced by attitude, control on availability, subjective norm, green trust, not by perceived consumer effectiveness. Therefore, there is the relationship between the attitude, control on availability, subjective norm, green trust and purchase intention.

## 5 CONCLUSION

### 5.1 Conclusions

The research aims to verify the effects of attitude, perceived consumer effectiveness, control on availability, subjective norm, green trust on the organic cosmetic purchase intention in order to understand young Vietnamese consumer' organic cosmetic purchase intention. The statistical analysis has brought in the findings summarized in Table 5.1, which lead to varieties of important conclusions and implications.

**Tab.16 - Hypotheses and Empirical Test**

Concept	Hypotheses	Result
Collectivism	<i>H1a</i> : Collectivism will be positively related to self-transcendence values. That is, people who are more collectivism will support self-transcendence values more strongly.	Supported
	<i>H1b</i> : Collectivism will be negatively related to self - enhancement values. That is, people who are more collectivist will de - emphasize self - enhancement values.	Not supported
Personal value	<i>H2a</i> : Self-transcendence values will be positively related to attitudes.	Supported
	<i>H2b</i> : Self-enhancement values will be negatively related to attitudes.	Not supported
Attitude	<i>H3</i> : There is a relationship between attitude and intention.	Supported
Purchase intention Control	<i>H4a</i> : There is a positive relationship between the control on availability of organic cosmetic and purchase intention for those products.	Supported
	<i>H4b</i> : There is a positive relationship between perceived consumer effectiveness and purchase intention for organic cosmetic.	Not supported
Subjective norm	<i>H5</i> : There is a relationship between subjective norm and intention to purchase organic cosmetic.	Supported
Green trust	<i>H6</i> : There is a relationship between green trust and intention to purchase organic cosmetic.	Supported

Based on the results, of the nine hypothesized main effects, six were statistically significant and positive ( $p < .05$ ), supporting hypothesis 1a (collectivism to self - transcendence), hypothesis 2a (self - transcendence to attitude), hypothesis 3 (attitude - to purchase intention), hypothesis 4a (control on availability to purchase intention), hypothesis 5 (subjective norm to purchase intention) and hypothesis 6 (green trust to purchase intention). Contrary to expectations, the relationship between collectivism and self - enhancement value was insignificant. As well as the relationship between self - enhancement and attitude was insignificant. The results also showed that the relationship between perceived consumer effectiveness and purchase intention was insignificant. Thereby disconfirming hypothesis 1b, 2b and 4b.

First, the hypothesis  $H_{1-a}$  mentions the relationship between the collectivism and the self - transcendence value. From the test, the findings verify the significance of  $H_{1-a}$ . The positive result of  $H_{1-a}$  ( $\beta = 0.455$ ,  $p = .000$ ) is geared with that of McCarty and Shrum (1994), Oishi (et al. 1998), Kim and Choi (2005). The findings of this study showed that the effects of collectivism are found on two personal values which are believed to influence consumers' attitude, which support hypothesis  $H_{1-a}$  but fails to prove hypothesis  $H_{1-b}$  ( $R^2 = 0.027 < 0.1$  (not meet the criterion)) as hypothesis. Traditionally, Vietnamese consumers are regarded to be more collectivistic compared to other western consumers. Vietnamese collectivistic cultures might influence on the developments of consumer's personal values. The present study also show that collectivism is an important role on development of Vietnamese consumer's personal values.

Second, the hypothesis  $H_{2-a}$  states that the self - transcendence is positively significant with attitude. From the empirical analysis, the findings verify significance of  $H_{2-a}$ . By having a positive relationship with attitude ( $\beta = 0.461$ ,  $p = .000$ ), self - transcendence appeared to be attitude important values. Basically, people who consider importantly the welfare of others and nature become more concerned with environmental issues because the consequences of environmental problems can affect the quality of all people's lives. On the other hand, significant relationship was not found between self - enhancement values and attitude ( $R^2 = 0.032 < 0.1$  (not meet the criterion)). So that hypothesis  $H_{2-b}$  is not supported. Conceptually and theoretically, self enhancement is incompatible with self - transcendence (e.g, Schwartz 1994) because of their opposing motivational goals. Self - enhancement values motivate people to focus on selfish interests than others' welfare. Thus self - enhancement values may not be suitable for collectively - oriented environmental attitudes and actions.

Third, previous results regarding the attitude - intention relationship, the present study shows that attitude is an important determinant of green purchase intention. From the results, the findings confirm positive relationship between attitude and green purchase intention ( $\beta = 0.586$ ,  $p = .000$ ). So that hypothesis  $H_3$  is supported. Consumers' ecological consumption is importantly determined by their attitudes toward environmental issues. That is, consumers with high environmental attitudes are more willing to buy ecologically considered products. The finding of  $H_3$  is consistent with Chan (2001), Tanner & Kast (2003), Vermeire & Verbeke (2004) and Fraj and Martinez (2007).

Fourth, in this paper, perceived behavioral control is explained by two variables, control on availability and perceived consumer effectiveness. The hypothesis  $H_{4-a}$  indicates that there is the positive relationship between control on availability and purchase intention. The results verify significance of  $H_{4-a}$ . Availability of a product is the degree to which how difficultly or easily a product is located or obtained for consumption (Kumar, 2012). There are analogous conclusions from many researchers that an individual's confidence in his or her ability to

control and perform the behavior has positive relationship with purchase intention and purchase behavior (Taylor & Todd 1995). Availability be considered by two perspectives: customer and company. For customer perspective, people who have time to search, get information about ecological products as well as their ability to pay, to use this product. Besides, the company should give more information as well as the visible products...for customers to show that it is easily product is located or obtained for consumption. High control on availability will lead to high ecological purchase intention. The hypothesis H<sub>4-b</sub> states that perceived consumer effectiveness is positively related to green purchase intention (where perceived consumer effectiveness was identified and was created as a measure to see how far a person believes an individual consumer can be effective in pollution reduction). Unexpectedly, the findings show that the hypothesis H<sub>4-b</sub> is not supported.

Fifth, the hypothesis H<sub>5</sub> emphasise that subjective norm is positively related to green purchase intention. Based on the findings, by having a strong, positive relationship with attitude ( $\beta=0.618$ ,  $p=.000$ ), subjective norm appeared to be attitude important values. Hypothesis H<sub>5</sub> is supported. The findings pointed out that the current society and social influences have a key role to promoting the purchase of green products, especially in the adolescent population. The friends, parents, social organizations play important role in consumers purchase intention.

Finally, the hypothesis H<sub>6</sub> underlines the positive relationship between green trust and green purchase intention and the imperial test also results in the positive relationship between them ( $\beta=0.541$ ,  $p=.000$ ). so, hypothesis H<sub>6</sub> is significant in predicting consumer purchase intention. This result is in line with the previous researches of Schlosser et al., 2006, Chen (2010), Kalafatis and Pollard, 1999. If buyers have had a good experience with the company, they would have a higher level of purchase intention. Recently, customers are unwilling to trust on few companies due to overemphasizing the environmental performance of their product.

## **5.2 Suggestions & Implications**

### **5.2.1 Academic Implications**

First, the research reconfirms that a positive attitude proves to be an influential indicator for ecological purchase intentions in this research. Fraj and Martinez (2007), and Eliam Trop (2012) had similar findings regarding the predictive power of attitudes. Attitudes served as indicators for ecologically conscious purchasing. Additionally, this study shows ecological purchase intention influenced by control on availability, which is retained from the efforts of company activities in the interaction with customer when provide products information, easily products located, available products in store and easily obtained for consumption for consumers. Moreover, this research become more realistic when adding green trust, an antecedent of green purchase intentions attracting an increasing huge numbers of managers, as an independent variable in influencing the consumer purchase intention.

Second, in addition to many findings consistent with previous studies, i.e the positive relationship between attitude, control on availability, subjective norm, green trust and green purchase intention (Chan, 2001; Tanner & Kast, 2003; Vermeire & Verbeke, 2004; Fraj and Martinez, 2007; Kumar, 2012; Taylor & Todd 1995; Schlosser et al., 2006; Chen, 2010; Kalafatis and Pollard, 1999) this research, therefore, becomes more meaningful when contributing some results that may be specialized in organic product industry, and the framework model can be a good one reference in this field for further research.

Finally, one issue that the findings of significant differences in the consumer awareness, their monthly income and their education level. The findings state that, people with high awareness will be willing to purchase organic cosmetic for protect environment purpose. Fraj and Martinez (2007) briefly mention that people are aware that environmental protection is not only up to firms and institutions but also their own responsibility as consumers. This study also has contribution that people with different income and education level will be impact to purchase intention in different way.

### **5.2.2 Managerial implication**

This research has contributed to prove the effectiveness of marketing strategy in organic product industry. The most fundamental findings of the research are that companies can achieve consumer purchase intention by influencing consumer attitude, control on availability, subjective norm and green trust from the company strategy. From the findings, some suggestions in marketing and managerial functions can be drawn.

First, the suggestions are mainly related to segmentation and targeting efforts and in particular to what types of messages are constructed to persuade people to get their intention. In terms of segmentation, the results of this study suggest that target segments for organic product may be those who are motivated strongly by self-transcending goals. Likewise, advertising and other marketing communication efforts need to portray the use of green products as a way which can contribute to the well-beings of all. In view of the collectivist nature of the Vietnamese, green marketers should always remind themselves of the power of opinion leadership in disseminating pro-environmental messages in a Vietnamese cultural setting.

Because the path to green purchase intention can vary as a function of personal values, the appeals of persuasive communication should also vary according to the values of the target. Communications aimed at promoting people's environmental attitudes and buying habits may try to match the focus of the expected benefits to the predominant values of the target like altruism. For example, advertising appeals that stress group benefits as the consequences of individuals' ecological buying can be better accepted by Vietnamese consumers. That is, marketers and policy makers can be recommended to use communication message developing the link between consumers' green choices and the betterment of community life. Other research provides more support for this notion: Aaker and Williams (1998) found that the persuasiveness of types of emotional appeals (e.g., ego-focused vs. other-focused) used in persuasive communications varies as a function of the value orientation of the message recipients.

Second, young consumers' attitude toward a product is always very important issues for marketers. Marketers are able to prepare different marketing strategy and stimuli for successful product development and its implementation depending upon the consumers' attitudes. The findings found that affect young consumers' attitude of buying green products will certainly give some new ideas for thinking of green marketing. This study shows young consumers' purchase intentions are quite good 3.2/5 (Likert scale) of them are interested in buying green products. Even though the response rate is quite high, we will point out that young people's intention do not predict that they will perform the behavior. Therefore, marketers need to develop efficient campaigns to motivate young people. To sum up, marketers should keep in mind that higher motivation is needed to come into effect toward attitude an object (Solomon et al., 2010, p. 277). Thus, marketers should initially educate

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young consumer through their advertisements and awareness program why green products are important to buy and to change their attitude accordingly.

Third, this findings conformity provides green marketers with useful insights into how to improve the communication effectiveness of their green messages. For instance, to take advantage of the pervasive influence of such importance reference as family members, spouse and friends, green marketers in Vietnam should feature relevant reference group appeals in their advertisements.

Fourth, Vietnamese consumers were found to exhibit a lower degree of volitional control over their green purchases. This phenomenon is likely to be attributed to Vietnamese consumers' lack of the requisite resources (e.g., environmental knowledge, money and time), and opportunities (e.g., inadequate availability of green products). Given that Vietnam is still a developing country with its green movement in an embryonic stage, it seems very difficult to resolve all these resource and opportunity issues overnight. Nonetheless, these issues should call for continued strategic efforts from both the Vietnamese policy makers and green marketers if they really wish to advance a more sustainable consumption pattern across the country. These strategic efforts, among others, should include further strengthening Vietnamese's environmental education and improving the distribution of green products. To make consumers more willing to pay and search for green products, more comprehensive legislation to closely monitor quality and advertising claims of these products is also essential.

Last, to successfully sell their eco-friendly products to the public, companies should provide reliable information to customers willing to buy green products with trustworthy information that reduces their perceived risk. Therefore, marketers should devote their attention to educate young consumers through different knowledge building activities. For example, marketers can provide products for free trial, and can arrange knowledge building competition for innovative ideas.

### 5.3 Limitations and future research direction

There are a few limitations to be considered when making conclusions from the present study. The first limitation pertains to population and sample issues. As with any other studies using a student sample, the findings of this study might not represent consumers at large. Also the use of a student sample may limit the variety of response when measuring variables because students are less various in their characteristics. Thus future research using a sample representing population is recommended, and it is expected to detect more accurately the causality between main constructs.

A second limitation pertains to the narrow range of the study. The primary interest of this study was in understanding young consumer intention to organic cosmetic, with reference to the value - attitude - intention structure. Because of this interest, the study focused on a limited set of antecedents to the intention. Future studies can consider a comprehensive and unified framework suggested by Bagozzi (2006) to provide a deeper understanding regarding the variables and processes related to consumers' green behavior. Finally, this study focused on green purchasing intention only. Therefore, to advance the understanding of how values relate to green behavior, future research needs to apply the proposed model to other types of environmental behaviors.

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## Consumer Behaviour on the Meat Market in South Moravian Region

*Jiří Urbánek, Davit Alaverdyan, Vojtěch Tamáš*

### ABSTRACT

*The paper focuses on identification of factors, which influences the behaviour, and suggests recommendations applicable for businesses operating on the market of meat in South Moravian Region. The main objective is to formulate recommendations through analysis of the data concerning at consumer behaviour on the market of meat and meat products in South Moravian Region. Through this research has been created, analysed and evaluated survey questionnaire focused in the market of meat and meat products. The questionnaire survey is focused at description of shopping behaviour. The results are introducing the complex of the most important factors which play a role when purchasing of meat and meat products, together with preferences of meat among consumers.*

**Key words:** *Agribusiness, consumer behaviour, demand, market of meat, South Moravian Region.*

**JEL Classification:** Q13, P 23

### 1 INTRODUCTION

The objective of the paper is to provide results of analysis of consumer behaviour on the market of meat in South Moravian Region. This research use created, analysed and evaluated survey questionnaire focused in the market of meat and meat products. The questionnaire survey is focused at a description of shopping behaviour in the South Moravian Region the second survey is targeted to specific selected company working operating in South Moravia. The main objective is to analyse the data concerning at consumer behaviour on the market of meat and meat products in South Moravian Region and formulate appropriate recommendations.

Meat is an inseparable part of human nutrition already for millions of years. Currently there are different views of whether the meat is a necessary foodstuff for humans or not. There are opinions that meat and meat products should not be eaten for ethical, health and religious reasons. A novelty is the decree of the World Health Organization (2015), which stated that already merely 50 grams of sausages increases the risk of cancer by nearly 20 %. Despite the objections of such groups the meat is one of the most consumed foods in all countries.

In recent years the situation in the Czech Republic has been considerably variable. Production of slaughter animals according to the Czech Statistical Office (2014) declined sharply between 2006 and 2014 for more than 150,000 tons (live weight), while production of slaughter pigs has decreased the most and production of cattle for slaughter has decreased the least. However, such a decrease of production has not resulted in large fluctuations in the consumption of meat in the country. According to the Czech Statistical Office (2014), in the Czech Republic is mainly consumed pork, then poultry followed by beef, as evidenced by



research of (Palát *et al.*, 2012) focussed on changes in demand for beef in the Czech market. Other species such as rabbit, venison, etc., have a negligible consumption in comparison to those foregoing.

Schiffman (2004) defines the consumer behaviour as "the behaviour that consumers express when searching, shopping, using, evaluating and managing products and services from which they expect to meet their needs."

Kotler (2004) expands this definition and states that *"shopping behaviour relates to end-consumers, differing from each other by age, education, income and taste. Their choice among a wide assortment of products and services and also companies, is also influenced by behaviour of other consumers and surrounding environment. Consumers every day realize a lot of purchase decisions. Most companies research purchasing patterns of consumers in an effort to obtain information such as where, when, how, in what quantity, and why consumers buy. On consumer shopping have an influence cultural, social, personal and psychological factors."*

However, researching of consumer behaviour is considerably problematic, for example. Bártová (2002) argues that *"knowledge about consumer behaviour are taken from a variety of scientific disciplines, while each of them is concerned with a specific aspect of behaviour and on the other hand, each of them becomes a target of criticism because of its unique approach limits application possibilities of their knowledge on human behaviour and therefore also on behaviour of human-consumer."*

Smith (2000) explained, that the peculiarity of the current review of the behaviour of consumers is the fact that people often do not buy products because of their main function, but because of what they mean to them. Of course this reduces the importance of the main functions of the product, but the fact is that we must also examine the role of the product that crosses the border only their operation.

Turčínková (2007) adds to this, that *„still more often consumers do not evaluate product according to his core (thus the main effect, which it has to provide), but especially according to real product (specific product quality) an enhanced product, meaning a set of factors of an intangible nature providing the a perceived advantage to the customer – image of a product users, counseling, after-sales service and more."*

Schiffman (2004) divides the process of purchasing decisions (behaviour) into three phases, which are mutually interconnected. These phases are:

input phase: consists in shortage detection – consumer realizes that he needs the product, what he finds out due to two main sources of information: **corporate marketing efforts** (4P-product, price, promotion and place of sale), and a second source are external social influences on consumers (e.g. family, friends, neighbours and others);

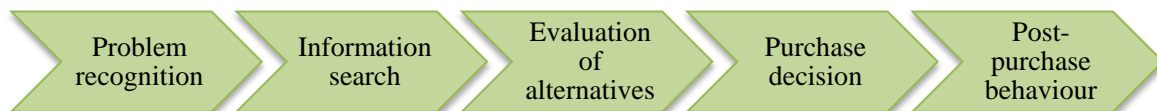
procedural phase: focuses on consumer decisions. In this part are important psychological factors embedded to every individual (motivation, perception, personality etc.) affecting in particular the impact on the information search before buying and evaluating of individual variants of purchase. The experience gained during the evaluation of individual variants of purchase affect the existing psychological characteristics of consumer. This part is often called as a so-called black boxes of consumer, which "from the perspective of marketing presents the world of interaction of consumer predispositions, situational influences and buying decision making, which takes place in the mind of consumer." ;

output phase: follows two related activities after the decision: shopping behaviour and evaluation after the purchase.

The book *Customer behaviour - how to uncover the secrets of the "black box"* from Vysekalová (2011) presents a model called "black box" (see below), to which she adds that exogenous factors (meaning those external) we examine, quantify, and some of them we can influence or create. Therefore, it is clear that we are interested in the impact of these external incentives on consumer behaviour and buying decisions in all categories of these impulses. This includes in particular the social and socio-cultural effects. Regarding the view from internal factors, so here is talking mainly about individual influences (for example. a lifestyle and values of the individual) and the psychological as motivation, perception, adaptation, etc.

In the world there are no two individuals, let alone household or organization and therefore it is clear that everyone decides when purchasing differently – especially in response to current options and offer, but still in marketing are used generally accepted decision making models that try to capture the basic factors and influences on this process.

According to Foret (2011) at present, the most famous model that explains the behaviour of the customer is the model divided into five stages. Some authors, for example Kotler (2007), define the buying process as a "model of the five stages." He adds that *"a smart companies are trying to fully understand the process of purchasing decisions of customers with all their experience with identifying, selecting, thinking and even by disposing a particular product."* Also adds that *"the buying process starts long before the actual purchase and its implications last for long after."* From these quotations it is apparent that purchasing process is divided into five stages, but in the literature of Kotler (2007) and Mowen (1990) is visible from Figure 1 as only the linear sequence of these stages.



**Fig.1 - Purchase process**

*Source: Mowen (1990)*

Vysekalová (2011) stresses, that in most of cases cannot be applied the purely rational procedures, without consideration of psychological "mechanisms". In fact, the customer does not always choose the best or most sensible variant of purchase corresponding to rational procedures. But this contradicts with the economic view on shopping behaviour.

The consumer is in his decision making affected by a number of factors that every author perceives in another way, see Table 1 below.

**Tab.1** - Differences between perception of factors influencing consumer

Koudelka (1997)	Brown (2006)	Kotler (2001)	Turčínková (2007)
Inner	Personal	Personal	Personal
Outer	Psychological	Psychological	Psychological
	Social	Social	Social
		Cultural	Cultural
			Situational

Source: Turčínková (2007)

## 2 MATERIALS AND METHODS

The data was obtained through qualitative research via online polling. Filling in the questionnaires took place from February 10th to March 12th 2016. For content accuracy and clarity of questions was made pre-test with 15 respondents. The questionnaire survey consists of 23 questions, where 15 of them are focused on achieving the objective of the questionnaire and the remaining 8 are used to identify the respondent. In matters relating to preferences, respondents rated on a scale from 1 to 10 (where 1 = least and most = 10) the importance of each factor when purchasing meat and meat products. After completion of the questionnaire survey were filled in a total of 512 questionnaires, of which 30 were excluded because they have not come from South Moravian Region and 8 respondents were excluded because they have never bought the meat (or meat products). A total of 474 of questionnaire surveys collected from respondents from South Moravian Region.

For the evaluation of the obtained data was used MS Excel, that served mainly for easy and clear visualization of relations in contingency tables, graphs creating and hypotheses calculation. In monitoring the dependence between more variables was created contingency table from which has been tested statistical hypothesis  $H_0$ . „claims referring to properties of the probability distribution of observed random variable  $X$  with the distribution function  $F(x, \theta)$  or a random vector  $(X, Y)$  with simultaneous distribution function  $F(x, y, \theta)$  etc. The procedure which verify the hypothesis is called the test of statistical hypothesis. Against to test the hypothesis  $H_0$ , also called the null hypothesis, so we put an alternative hypothesis  $H_1$ , which is chosen according to the requirements of the task.“ (Karpíšek, 2016):

For calculation of the hypotheses were used formulas (Karpíšek, 2016):

Test of good conformity:

$$\chi^2 = \sum_{i=1}^k \frac{(X_i - Np_i)^2}{Np_i}$$

The value of the resultant values, are compared with the corresponding critical value of the chi-squared, at the desired level of significance. The test of good conformity determines whether the monitored variable has a probability distribution of a certain type (UPOL, 2015):

Pearson's test of independence:

$$\chi^2 = \sum_{i=1}^r \sum_{j=1}^c \frac{\left( n_{ij} - \frac{n_{i\cdot} \cdot n_{\cdot j}}{n} \right)^2}{\frac{n_{i\cdot} \cdot n_{\cdot j}}{n}}$$

„Test of independence is used for the assessment dependence of two qualitative measurements of the elements of the same choice, (UPOL, 2015):

Cramer's coefficient:

$$V = \sqrt{\frac{K}{n \cdot (m - 1)}}$$

This coefficient takes values from 0 to 1. The closer it is to 1, the dependence is greater, and vice versa (UPOL, 2015).

## 2.1 Identification of respondents

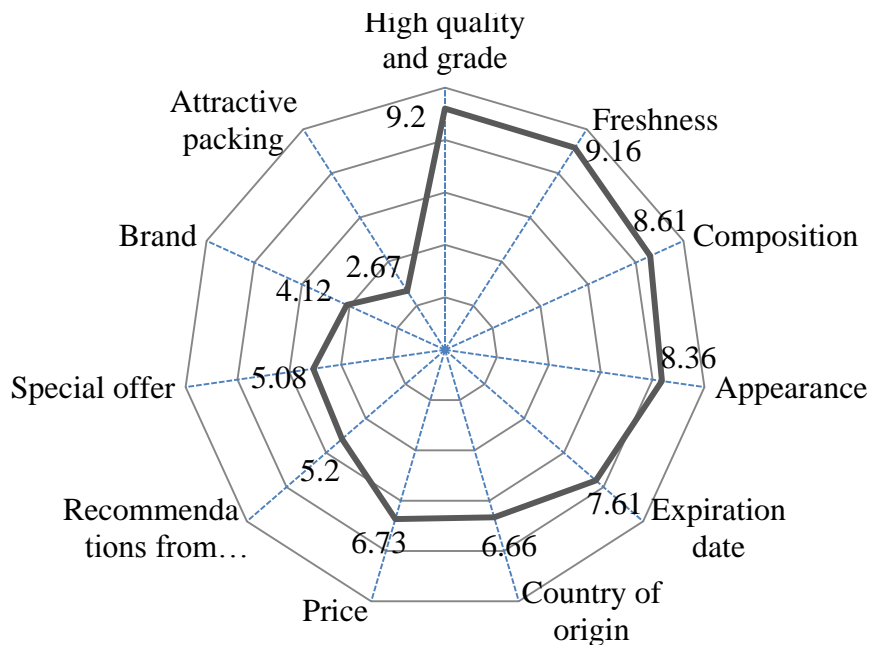
The questionnaire survey was attended by 41 % of men and 59 % women, which means 194 completed questionnaires from men and 280 from women. The largest group there was the age category of 18 – 24 years with 27.6 %, the second largest group is the 25 – 34 category with 26.4 %, is the third largest category of 35 – 54 years, with 24.1 % and the least numerous was category of 55 – 64 years with a share of 11.2 % and over 65 years with a 10.8 % share. The number of respondents from the South Moravian Region thus was 474, whereas the largest group lives in a village with over 100 000 inhabitants (38.8 %), 28.1 % of the respondents live in a municipality with 5000 inhabitants and in a village between 5000 and 15,000 residents live 13.7 % of respondents. The least of respondents live in the village in the size of from 35 000 to 100 000 inhabitants (10.3 %) and in the village of 15 000 to 35 000 inhabitants. Respondents were also divided according to economic activity. The largest group was a group of employees with 48.1% share, the second largest was a student group with 31.9 % share, the third largest group was self-employed with 11.4 % share and had the smallest representation of a persons on maternity leave (4.6 %), a person receiving a pension (2.5 %), and least abundant was unemployed (1.5 %). Regarding the size of incomes, the largest group was classified into the households with satisfactory income (57.2 %), 27.2 % of respondents into the category "sufficient", 8.6 % into the category of high, 6.1 % into the category of low and 0.8 % of respondents assessed as insufficient household income.

## 3 RESULTS

The most important factors which play a role when purchasing of meat and meat products are high quality and grade (9.2), freshness (9.16) and composition (8.61). It is interesting that the price finds itself on sixth place and a special offer on the ninth of the eleven factors. It is important to mention that the price received from respondents an average mark 6.7, but older respondents (particularly 65+) have given an average mark 8.53, which is a big difference in the perception of an importance of prices. On the contrary, clearly the lowest importance rating when purchasing gained an attractive packaging (2.67).

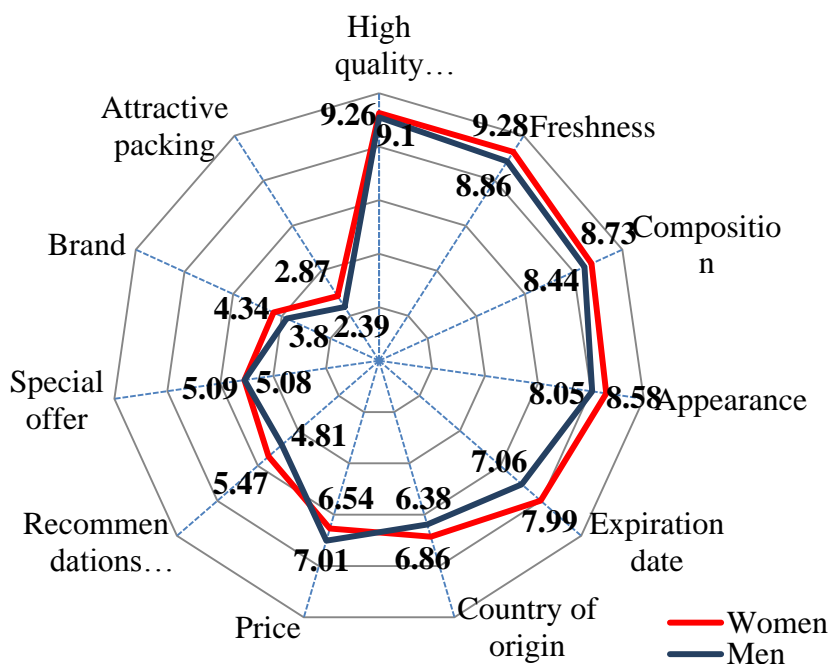
Figure 3 shows that women generally assess higher grades than men – only one category of men rated higher average grade in the category of price, while the ratings factor of special offers is almost identical for both sexes. The order of importance of the various factors of past question remained unchanged in both sexes.

From the Table II can be seen that the high quality and grade particularly emphasizes the age group 25 – 35 years, while the older category (55+) does not see such importance of the quality. Freshness is the strongest factor in group of 55 – 64 years. The composition stresses the most the category from 35 to 54 years and there is a noticeable reduction of stress on this factor with increasing age (as in quality). The appearance of meat and meat products is on the contrary evaluated in the field of importance in the category of 65 years and more, whereas there is a tendency of less importance in the category under 55 years. The most interested in expiration date is the category of 55 – 64 years. The greatest interest concerning the country of origin has the category of 25 – 34 years, there is a significant deviation from all ages. Category of 65+ has a significant deviation in sensitivity to a price – the reason is likely to be lower monthly income in this category, which confirms the fact that the second group in order in the price category is the group of 18 – 24, who are mostly students.



**Fig.2** - The most important factors when purchasing meat and meat products

Source: The questionnaire survey in the South Moravian Region – 2/3 2016 n=474



**Fig.3** - The most important factors when buying meat and meat products based on gender

Source: The questionnaire survey in the South Moravian Region – 2/3 2016, n=474

Recommendations from acquaintances is the most important for the category of 65 and more. Special offer is as well as price the highest marks have given the category of 65+, again followed by category of age 18 – 24. Brand and attractive packaging, although generally low rated, are the most important for a category of 18 – 24.

**Tab.2** - The most important factors when buying meat and meat products depending on age

Factors / age (in years)	18 – 24	25 – 34	35 – 54	55 – 64	65 a more
High quality and grade	9,10	<b>9,64</b>	9,54	8,95	8,82
Freshness	9,08	8,92	9,46	<b>9,55</b>	8,94
Composition	9,01	8,71	<b>9,32</b>	8,54	6,90
Appearance	8,14	8,06	8,54	8,77	<b>8,86</b>
Expiration date	7,35	7,15	8,05	<b>8,19</b>	7,76
Country of origin	5,94	<b>7,96</b>	6,64	6,79	6,82
Price	6,95	6,46	5,49	6,54	<b>8,53</b>
Recommendations from acquaintances	5,21	4,99	5,11	5,17	<b>5,92</b>
Special offer	5,34	4,93	4,37	4,53	<b>7,00</b>
Brand	<b>4,33</b>	3,94	4,18	3,87	4,24
Attractive packing	<b>2,84</b>	2,59	2,75	2,32	2,65

Source: The questionnaire survey in the South Moravian Region – 2/3 2016, n=474

### 3.1 Selection of shop (place of purchase)

As the main shopping place, respondents elect hypermarket (or Supermarket) – 42.2 %, further specialized stores (butcher) – 37.8 %. In hypermarket buy respondents most often due to: purchase together with the purchase, convenient accessibility and satisfaction with prices. In the contrast, in butchery, respondents buy most often due to: Satisfaction with the quality, satisfaction with the wide range of products, convenient accessibility of the shop and satisfaction with the expertise of the staff.

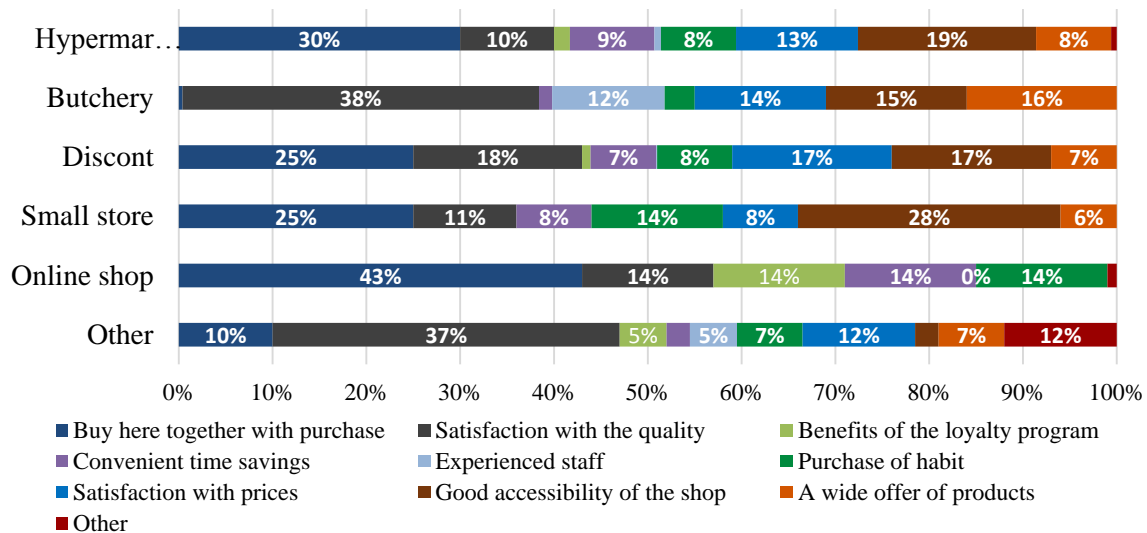


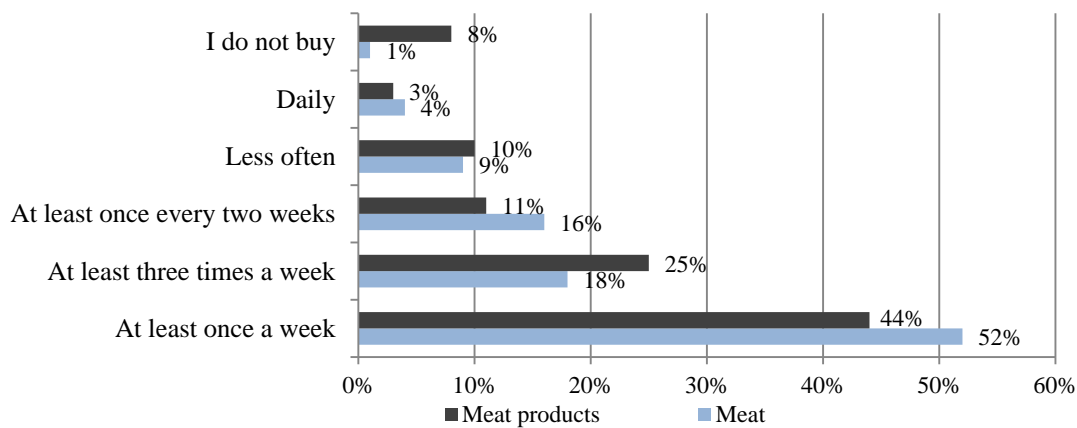
Fig.4 - Dependence of main shopping place and reasons for its visit

Source: The questionnaire survey in the South Moravian Region – 2/3 2016, n=474

An interesting finding is reached by comparing satisfaction with the quality of hypermarket (supermarket) and the butchery in terms of satisfaction with the quality of meat and meat products, where in the butchery are satisfied and 38 % in the hypermarket (supermarket) only 10 %.

### 3.2 Frequency and household expenses

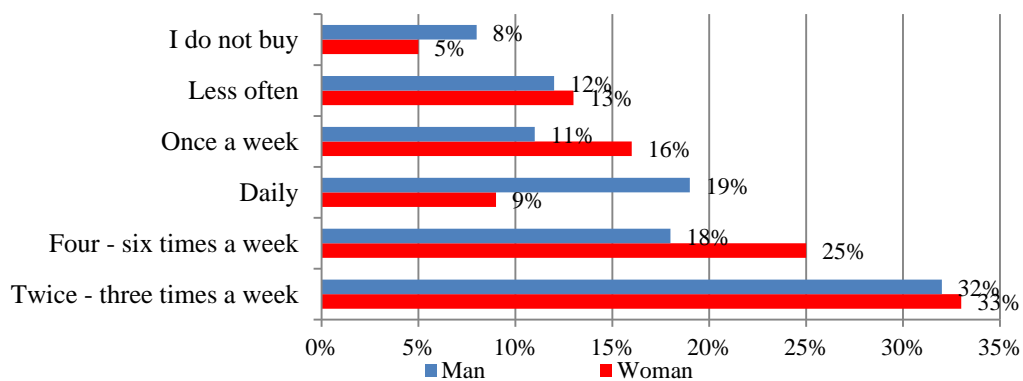
Meat and meat products, respondents most often buy once a week, while meat products do not purchase 8 % of respondents, mainly because of lack of confidence in their quality and vegetarianism. Regarding the consumption of meat, then every day 46 % of men consume meat and only 8 % of women (who frequently consume meat twice – three times a week) – from this it is clear that in the frequency of meat consumption lead definitely men. At the consumption of meat products that outcome is not so obvious, because here are the values of the frequency of consumption relatively balanced - usually both sexes consume meat products twice – three times a week.



**Fig.5** - Frequency of buying meat and meat products

Source: The questionnaire survey in the South Moravian Region – 2/3 2016, n=474

When comparing the frequency of consumption of meat, the results spoke clearly because men have a higher frequency of its consumption than women. But as regards meat products, this result is not so obvious because they are eaten by both sexes similarly. Even if the category “Daily” men consumed 19 % rate of meat products and women 9 %, so it is interesting that while in category “not consume” have marked mostly men than women.



**Fig.6** - Frequency of consumption of meat products in relation to sex

Source: The questionnaire survey in the South Moravian Region – 2/3 2016, n=474

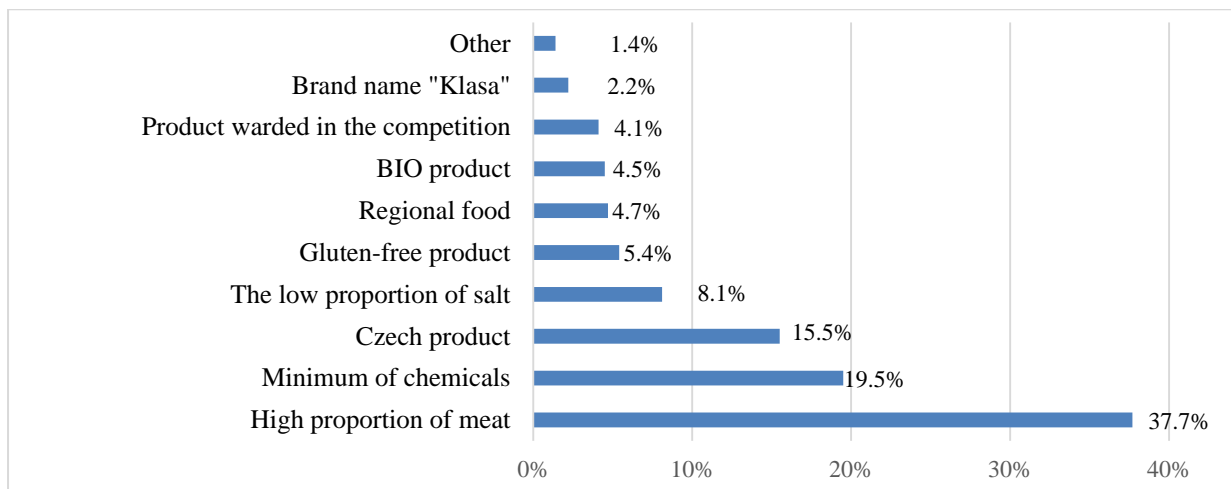
The average weekly spending on meat is usually in the amount of 100 – 300 CZK (whereas the greatest deal of money for purchasing of meat has a respondent who lives in the home alone), the average weekly spending on meat products ranges not higher than 100 CZK.

### 3.3 Preferences and information sources

The preferences of meat among consumers clearly win poultry meat, which is also the most popular with women (mainly due to nutritional values), in second place of preferences was ranked beef, which is by contrast mostly preferred by men (here because of the taste



properties and their appropriate use for steaks). In the preferences of the meat products is the situation different. Respondents here mostly prefer pork products (both sexes), but poultry is in second place, again mainly due to women's preference. Regarding the preferences of condition of meat, respondents in all kinds of meat (pork, beef, poultry) clearly chosen chilled meat (over 80 % for all types of meat), only poultry meat has been chosen by 16.7 % of respondents in frozen form. Quite important is communication on meat products that dealers can use when presenting their products. The most important seems to be the communication on a high proportion of meat, the minimum content of emulsifiers and labelling “Czech product”. The author of this thesis finds as an interesting finding, that only statement that only 4.5 % of people consider important the product is organic quality.

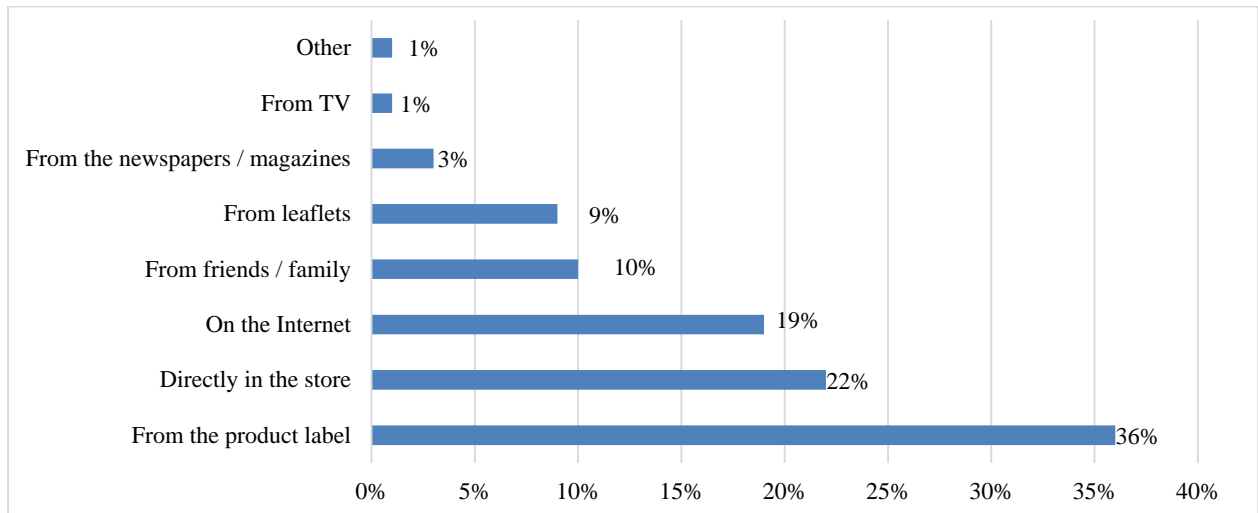


**Fig.7** - The most important communication on meat products

Source: The questionnaire survey in the South Moravian Region – 2/3 2016, n=474

The respondents were also expressing their agreement with certain statements. From these claims, we know that the majority of respondents are willing to pay more for quality (average mark 8.19), while to this are rather consenting men and especially younger ages (most 25 – 34). Women, in comparison with men, prefer shop where they can pay by credit card and buy what they did not intend, and also they are more loyal to a particular brand. Conversely, men tend to be convinced to purchase by tasting of a product rather than women, although neither of genders has not indicated with this assertion large agreement (average grade only 3.20).

The respondents get information about meat and meat products mostly from the product labels, directly in the store and online. Men and woman differ especially in the fact that men reach information more often on the Internet. Respondents generationally differs in that the younger generation looks for information on the Internet more and the older generation rather in the form of leaflets and acquaintances. The most common source of information gathering on meat and meat products In this question respondents could indicate up to three sources for finding information about meat and meat products that are most important to them, or they could write their own. The most common sources of information are directly product labels (36 %) is also very common to obtain information directly in the store (22 %), information on the Internet obtains 19 % of the respondents, 10 % from friends and family and from the advertising leaflets 9 % of respondents. Conversely, the least often the respondents look for information from newspapers / magazines and television.



**Fig.8** - The most important sources of information gathering

Source: The questionnaire survey in the South Moravian Region – 2/3 2016, n=474

#### 4 DISCUSSION

Consumer behaviour in the Czech Republic gets gradually similar features to the consumers in West European countries. A few years ago has been described the behaviour of consumers in the market of meat in Western European countries as follows. “Consumers in Western countries are making increasingly complex and varied demands with regard to the food product they buy. To satisfy health concerns, for example, food must contain less fat or salt. Consumers also want a large choice of food products, whether fresh or processed, while time constraints have also increased their demand for convenience food. Concerns for the environment in terms of soil and air pollution, on the other hand, have led to demands for regional and organic produce” (Trienekens et al., 2009).

In general, we can say that in the last decade, many new consumer groups occurs on the market of food. This clearly reflects the shift from the previously rather homogeneous demand at its present very heterogeneous nature. Thereof, is obvious complexity uniquely identifying the preferences of today's consumers, which hampers producers respond to market changes. Risky for the producer becomes the selection of the target group (s) of consumers as preferences tend to be quite volatile as well as within individual consumer groups. Simultaneously, is not sufficient just to observe trends in the local market, although the company operates only on them, but it is necessary to follow the broader global development of the sector and specific target groups of consumers. On the contemporary global market is therefore not possible to assess consumer's behaviour in the individual national context, but in a broader context and connectedness. As well as the results of a survey of consumer behaviour within the selected region - South Moravia reflects the wider global context observed in comparable markets in the global economy. The only exceptions are still in a certain cultural, religious and anthropological specifics reflected in the specific taste habits and psychological factors.

## **5 CONCLUSION**

Men in comparison with women much more often buy for themselves. Moreover, with increasing age among respondents there is a growing need to buy for the home. Sales staff should therefore focus in personal selling on women and their household purchases, for example to recommend to women meat and meat products in greater quantity – this corresponds to the fact that women buy more impulsively than men. By contrast, men like to purchase meat and meat products for themselves, what can be combined with the fact that they like to pay extra for quality (in particular male aged 25 – 34).

Hypermarkets and supermarkets are in the forefront when choosing main shopping place of the respondents, yet we know that people buy here mainly along with the purchase, but also because of easy availability and satisfaction with prices. Butchery should not try to compete in all scales, which hypermarkets attract, because prices they practically cannot compete with – hypermarket can afford to sell meat and meat products with minimum profit mainly because even with a small profit on the single sold piece the profits equals that they sell a lot of units (which is not likely butcher). Of course, also possible lower profits can be compensated by other products they sell, which is another thing in which the hypermarket should not try to compete with butchery – often you can see the butchery, which looks more like groceries than as a specialized shop.

Essential findings of is that respondents do not consume meat products because of lack of confidence in them (for meat also, but it is only 1 %, mostly because of vegetarianism) – sellers should strive to constantly improve their products and increase their awareness about the quality among customers, which again corresponds to the previous statement.

Sellers should think about which customers they want to target at, because from a general questionnaire is clear, that women prefer poultry when buying because of favourable nutritional values, while men tend to prefer beef due to the properties suitable for the preparation of meat in the form of steaks. With man it is easier because the preference of beef is not as significant as compared to poultry and pork, whereas women prefer poultry markedly - in evaluating from 1 to 10 there is even two evaluation stages difference. It is also needed to think about what form (or state of meat) respondents require. It is obvious that most respondents buy chilled meat, and this is particularly true for pork and beef, in poultry nearly 17 % of people buy frozen poultry rather than chilled.

The question is, if people do not buy frozen meat because of its bad reputation (a lot of cases - but particularly associated with hypermarkets) and is therefore worth considering whether it should be sold in a butcher shop at all (if they want to be presented by its quality).

In contrast, for meat products is in overall terms in a clear preference pork in both sexes, whereas women have also noticeably high rating of poultry meat – in store should be definitely a great selection of products from pork, less from poultry, which is bought more likely women and the least from beef, which is more likely bought by men.

The most important message, which can help retailers in their presentation to customers, seems to be especially high proportion of meat, low emulsifiers and original Czech product. A high proportion of meat and products without emulsifiers are the trend of recent years, which is becoming more "healthy lifestyle" and people naturally seek out products that in today's hectic times can be eaten without compunction that they violate their lifestyle. Then the question is, why people prefer when buying pork meat products, inasmuch as poultry products have in the eyes of many people (even professionals) favourable nutritional value (for example. A lower proportion of fat) – the author inclines to the thing, that people prefer

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pork meat products because of their generally lower price. After all, as regards meat products, 45 % of the people spend on them up to 100 CZK, and another 38 % from 100 to 300 CZK, which is obviously much less than on the meat, while in their consumption is not a huge difference! It is equally important statement that the meat product is a Czech product. Preference of country of origin from the Czech Republic certainly comes from a variety of cases of meat (especially poultry) by its imports from countries such as Poland, Brazil and so on. Sellers should sell products that contain a minimum of emulsifiers, a high proportion of meat and are manufactured in the Czech Republic – then it can be assumed that for these products will be greater demand. Of course, if this product will fulfil this, he must inform the consumers (hereinafter will explain which ways).

The best sources through which sellers can let you know about the quality of your product has been proven to provide information on the label, in-store and online. Concerning the label, then it is not purely an attractive container (people obviously do not need it and are not very interested in it - see the importance of evaluation factors when buying). The important thing is to provide clear and concise communication about the product on the packaging. Internet is the trend for getting information in almost all fields and it is not different for meat and meat products. In addition, an online searching for information about meat and meat products do rather men, hence it would be useful to present more beef and pork meat products. However, for example if we have a store in a small town (village) and our customers are mostly older age groups (55 and over), then they surely appreciate more information in leaflets - hypothesis has proved the dependency of age categories on utilization of sources of information.

As noted in the results, most respondents valued factors such as high quality and grade, freshness and composition. The price is surprisingly ranked at 6th place (out of 11), while for the younger category was not so important, but for the older category is one of the most important factors. Older generations also give recommendations to friends, that is why sellers should strive to create positive intergenerational relations with these and further develop, e.g. in the form of loyalty prices.

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## The Role of Sharia Compliance in the Relationship between the Marketing Mix, Satisfaction and Loyalty in the Sharia Hotel

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### ABSTRACT

*The rapid increase in the number of international muslim travelers, causing halal tourism to be the concern of various countries. One important facility that continues to be built to meet the special needs of muslim travelers is the syariah hotel. How is the strategy of marketing mix of syariah hotel with the existence of component of syariah compliance? This study aims to examine the importance of sharia compliance in develop hotels' marketing mix strategies, and to investigate the direct and indirect effect of sharia compliance on customers' satisfaction and loyalty. The target population is muslims who are at least 17 years old and have stayed at least one night at sharia hotels throughout Indonesia. The survey was conducted by distributing questionnaires offline (directly to respondents) and online by using google form and surveymonkey.com. The data collected from the 158 respondents were analyzed using Analysis Factor and Multiple Regression. The results show that the sharia compliance affects the customers' satisfaction and loyalty. The effect of three components of marketing mix, namely: product, price and place, on the satisfaction are not dependent on the sharia compliance, but effect of promotion on customers' satisfaction is depends on the sharia compliance.*

**Keywords:** *Sharia Compliance, Marketing Mix, Satisfaction, Loyalty, Sharia Hotel*

**JEL Classification:** M31, Z33

### 1 INTRODUCTION

Muslim tourism market has great potential and rapid growth. Based on Global Muslim Travel Index 2016, international muslim travelers reach 117 million people by 2015. This number is expected to increase to 168 million people by 2020, where the total muslim travelers spending for the year is expected to reach US \$ 200 billion (*Mastercard and Crescent Rating*, 2016). Meanwhile, according to *Reuters & DinarStandard* (2016) the number of global muslim spending for the media and recreation sector in 2015 is US \$ 189 billion and is predicted to rise to US \$ 243 billion or 8.2% of the total world expenditure by 2021. The potential market has made many countries pay attention to the development of halal tourism. The development of sharia tourism is not only the concern of the member countries of the Organization of Islamic Conference (OIC), but also non-OIC countries such as Thailand, Singapore, Japan, Taiwan, China, Australia and Germany.

Hotel is the most important facilities needed by muslim travelers. According Siprasat, Chainin, & Rahman (2014) the majority of muslim travelers use hotel, resort, or homestay during a tourist visit. Islamic rules and regulations are the cause of muslims having restrictions on consuming products. In Islamic law (known as sharia), product must be permissible (*halal*). All hotel rooms may be *halal*. However, it is possible in the hotel itself there are various things that are prohibited in Islamic law, such as: the availability of alcohol,

gambling or prostitution. Besides that, muslims have some special needs in hotel rooms, such as: prayer mats, Al Quran, and so forth. Therefore, Weidenfeld (2006) classify muslim travelers as religious tourist group which has special needs. Hotel that provides services in accordance to the sharia principles are known as sharia-compliant hotel (Yusuf, 2009) or simply called the sharia hotels.

The special needs of tourists depend on their beliefs, because one's needs and wants will be influenced by their religious orders and prohibitions (Poria, Butler, & Airey, 2003). The increasing number of muslim travelers causes the availability of sharia hotels become a necessity in tourism development of a region. The sharia hotels are a place to stay that can meet one of the special needs of muslim travelers. Thus it can be stated that the availability of sharia hotels is one of the advantages of competing with other tourist destinations. Weidenfeld (2006) revealed that in order to attract new tourism segments, the tourism industry must be able to satisfy the special needs of different tourist characteristics. Therefore, understanding the unique muslim travel behavior and needs is very important (Sriprasert, et al., 2014).

Customer satisfaction is one of the marketing goals, because the higher customer satisfaction can lead to have a stronger competitive position resulting in higher market share and profitability (Fornell, 1992), and investment return (Anderson, Fornell, and Lehmann, 1994), reduced price elasticity, lower business cost, reduced failure cost, and mitigated cost of attracting new customers (Chien, Chang, & Su, 2003). Customer satisfaction is necessary for long-term success in business (Nam, Ekinci, & Whayatt, 2011), because customer satisfaction is also associated with building and maintaining strong customer relationship (Blattberg, Malthouse & Neslin, 2009). In other words, customers' satisfaction will bring consumer loyalty (Jang & Feng, 2007). That's why customer satisfaction is one of the most important research issues in marketing (Nam, et al., 2011).

Marketing mix as a determinant of satisfaction and loyalty has been widely known, either by academics or practitioners. Several studies have revealed the significant effect of marketing mix on customer satisfaction and loyalty in various businesses and markets. Every organization needs to measure the degree of its marketing mix strategy that will contribute to customer satisfaction as well as customer loyalty (Ibidunni, 2011). So, the ability of the hotel in creating and developing a marketing mix strategy is the key to the success of its business.

Islamic law has its own rules and regulation regarding product, price, place and promotion. Therefore, it is possible that sharia compliance has a role in the relationship between marketing mix and customers' satisfaction. Marketing mix that is in line with sharia will be more acceptable by muslim travelers, which lead to the higher muslim travelers' satisfaction. Unfortunately, sharia compliance has never taken into account the relationship of marketing mix and satisfaction, especially in the context of the halal tourism, whereas the muslim market and conventional markets have different characters.

thus, the main purpose of this research is to study the role of sharia compliance in the relationship between marketing mix customers' satisfaction, and loyalty.

## **2 LITERATURE REVIEW**

### **2.1 Marketing Mix**

McCarthy (1971) reveals that the entire marketing process will be influenced by marketing mix (4P) and macro factors (external companies). Marketing mix can be controlled by companies (Kotler & Armstrong, 2010; Shankar & Chin, 2011), but no company can control macro factors, such as economic growth, inflation, public policy, etc. Therefore Hakansson & Waluszewski (2005) mentioned that elements of the marketing mix are a set of marketing tools for achieving the goals of the institute of marketing. Thus it can be stated that the determination of the marketing mix for each product is a very critical effort, so it becomes the main focus of the company. Accuracy in setting and developing a marketing mix can build a sustainable competitive advantage that will affect long-term growth and profitability, because marketing mix will help to increase the sales and profits of the organization.

The main motivation for understand and apply an accurate marketing mix because the marketing mix is the determinant of satisfaction and loyalty. Buyers will perceive the marketing mix approach as benefits that offered by the seller for them (Kotler & Keller, 2009). Shankar & Chin (2011) revealed that elements in marketing mix are a reflection of customers' satisfaction. Meanwhile Wahab, Hassan, Md Shahid & Maon (2015) stated that a clear understanding of elements in marketing mix will help business providers to influence current customers become loyal customers.

Kotler & Armstrong (2010) define the product as anything which is offered to a market to attend, acquire, use or consume and it may satisfy the consumers. Product is not just tangible goods, but includes physical objects, service, place, organization or idea. The customers buy the product because it can satisfy their needs (Kotler & Keller, 2009).

Price, the amount of money that buyer have to sacrifice or pay in order to acquire the right and use of the product. Many consumers use price as an indicator of quality, higher-priced are perceived to possess high quality and vice versa (Kotler & Keller, 2009). Price is the key to success in tourism (Kadhim, Abdullah & Abdullah, 2016). The hotel visitors will compare the amount of money they have paid with the quality of hotel facilities and services they get (Morisson & Mahoney, 2002). The company can only set prices, but the market value will be formed from consumers (Kotler, Bowen & Makens, 2014). Because of that, companies should be able to make a good pricing policy. Therefore it can be stated that price means that company can offer competitive price (Uddin & Akhter, 2012; Yoo, Donthu & Lee, 2000).

Kotler & Armstrong (2010) defined place or distribution as a set of interdependent organizations involved in the process of making a product available for use or consumption by consumers. Place is the location where products and services are available and can be purchased (Sarker, Aimin & Begum, 2012). Place plays a significant role in tourism field (Kotler & Armstrong, 2010). Generally tourists are looking for hotels that are easily accessible from various places. Therefore, the majority of hotels have locations near airports or train station, city centers, and tourist attractions.

Promotion is creative strategy depends on how the message is being delivered. Promotion is a marketer's effort to communicate its products to consumers (Al Muala & Al Qurneh, 2012; Kotler & Keller, 2009). If the communication is delivered ineffective, the customers will not understand the meaning and will not interested to buy the product (Kotler & Keller, 2009).



## **2.2 Satisfaction**

Satisfaction is a person's feelings of pleasure or disappointment over the comparison between service performance and expected expectations (Kotler & Keller, 2009). Satisfaction was also interpreted as consumers' perception of the performance of goods and services in connection with expectations (Schiffman & Kanuk, 2010). Customers are having their own standard of expectation. If the performance of product does not match their standard, it will make the customer disappointed. On the other hand if it's more than they expect, it will definitely make the customer satisfied. Therefore, customer satisfaction can be measured by measuring customer expectation gap with management perception (Kotler & Keller, 2009).

Several studies have revealed the significant effect of marketing mix on customer satisfaction in various businesses and markets, such as: Kadhim, et al. (2016), Satit, Tat, Rasli, Chin & Sukati (2012) in tourism marketing; Wahab, et al (2015) in hijab industry; Mohammad (2015); Pour, Nazari & Emami (2013) in retail bank; Mustawadjuhaefa, Basrimodding, Jobhaarbima & Ilhamlabbase (2017) in automobile industry; Souar, Mahi & Ameer (2015) in telecommunication company; Olaleke, Borishade, Adeniyi & Omolade (2014) in education marketing; Sukamton & Lumintan (2015) in Blackberry product; Ali, Wan Ibrahim, Said, Mat & Yusof (2017) in retail industry; and Mursid, Halim & Osman (2014) in Pharmaceutical industry.

Based on the previous research, as Kadhim, et al (2016) stated that (in tourism marketing) marketing mix is not possible to be separated from customer satisfaction. Therefore, a thorough knowledge on effects of marketing mix elements for satisfying tourists may help the tourism operators for developing their tactics and strategies for maximizing the satisfaction of visitors and profitability (Sarker, et al., 2012).

## **2.3 Loyalty**

Kotler & Keller (2009) define customer loyalty as a deeply held commitment to re-buy or re-patronize a preferred product or service in the future despite situational influences and marketing efforts having the potential to cause switching behavior. Loyal customers are willing to continuous or repeat to purchase (Day, 1977; Griffin, 1996; Kotler & Keller, 2009), purchase more frequently (price insensitivity), try the firm's new products or services (repurchase intention), recommend products and services to others (word-of-mouth), and give companies suggestions (complaint behavior) (Reichheld & Sasser, 1990).

Some research proves that there is a relationship between satisfaction and loyalty that will ultimately bring benefits to the company. Customer's re-purchase behavior is estimated as a basic requisite for loyalty that is followed by satisfaction (Punniyamoorthy & Raj, 2007). Customers' satisfaction will bring consumer loyalty, which is reflected by their recommendations to other consumers (Jang & Feng, 2007), and their intention to revisit to the hotel (Alen, Rodriguez & Fraiz, 2007).

Marketing mix has no direct effect on customers' loyalty, but is mediated by customers' satisfaction. Many researchers have studied and confirmed that customer satisfaction is a mediating variable, which is a determinant of whether consumers will become loyal or not (Patterson, Johnson & Spreng, 1997; Bennett & Rundle-Thiele, 2004). On other hand, Punniyamoorthy & Raj (2007) stated that customer's re-purchase behavior is estimated as a basic requisite for loyalty that is followed by satisfaction. Previous studies have also found that one of the major determinants of customer loyalty is customer satisfaction which is in

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every business and market; customers need to be satisfied before they can become loyal (Parasuraman, Zeithaml & Berry, 1988; Lin & Wang, 2006).

### 2.4 Syariah Compliance

Basically, muslim travelers have similar needs as the general tourist, such as comfort hotels, excellent service, competitive prices, and good facilities. However, since Islam has its own teachings in organizing its followers in living life, it leads muslim travelers have special needs, which may not be necessary for non-muslim travelers. Religion is a stable factor that affects consumer buying behavior and creates demand for sharia products and services (Muhammad & Mizerski, 2010).

In the hotel industry, there is a demand on the hotel to provide facilities and rooms in accordance with sharia (Salleh, Hamid, Hashim & Omain, 2014). Sharia hotels certainly have paid attention to the fulfillment of sharia aspects on every tourism product offered, in order to be able to satisfy the special needs of muslim travelers. Therefore, sharia compliance is the excellence of sharia hotels in the muslim market. According to Syed (2001), the fulfillment of sharia compliance in the tourism industry and hotels will be its own competitive advantage, especially for the muslim tourism market. Therefore, it is important to be able to provide hotels in accordance with the sharia in order to satisfy the special needs of muslim travelers.

How is the hotel according to sharia? Academics and researchers are trying to set up sharia standards that the hotel must meet, although not yet a consensus. Based on various literatures (Jurattanasan & Jaroenwisan, 2014; Kamarudin & Ismail, 2012; *Standard & Crescentrating*, 2012; Islam & Karkkainen, 2013; Sriprasert, Chainin & Rahman, 2014; and Chookaew, Chanin, Charatarawat, Sriprasert, & Nimpaya, 2015) sharia compliance in hotel includes: hotel employees use Islamic dress, no alcohol available, availability of halal food, TV shows do not contain impressions that do not comply with sharia, service to guests is not given by the opposite sex, available a spacious prayer room and comfortable to worship activity, availability worship equipment (prayer mat, Al Quran) in hotel room, availability of prayer direction, the hotel toilet is not facing the Mecca, no nightclub available, not displaying art that is a human or animal image, hotel recreational facilities, such as gym, swimming pool, spa, etc., separate between male and female, financial transactions using Islamic finance media, and availability of Islamic bank ATM. There are several more elements of sharia in hotels, such as: hotel organizes preaching sessions, availability of mosques, or ease of finding prayer facilities. However, these elements have been represented by the elements mentioned earlier.

In order to operate in accordance with sharia, many elements of sharia compliance must be met by the hotel. Considering that most sharia hotels are still in development stage, so it is reasonable if there are still many sharia hotels that have not be able yet to fulfill all elements of sharia compliance.

### 2.5 Hypothesis

Marketing mix strategy applied by the company is the key to satisfy the consumers. As expressed by McCarthy (1971) and Kotler & Armstrong (2010), that customer satisfaction is the result of successful marketing mix strategies that creates more competitive value for customers. Various researches (such as: Aimin & Begum, 2012; Al Muala et al, 2012; Faryabi, Kaviani & Yasrebdoost, 2012; Cengiz & Yayla, 2007) stated that marketing mix

strategies has a significant impact on satisfaction. Based on the literatures, the following hypothesis is proposed:

H<sub>1</sub>: Marketing mix has a significant impact on customer satisfaction

Considering the needs of everyone will be influenced by their religion and beliefs (Din, 1989; Kamarudin & Ismail, 2012), the impact of sharia compliance by sharia hotels on muslim travelers satisfaction needs to be taken into account in the model. Based on this limited literatures, the following hypothesis is proposed:

H<sub>2</sub>: Shariah compliance has a significant effect on customer satisfaction

According to the Islamic perspective, products or services can influence customer satisfaction through five principles, namely lawfulness, purity, deliverability, precise determination and cleanliness (Ahmed & Rahman, 2015). In addition, the production process should be permissible (*halal*) and pure (*tayyib*), and the ingredients have been taken/extracted/obtained from lawful sources, to the extent that it is free from any harmful consequences (Saeed, Ahmed & Mukhtar, 2001). Thus, muslims very depend on Islamic rule and regulation in assessing a product and consuming the product. Similarly, in assessing the marketing mix applied by the hotel. Based on this rationale, it also proposes the following hypothesis:

H<sub>3</sub>: Impact of marketing mix on customer satisfaction depend on shariah compliance

Patterson et al. (1997); Bennett & Rundle-Thiele (2004) revealed that there is a relationship with nature between satisfaction and loyalty that have been studied by many researchers and were confirmed that customer satisfaction is the mediating variable that might change the customers, whether they will become loyal or not. Previous studies have also found that one of the major determinants of customer loyalty is customer satisfaction. Customers need to be satisfied before they can become loyal (Parasuraman, Zeithaml & Berry, 1988; Lin & Wang, 2006). Customer satisfaction is linked to customer loyalty (Fornell, 1992). Based on the previous researches, it proposes the following hypothesis:

H<sub>4</sub>: Customer satisfaction has a significant effect on customer loyalty

Eid & El-Gohary (2015) stated the religious elements of Islamic physical attributes and Islamic non-physical attributes may affect consumer satisfaction. Thus, sharia will be easier to satisfy the customer, and make them loyal (Wahab, et al., 2016). Therefore the following hypothesis is proposed:

H<sub>5</sub>: Sharia compliance has a significant effect on customer loyalty

H<sub>6</sub>: Impact of customer satisfaction on customer loyalty depend on shariah compliance

### **3 METHODOLOGY**

Target population in this study is muslim travelers at least 17 years old and had stayed at least one night at sharia hotels throughout Indonesia. The survey was conducted by distributing questionnaires directly to respondents and online by using google form and

surveymonkey.com. Respondents are selected through muslim travelers' social media accounts, identified by sharia hotel hashtags, or add location tags on social media. Data collection was conducted from May to June 2017, of which 158 respondents completed and returned the questionnaire.

The method used to get score of each variable is Factor Analysis. Meanwhile, to test the research hypotheses uses the Multiple Linier Regression. The regression models are:

$$\text{Satisfaction} = \beta_0 + \beta_1 \text{Product} + \beta_2 \text{Price} + \beta_3 \text{Place} + \beta_4 \text{Promotion} + \beta_5 \text{Shariah Compliance} + \beta_6 \text{Product*Shariah Compliance} + \beta_7 \text{Price*Shariah Compliance} + \beta_8 \text{Place*Shariah Compliance} + \beta_9 \text{Promotion*Shariah Compliance} + e_1 \text{ (Model 1)}$$
$$\text{Loyalty} = \gamma_0 + \gamma_1 \text{Satisfaction} + \gamma_2 \text{Shariah Compliance} + \gamma_3 \text{Satisfaction *Shariah Compliance} + e_2 \text{ (Model 2)}$$

#### 4 DATA

All variables on this study adopt measurements that used in previous research. Marketing mix measurement, which consists of product, price, place and promotion, is taken from Al-Debi & Mustafa (2014), Bapat, Soni, & Khasgiwala (2015), Amofah, Gyamfi, & Tut (2016), Pereira & Almeida (2014), Magatef (2015), Kotler, Bowen, & Makens (2014), Ubeja & Bedia (2014), and Abuznaid (2012). Meanwhile measurement of customers' satisfaction is adopted from Yoon & Uysal (2005), and Valle, Silva, Mandes & Guerreiro (2006). Statement items for all variables are measured on a six-point Likert Scale ranging from 1 – strongly disagree to 6 – strongly agree. Measurement of variables product, price and place use 5 item statements, promotion 8 item statements, and satisfaction 3 item statements (see Appendix 1).

The definition of loyalty used in this study is intention of the muslim travelers to revisit to the sharia hotel. Measurement of loyalty refers to Valle, et al (2006), 2 item statements, and measured on a six-point Likert Scale ranging from 1 – strongly disagree to 6 – strongly agree (see Appendix 1).

Furthermore measurement of sharia compliance which shows the ability of sharia hotels to provide special muslim needs or the realization of sharia compliance elements in the hotel is adopt from AHCC (2008), *Standard and Crescentrating* (2012), Islam & Karkkainen (2013), Sriprasert, et al (2014), Jurattanasan & Jaroenwisan (2014), Battour & Ismail (2016), Chookaew, et al (2015). Statement items for variable Sharia Compliance is measured on Guttman Scale, which is 1 for 'yes' (hotel realizes a sharia compliance element), and 0 for 'no' (hotel does not realize a sharia compliance element). Measurement of variable sharia compliance used 14 item statements (see Appendix 1).

#### 5 RESULT AND DISCUSSION

The average for the marketing mix components show respondents perceived the strategy applied by the sharia hotel has been good enough. However, based on the statistic minimum of each component, there are respondents who evaluate the implementation of marketing mix in sharia hotels are still not good (see Table 1).

Table 1 also shows a high rate of satisfaction and loyalty of respondents. However, as the marketing mix component, there are respondents who feel very dissatisfied and will not be loyal to the sharia hotels. Nevertheless, based on the data, only 5.7% of respondents who can

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be categorized as unsatisfied and 12% of respondents who can be categorized as not loyal to the sharia hotels.

Meanwhile, the average of sharia compliance is 10.4430. The statistic indicates that the respondents consider not all elements of sharia compliance can be fulfilled by sharia hotels in Indonesia, even based Table 1 there are sharia hotels in Indonesia that only meet the 4 elements of sharia compliance only.

**Tab.1** - Descriptive Statistics

Variable(s)	Minimum	Maximum	Mean	Std. Deviation
Product	1.80	6.00	4.5633	.78743
Price	1.40	6.00	4.6873	.86206
Place	1.20	6.00	4.8089	.73748
Promotion	1.63	6.00	4.5467	.80794
Sharia Compliance	4.00	14.00	10.4430	2.47663
Satisfaction	1.00	6.00	4.7532	.86709
Loyalty	1.00	6.00	4.6044	1.16348

Table 2 presented the coefficients, t-statistics and its p-value of multiple regression equations. Based on the table, the regression coefficient of the independent variable product is positive and statistically significant at 10% significance level, as the test value t-statistic is 3.059 with p-value = 0,003. Regression coefficient of independent variable price is also positive and statistically significant at 10% significance level, as the test value t-statistic is 3.166 with p-value = 0,002.

For independent variable place, the regression coefficient is also positive and statistically significant at 10% significance level, as the test value t-statistic is 1.711 with p-value = 0,089. Meanwhile, the same results are also obtained for independent variable promotion, regression coefficient is also positive and statistically significant at 10% significance level, as the test value t-statistic is 4.036 with p-value = 0,000.

Hypothesis test results above shows the data support Hypothesis 1. Thus it can be stated that the marketing mix has a positive and significant impact on customer satisfaction. The better acceptance of muslim travelers to the marketing mix components offered by sharia hotels, the higher the muslim travelers' satisfaction.

The present study reveals that marketing mix have significant impact on satisfaction. This result is in line with McCarthy (1971), Kotler & Armstrong (2010), Aimin et al (2012), Al Muala et al (2012), Faryabi et al (2012), and Cengiz et al (2007). Considering the marketing mix is a controllable variable (Kotler & Armstrong, 2010; Shankar & Chin, 2011), the marketer can plan, build and apply the marketing mix strategy. High marketers' ability to build and implement the hotel's marketing mix according to the needs and wants of muslim customers is the key to improving customer satisfaction.

**Tab.2 - Summary Results of Regression Analysis Model 1**

Independent Variable(s)	Coefficients	t-statistics	p-value
Constant	.019	.403	.688
Product	.244	3.059	.003
Price	.272	3.166	.002
Place	.125	1.711	.089
Promotion	.254	4.036	.000
Sharia Compliance	.100	1.940	.054
Product* Sharia Compliance	-.050	-.516	.606
Price* Sharia Compliance	-.120	-1.461	.146
Place* Sharia Compliance	.007	.087	.931
Promotion* Sharia Compliance	.187	2.860	.005

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R<sup>2</sup> = .700  
F Statistics = 38.456

The data also support Hypothesis 2, which mentions sharia compliance has significant impact on satisfaction, based on the t-statistic of  $t_0 = 1.940$  with a p-value = 0.054. Thus it can be stated sharia hotels which is provide more facilities in accordance with sharia compliance, leads to higher muslim travelers' satisfaction. The result confirmed several arguments, such as Din (1989), and Kamarudin & Ismail (2012). This condition shows that muslim customers in sharia hotels really want the hotel to more and more provide facilities in accordance with the sharia compliance.

The regression coefficient of the interaction variable Product\*Sharia Compliance, Price\*Sharia Compliance, and Place\*Sharia Compliance are statistically insignificant at 10% significance level. The results of this hypothesis test can be interpreted that the effect of product, price and place on satisfaction is not depend on sharia compliance. In other words, product, price, place, and sharia compliance have their respective influence on customers' satisfaction.

Hotels that operate on the basis of sharia compliance are needed by muslims, but not the only ones considered important by muslim travelers, because performance of product, price, and place are important as well. Hotels that meet all sharia compliance, but provide uncomfortable rooms or locations are difficult to access, can lead to low satisfaction of muslim travelers. So, in order to compete in the market, sharia hotels can not only rely on muslim traveler's compliance to sharia, but must offer elements of marketing mix that suit the needs and desires of the muslim travelers. Usman, Tjiptoherijanto, Balqiah & Agung (2017) in the study of the selection of Islamic banks shows the selection of banks (sharia or conventional) is not only based on the issue of sharia compliance, but also consider the bank's attributes (convenience, service, price). Thus it can be stated that muslim travelers is an emotional and rational market.

Even though sharia compliance does not play a significant role on the relationship between product, price and place on customer satisfaction, but sharia compliance has a significant role in the relationship between promotion and satisfaction. The regression coefficient of the interaction variable Promotion\*Sharia Compliance, is positive statistically significant at 10%

significance level. It can be stated that the influence of promotion on satisfaction depends on sharia compliance. The higher sharia compliance is causing the influence of promotion on satisfaction to be higher. The result of hypothesis test on the influence of interaction variable of marketing mix elements and sharia compliance on satisfaction shows the data support Hypothesis 3 partially.

Sharia compliance is positive values that have been embedded in Islamic principles. The more elements of sharia compliance that can be shown by the hotel in running its business, it will arise trust in muslim customers. Hotels that comply with Sharia compliance will be imaged by the customer as a hotel that honest in promotions, or will perform promotions in accordance with sharia. As a result of this trust then muslim travelers feel the expectations arising from the promotion of the hotel in accordance with the perceived reality, and lead the muslim travelers' satisfaction to be higher. Therefore, sharia hotels really need to emphasize sharia compliance in promoting.

**Tab.3 - Summary Results of Regression Analysis Model 2**

Independent Variable(s)	Coefficients	t-statistics	p-value
Constant	-.037	-.584	.560
Satisfaction	.539	8.174	.000
Sharia Compliance	.291	4.201	.000
Satisfaction* Sharia Compliance	.106	2.230	.027

$R^2 = .427$   
F Statistics = 38.190

Table 3 shows the data support Hypothesis 4 based on the regression coefficient of the independent variable satisfaction (t-statistic of  $t_0 = 8.174$  and p-value = 0.000). It can be interpret that individuals who have the higher degree of satisfaction tended to more loyal. This research reveals the importance of satisfaction in running a long-term business. These results support several previous statements and research, such as: Patterson, et al (1997), Bennett & Rundle-Thiele (2004), Parasuraman, et al (1988), Lin & Wang (2006), and Fornell (1992). This condition also indicates that customers' satisfaction is a mediating variable of relationship between marketing mix and sharia compliance, and customers' loyalty.

The data also support Hypothesis 5, based on the t-statistic of  $t_0 = 4.201$  with a p-value = 0.000. These result leads to the conclusion that the sharia compliance has a significant influence on loyalty. With the positive regression coefficient value, it can be interpreted that the more hotels provide facilities in accordance with sharia compliance, lead to the higher loyalty of muslim travelers. Therefore, sharia compliance is a very important factor in determining the loyalty of muslim customers in sharia hotels.

Meanwhile, the regression coefficient of the interaction variable Satisfaction\*Sharia Compliance, is positive statistically significant at 10% significance level. It can be stated that the influence of satisfaction on loyalty depends on sharia compliance. The higher sharia compliance increased the influence of customers' satisfaction on customers' loyalty. The results of this hypothesis test show that the data support Hypothesis 6.

This study reveals that sharia compliance has a direct impact on customers' satisfaction and loyalty, and has an influence in the relationship between customers' satisfaction and loyalty. These results show how important the role of sharia compliance in running a long-term hotels' business.

## **6 CONCLUSIONS**

This study found that elements in marketing mix are a reflection of customers' satisfaction, as expressed by Shankar & Chin (2011). However, this study also found that in muslim market, sharia compliance has a very important role. Sharia compliance has a direct effect on the satisfaction of muslim travelers, and it has influence on the loyalty of muslim travelers, directly and indirectly. This result is in line with Weidenfeld (2006), which suggests that tourism industry must be able to satisfy the special needs of different tourist characteristics, and support the statement of Syed (2001), which the fulfillment of sharia compliance in the tourism industry and hotels will be its own competitive advantage.

The role of sharia compliance in the relationship between the marketing mix and customer satisfaction is only indicated by the promotional component. Meanwhile, the effect of product, price and place on customer satisfaction does not depend on sharia compliance. Sharia compliance can indeed increase consumer satisfaction, but if not accompanied by the right strategy for product, price and place, the customer satisfaction will be reduced, which in turn will decrease loyalty. Vice versa, if the strategy of product, price and place has been appropriate with customers' expectation but not accompanied by sharia compliance, the satisfaction of muslim travelers will be reduced.

The importance of the role of sharia compliance is also indicated by the results of the analysis which reveal that the impact of customer satisfaction on customer loyalty depends on sharia compliance. This result can be interpreted the higher sharia compliance increased the influence of customers' satisfaction on customers' loyalty. Customer satisfaction brings consumer loyalty (Jang & Feng, 2007), but on the same level of satisfaction, muslim travelers loyalty will be greater if the hotel implements sharia compliance.



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### **Appendix 1:** Items Statement of Research Variables

Items Statement of Product: (1) The hotel rooms are spacious and comfortable; (2) The hotel provides a quality service; (3) The hotel offers a variety of services to meet the wishes of the guests; (4) The hotel features restaurants, business center and ballroom; (5) The hotel provides taxi service

Items Statement of Price: (1) Prices are in accordance with the quality of service received; (2) The hotel room price is reasonable (reasonable cost); (3) The hotel offers special rates for certain events and feast days; (4) The hotel offers excellent rates; (5) Rates compete with other hotels

Items Statement of Place: (1) The hotel has good connections with travel agencies; (2) Hotels associated with the global reservation system (Chain Hotel); (3) The hotel has an effective electronic booking system; (4) The hotel can be reached by private and public transportation; (5) The location of the hotel is strategic

Items Statement of Promotion: (1) The hotel uses good promotional media; (2) Promotion using Direct Marketing; (3) Hotels do promotion through the internet; (4) There is enough online information about sharia hotels; (5) Easy to get hotel information; (6) Sharia hotel information provides knowledge and motivates me; (7); The hotel provides an annual reward point; (8) No lies in promotion

Items Statement of Sharia Compliance: (1) Hotel employees use Islamic dress; (2) No alcohol; (3) Availability of halal food; (4) Conservative television show; (5) Service to guests is not given by the opposite sex; (6) Available a spacious and comfortable prayer room; (7) Availability worship equipment; (8) Availability of prayer direction; (9) The toilet is not facing the Mecca; (10) No nightclub; (11) Not displaying human or animal image; (12) Recreational facilities separate between male and female; (13) Transactions using Islamic finance media; (14) Availability of Islamic bank ATM

Items Statement of Satisfaction: (1) I am satisfied with the hotels' room and facilities; (2) The hotel service meets my needs; (3) The hotel service fulfilled my expectations.

Items Statement of Loyalty: (1) I intend to recommend the hotel to others; (2) I intend to revisit to this hotel.

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# Impact of Accommodation Service Quality on Customer Satisfaction in the Hotel Industry: a Study of 4-Star Hotel at Ho Chi Minh City Vietnam

*Quoc Loc Nguyen, Phuong Dung Trinh*

## ABSTRACT

*This study examines the impact of accommodation service quality on customer satisfaction specifically in 4-star hotels at Ho Chi Minh city, Vietnam. Customer satisfaction is a vigorous factor and a goal that all hotels are now pursuing. Along with the increasingly intense competition in the business environment, learning about customer needs, factors affecting customer satisfaction becomes more urgent in the industry.*

*The research model consists of the SERVQUAL model established by Parasuraman et al. in addition of price value according to some previous found studies. The researcher distributed questionnaire survey to customers in 4-star hotels at Ho Chi Minh City. The result which is draw from information collected of 216 answers shows significant differences from other previous comparable studies. On the basis of identifying the factors that affect customer satisfaction and finding a statistically significant difference for each customer group in assessing the quality of accommodation service in 4-star hotels. The hotel management ought to focus on improving the quality of each factor impact to the satisfaction of customers, paying attention to the difference of each customer group in the process of serving in order to bring the highest efficiency, in terms of limited resources, to improve the quality of accommodation service. Making customers more satisfied with the quality of overall service provided by the hotel.*

**Keywords:** *Satisfaction, Accommodation service*

**JEL Classification:** E21, L80

## 1 INTRODUCTION

The tourism industry in general is an important service industry in many developed and as well as developing countries thorough the world. Especially it is prosperous in Vietnam, making a constantly growing share of national income and return on investment. Ho Chi Minh City, the biggest city of the country, is not only a commercial center but also a scientific, technological, industrial and tourist center of the country. Tourism in Ho Chi Minh City develop rapidly into a key economic sector of the city. Welcoming thousands of visitors coming from all over the world every day for many different purposes aside from typical tourist, hotels in Ho Chi Minh city are getting to be built and developed more in different sizes from small to large and from economy to luxury ones.

According to the Vietnam National Administration of Tourism in 2014, tourism in Ho Chi Minh City contribute up to 15% of the city GDP and 6% of the total of the whole country tourism revenue. Statistics found in a website termed Chinhphu.vn determines numbers of



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both international and domestic visitors coming to Ho Chi Minh City to reach total 22 millions of visitors in 2014 and brings in over 86 trillion VND in revenue.

As a result of the blooming tourism industry in Vietnam, the Vietnam National Administration of Tourism declares there are more than 1800 accommodation establishments with 42000 classified rooms, and more than 29000 other related facilities in the business at Ho Chi Minh City. This creates an excessive competitive business environment which lead to a problem all accommodation facilities facing as well as hotels. Providing an adequate good accommodation service quality to satisfy customers. Hotels in Ho Chi Minh City are categorized accordingly to number of star from one to five star ranking following the National standard. There are one and two star hotels in the budget category, three star is consider economy, four and five star hotels are somewhat upscale/luxury service providers. 4-star hotels are chosen commonly since the service quality is overall better than those 3-star or lower, and the price is more reasonable. However, many hotels are not making any different in providing service in term of quality with their star ranking. Even service in higher market segment such as 4 and 5-star hotels does not really meet the customer needs, and makes them dissatisfied leading to negatively affecting their intention of returning to the hotel, or even the city as their tourist destination. The identified problem here is that how, in particular: 4-star hotels located in Ho Chi Minh City can establish their reputation for such better service at a more competitive price to those 5-star hotels in order to gain the competitive advantage in the market. In other saying, 4-star hotel management is trying to maintain an exclusive good accommodation service quality with lower price to satisfy customers more in their segment. Therefore, many 4-star hotels have been focusing on improving accommodation service quality and customer satisfaction. In order to assess customer satisfaction during their stay at a hotel, it is crucial to find out which factors impact the customer in receiving accommodation service.

This study determine those factors impact customer satisfaction in a more complete and accurate way using both qualitative and quantitative methods. The findings indicates approaches hotels, specifically the chosen 4-star hotels, could possibly apply to improve service performance and create better customer satisfaction. Therefore, service quality at 4-star hotels in Ho Chi Minh City can make a good impression on tourists, promote a better image of civilized city, and ensure the sustainable development of tourism in Ho Chi Minh City for the long term.

## 2 LITERATURE REVIEW

### 1.1. Accommodation service in the hotel industry

Service in hotel are general values that individuals or organization get mostly from the hotel staff in order to meet the needs of resting, food and beverage, and entertaining during the process that start before their stay at the hotel. This include service receive from the first time contact between hotel and customer is made from reservation, register the room until leaving the hotel. These values bring benefits to the hotel in term of finance, reputation, and a lot more.

Accommodation service in a hotel refer to the result of interactions related particular in the room division as well as through other interactive activities within the established facilities in order to fulfill the customer needs of resting, sleeping, and relaxing, etc. The hotel industry is considered a service industry though hotel products exist in both tangible and intangible forms. For instant, accommodation service comes with the providing of toothbrush, shampoo,

or even food and drinks in the mini-bar. In case, a person does not involve in using accommodation service of the hotel; those toothbrush, bottle of shampoo and shower gel shall not be sold individual outside as the main products. Therefore, accommodation service is the primary business activity of any hotel and is considered as the spindle for all other service activities revolve around it. This include the providing of room rental and other additional service for customer during their temporary stay at the hotel such as bedroom service, cleaning and laundry.

## **1.2. Service quality**

Service quality is generally defined as the customer's assessment of the transcendence and overall goodness of an entity. It is a form of attitude and relationships from a comparison between what is expected and received (Zeithaml, V.A, 1987). Also, Lewis and Booms (1983) stated that "Service quality is a measure of how well the service is delivered to the customer that is commensurate with the customer. Creating a qualified service means responding to customer expectations in a consistent way". In some other studies, Grönroos, C. (2001) mentioned service quality as a combination of the quality of the progress consumption, the quality of the outcome at the end, and the appearance of the service provider. It is also explained as the customers rating for the overall experience or the dominance of the offered service (Ueltschy et al., 2004). Furthermore, service quality is considered as a very significant indicator of customer satisfaction (Akan, P., 1995). Avelini-Holjevac, I. (2002) stated that "Quality means achievement of estimated standards and their constant maintenance, that is, an ongoing process. High class hotels render the highest standards and highest quality products and service, with the most extensive scope of expensive hotel service. Economy class hotels offer products and service of lower quality, with a limited scope of less expensive service" in the hotel industry.

Obviously, customer finds it difficult to evaluate and perceive service quality since it is highly variable. Purchasing goods like houseware for example, give customer a variety of assessing product quality criteria such as design, colour, labelling, suitability, brand, etc. Consequently, with the lack of tangible elements in evaluating service quality, customer must rely factors such as price, service availability, service location in assessing service quality. Moreover, each individual perceive quality differently. It is difficult for businesses to understand how their customers actual evaluate their service quality.

Beforehand, Parasuraman et al. (1988) studied on dimensions of service quality (SERVQUAL) have provided an extremely valuable insight into measurement of service quality. These five different dimensions are tangibility, responsiveness, reliability, assurance, and empathy which this study also adapt from to analyse the impact of accommodation service quality on customer satisfaction like some previous studies such as Lewis (1987); Saleh & Ryan (1991); Akan (1995), Costa et al., (2004); Wilkins et al., (2007); Akbaba (2006).

## **1.3. Customer satisfaction**

There are a number of studies argue about customer satisfaction such as Terrence Levesque et al. (1996) declared "Customer satisfaction is the perception of the customer to the service provider after experience that service. More specifically, customer satisfaction is the emotional response, the total feeling of the customer to the service provider on the basis of

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comparing the difference between what they received versus expectations" (Oliver, 1993). Also on the same point of view, "Satisfaction is determined on the basis of a comparison between the results obtained from the service and the expectations of the customer, which are considered on three levels: If the results received less than expected, the customer will feel dissatisfied, if the results are the same as expected, the customer will be satisfied, if the results get more than expected, the customer will be very satisfied and enjoy the service" (Kotler, P., 2000). Additionally, "Quality of service is the most influential factor in customer satisfaction" (Cronin & Taylor, 1992). If a service provider gives customers qualified service that meet their needs, then that business has initially made the customer happy.

On the other hand, Baker & Crompton (2000) described customer satisfaction as a psychological concept that involve the feeling of comfort and pleasure as resulting from obtaining what one might hope for and expects from an appealing product and service. It also can be the customer emotion stage after they experience the stay (Sanchez et al., 2006).

Therefore, in order to improve customer satisfaction, service providers must improve the quality of service in general. In other words, service quality and customer satisfaction are closely interrelated in which service quality is what created to determine customer satisfaction.

## 1.4. Price

Price is a factor defined as an impact in value related to quality in general, and in service. It is an important determination of customer satisfaction (Huber et al., 2001). Pricing methods and strategies can be tricky and problematic. However, it is crucial for any hotelier to be able to utilize available information to make critical decisions in time (Eliot, J., 2013). In order for hotels to have an effective price, customer responds are important to get to understood and then service charge can be modified over time to maximize the business profit but in term of customer satisfaction.

## 3 METHODOLOGY

### 3.1 Research Model and Hypotheses

#### 3.1.. *Research Model*

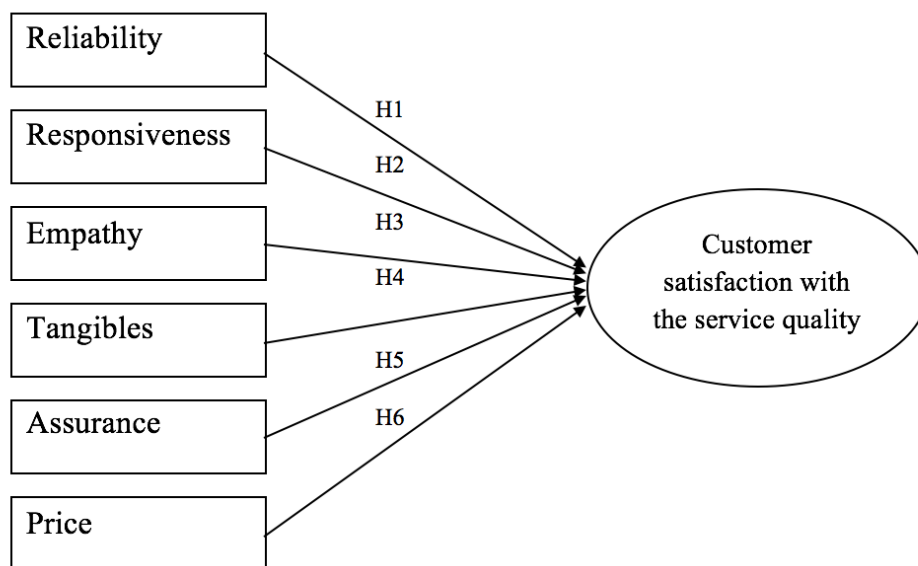
Based on the above theory, the authors present the proposed research model as shown in Figure 1 to apply the questionnaire to customers stayed and used accommodation service in 4-star hotels in Ho Chi Minh City.

The authors use the Parasuraman (1991) research model to assess the customer satisfaction impact from accommodation service quality which uses the scale measure service quality components from the SERVQUAL scale. It is also supplementary the price scale established based on several studies include

In particularly:

- The scale measures the customer satisfaction to accommodation services is based on the SERVQUAL scale of Parasuraman, 1991 is divided into five groups of factors: reliability, responsiveness, tangibility, tangibility, assurance. Besides, after discussions in the theoretical framework, it can be included the Price variance: based on 03 observation based on research by Bui Nguyen Hung and Vo Khanh Toan (2005) to measure the customers' satisfaction to accommodation services

- Customers' satisfaction variance: measured based on 03 observational variables using Nguyen Thao Vy (2014).



**Fig.1** - Proposed research model

### 3.1.2. Hypotheses

After relevant discussion related to service quality in the above section, one of the tendency to conclude that there is a positive relationship between service quality and customers in the hotel industry. Factors impacting service quality might have negative or positive relationship with customer satisfaction.

H1: Customer reliability and satisfaction have a positive relationship (the higher the reliability rating is, the higher the satisfaction and vice versa).

H2: Customer responsiveness and satisfaction have a positive relationship (the higher the responsiveness rating, the higher the satisfaction and vice versa).

H3: Empathy and customer satisfaction have a relationship in the same direction (the sympathetic component is highly appreciated, the higher the satisfaction and vice versa).

H4: The tangibles and customer satisfaction are in the same direction (the higher the visibility of the tangible components, the higher the satisfaction and vice versa).

H5: Customer assurance and satisfaction have a positive relationship (the higher the assurance rating is, the higher the satisfaction is and vice versa).

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H6: Price and customer satisfaction are in the same direction (when the price perceived by consumers is highly competitive or low, the level of customer satisfaction will increase or decrease accordingly).

## 3.2. Sample and procedures

The research process was carried out through two main phases: First phase of the preliminary study was conducted in 02 steps: the first step used qualitative method with group discussion technique to adjust kernel scales, and element in the research model; the second step to verify the reliability of the scale, the authors conducted preliminary quantitative survey by surveying 40 customers at any hotel. The second phase of formal research is done through quantitative methods. Data for quantitative research were collected by means of a questionnaire with the respondents who were using 4-star hotel accommodation in Ho Chi Minh City to determine what customers expected of the service. Staying at the hotel, and what makes them satisfied using the hotel accommodation service.

## 4 DATA

The study was conducted by interviewing directly customers using 4-star hotel accommodation in Ho Chi Minh City. The survey was conducted between June 2016 and August 2016. The research model has an observational variable of 27. If the standard of five samples for an observation, the required sample size is  $n = 135 (27 \times 5)$ . To reach the sample size, 250 questionnaires sent to interviewers collected 216 valid questionnaires and used them to audit research data. This study uses a convenient sampling method. The process of collecting information through live interviews with questionnaires.

Quantitative research is used to collect, analyze survey data and to test the research model. The formal study was conducted through data collected from the official survey form. The scale has been preliminarily tested with Cronbach's Alpha reliability coefficient and analyzed for EFA discovery factor using SPSS software.

Surveying information from customers have used accommodation services in 25 4-star hotels in Ho Chi Minh City, in which the most received answer is the Grand Silverland Hotel with 17 interviews. The lowest is the Vissai Hotel and the Silverland Sakyō Hotel with 3 response cards as shown in table 1.

The number of surveyed customers includes a total of 21 nationalities. Citizenship in the survey was Vietnam with 40 votes, followed by the United States with 23 votes. The least number of nationalities in the survey was Myanmar with 3 responses as shown in table 2

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**Tab.1** - A list of 4-star hotels was surveyed

No	Hotel	Number of asnwer	%
1	A&Em Corner	12	5.6
2	Alagon D'antique	8	3.7
3	Capri By Fraser	7	3.2
4	Crystal Merpel Palace	7	3.2
5	Duxton	15	6.9
6	Edenstar	8	3.7
7	First Hotel	10	4.6
8	Golden Central	6	2.8
9	Grand Silverland	17	7.9
10	Harmony	4	1.9
11	Liberty Central Centre	6	2.8
12	Liberty Central CityPoint	9	4.2
13	Liberty Central Riverside	14	6.5
14	Millennium Boutique	6	2.8
15	New Pacific	6	2.8
16	Norfolk	8	3.7
17	Novotel	16	7.4
18	Oscar	6	2.8
19	Palace Saigon	12	5.6
20	Paragon	8	3.7
21	Park Royal	5	2.3
22	Ramana	5	2.3
23	Royal	15	6.9
24	Silverland Sakyó	3	1.4
25	Vissai Saigon	3	1.4

**Tab.2** - Statistics of the nationality of visitors surveyed

No	National	Number	%	No	National	Number	%
1	Australia	6	2.8	12	Nederland	7	3.2
2	Campuchia	5	2.3	13	Philippine	5	2.3
3	Canada	7	3.2	14	Polska	5	2.3
4	China	13	6.0	15	Russia	5	2.3
5	France	10	4.6	16	Singapore	6	2.8
6	Germany	7	3.2	17	Switzerland	6	2.8
7	India	9	4.2	18	Thailand	8	3.7
8	Japan	14	6.5	19	UK	14	6.5
9	Korea	13	6.0	20	USA	23	10.6
10	Laos	10	4.6	21	Vietnam	40	18.5
11	Myanma	3	1.4	12	Nederland	7	3.2

## 5 RESULTS AND DISCUSSIONS

After evaluating the reliability and analysis of the EFA factor, the result shows that Kaiser-Meyer-Olkin Measure(KMO) of Sampling Adequacy = 0.864 > 0.5 indicated that 06 items were adequate for factor analysis and Bartlett's test with Sig. = 0.000 < 0.05 illustrated the observed variables are correlated in the overall. Percentage of variance = 70.775% > 50% shows that the factor analysis explains 70.775% of the variance of the data and Eigenvalue = 1.004 > 1 is eligible to deduct six factors. Hypothesis of the study still the same the proposed research model for the regression analysis as follows:

H1: The higher the empathy, the higher the satisfaction and vice versa (CT)

H2: The higher the price, the higher the satisfaction and vice versa (GC)

H3: The higher the reliability, the higher the satisfaction and vice versa (TC)

H4: The higher the tangibility, the higher the satisfaction and vice versa (PT)

H5: The higher the responsiveness, the higher the satisfaction and vice versa (PH)

H6: The higher the assurance, the higher the satisfaction and vice versa (DB)

**Tab.3** - Result of KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.864
Bartlett's Test of Sphericity	Approx. Chi-Square	2.059E3
	Df	190
	Sig.	.000

**Tab.4** - Result of extracted variance analysis of determinant group

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.150	35.748	35.748	7.150	35.748	35.748	2.752	13.758	13.758
2	1.995	9.977	45.725	1.995	9.977	45.725	2.421	12.105	25.862
3	1.536	7.680	53.404	1.536	7.680	53.404	2.391	11.957	37.820
4	1.283	6.416	59.820	1.283	6.416	59.820	2.316	11.579	49.398
5	1.187	5.933	65.753	1.187	5.933	65.753	2.202	11.009	60.408
6	1.004	5.022	70.775	1.004	5.022	70.775	2.074	10.368	70.775

**Tab.5 - Summary of regression results**

Model Summary <sup>b</sup>										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. Change	
1	.779 <sup>a</sup>	.607	.596	.47548	.607	53.792	6	209	.000	1.947
ANOVA <sup>b</sup>										
Model		Sum of Squares		Df	Mean Square	F	Sig.			
1	Regression	72.969		6	12.161	53.792	.000 <sup>a</sup>			
	Residual	47.251		209	.226					
	Total	120.220		215						
Coefficients <sup>a</sup>										
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics			
		B	Std. Error	Beta			Tolerance	VIF		
1	(Constant)	-.283	.221		-1.277	.203				
	CT	.133	.063	.113	2.094	.037	.641	1.559		
	GC	.201	.046	.233	4.373	.000	.665	1.505		
	TC	.139	.052	.154	2.674	.008	.568	1.761		
	PT	.447	.059	.380	7.542	.000	.739	1.353		
	PH	.157	.057	.161	2.781	.006	.560	1.785		
	DB	.018	.059	.016	.295	.768	.644	1.552		

The regression analysis showed that the model had a coefficient of  $R^2$  of 0.607 and a correlation coefficient of  $R^2$  of 0.596 indicating the correlation between the independent variable and the dependent variable. Adjusted  $R^2$  coefficient shows that 06 independent variables in the regression model explained 59.6% variation of dependent variable. The autocorrelation test with the Durbin-Watson coefficient ( $1 < 1.947 < 3$ ) and the VIF variance magnification coefficient, all VIF variance coefficients are  $< 10$ , so there is no hyperbolic multiplication.

The ANOVA analysis table of the regression model shows that the regression model is  $F = 53,792$  and  $Sig. = 0.000 < 0.05$  shows the overall suitability of the regression model. Thus, the linear regression model given is consistent with the model and research data.

As shown in Table 4, test hypotheses show that the DB (assurance) levels was significant  $> 0.05$  which was not statistically significant. Therefore, in this case, the assurance does not affect to the customer satisfaction when using the accommodation service at 4-star hotel in Ho Chi Minh City. The remaining factors CT (empathy), GC (price), TC (reliability), PT (tangibility), PH (responsiveness) all have positive and positive beta coefficients. Meaning  $< 0.05$  should conclude that the factors are statistically significant and have a positive effect on the customer satisfaction.



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## 6 CONCLUSIONS

Based on a preliminary evaluation of the scale with the two main tools used, Cronbach's Alpha and the EFA Discovery Factor Analysis, five factors were derived from the service quality scale and cost factor. Incorporation into the satisfaction study model by regression analysis in which the dependent variable is general satisfaction and independent variable is: reliability, responsiveness, tangibility, empathy, assurance, and price. As a result, the assurance factor does not affect customer satisfaction and should be excluded from the research model.

On the basis of identifying the factors that affect customer satisfaction and finding a statistically significant difference for each customer group in assessing the quality of service Hotel's managements should focus on improving the content in order of importance (priority level) of each factor to the satisfaction of customers, paying attention to the difference of each customer group in the process of serving in order to bring the highest efficiency (in terms of limited resources) to improve the quality of service, increasingly make customers more satisfied with the best quality of service.

The assurance factor being excluded from the regression equation does not mean that the variable does not contribute to the customer satisfaction. We can understand that, for the system of 4 star hotels this content is basically accepted by customers. If hotels invest in improving this content, it can also increase customer satisfaction but the improvement will not be as great as other content. Instead, the hotel needs to focus on improving the following key areas of content: tangibility, price, responsiveness, reliability and empathy will be more effective.

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## Modelling the Inbound Tourism Demand in Vietnam

*Eliyathamby A Selvanathan, Saroja Selvanathan*

### ABSTRACT

*Tourism is a key component that enhances trade between countries. The Vietnamese tourism sector has seen a rapid growth in the last decade. In this aspect, new knowledge on Vietnam's inbound tourism will provide useful insight for improving trade and investment in Vietnam, especially investment in the Vietnamese tourism sector. In this study, we identify 10 major countries from where most of the tourists visit Vietnam and model the inbound tourist arrivals to Vietnam from these countries using annual data for the period 1995-2016.*

**Keywords:** *Tourism, Relative CPI, Exchange rate, GDP growth rate, Vietnam*

**JEL Classification:** Z32

### 1 INTRODUCTION

Vietnam introduced free trade and open market economic policies during the late 1980s. Since then economic growth, tourism and foreign direct investment have improved dramatically (Cooper 2000, Thanh 2005). In most developing countries, the tourism sector contributes significantly to their GDP either directly or indirectly through tourism related activities. Vietnam is a country on the South China Sea in Southeast Asia and is a well-known tourist destination. Total international tourist arrivals in the first 6 months of 2017 has reached 6,206,336 arrivals, increase of 30.2% over the same period last year. The tourism receipts has increased from 17.4 trillion Vietnamese Dong in the year 2000 to 20 times (338 trillion Vietnamese Dong) in 2015. In 2016, the total contribution of the tourism sector to Vietnam's GDP is 9.1%. The tourism sector also directly supported 1,959,500 jobs, which is about 3.6% of total employment, and the total (direct and indirect) jobs supported by tourism is 4,003,000, which is about 7.3% of total employment (WTTC, 2017). These shares are expected to increase in the coming years. Therefore, if the tourism sector is managed properly, it can be used as an important source of government revenue, foreign exchange earnings and local employment that would enhance the Vietnamese economy.

A review of the literature on tourism related studies for Vietnam reveals lack of proper empirical research in this vital area (for example, see Cooper, 2000). Therefore, it is necessary to scientifically analyse the Vietnamese tourism data to identify the characteristics of the tourists to Vietnam from other countries and the determinants of inbound tourism to Vietnam. Previous studies on inbound tourism for other developing countries have shown that a number of factors such as consumer income, cost of food, local travel and accommodation costs, exchange rate, and economic or political stability at the tourist destination play a significant role in determining the selection of the country a tourist would like to visit (see Selvanathan 2006, Sarma 2007). Sarma (2007) pointed out that unlike most other products and services, there is no urgency about a holiday and it is in fact an infrequent purchase which occurs once a year or less, especially when it comes to an international trip. Adding to this, tourists have a vast number of destination choices around the world.

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Vietnam's tourism industry has to face severe competition from other similar neighbouring attractive tourist destinations such as Cambodia, China, Indonesia, Laos, Malaysia, Singapore and Thailand. Among the ASEAN countries, inbound tourist arrivals to Vietnam is ranked 5th preceded by Thailand (1st), Malaysia (2nd), Singapore (3rd) and Indonesia (4th). Given the significant and increasing contribution which the tourism sector is making to the Vietnamese economy, the development of the tourism sector appears to be as important as the development of other sectors of the economy.

While a number of studies have appeared in the literature analysing the demand for tourism in a number of developed and developing countries, very little or no scientific research has been published about the demand for tourism in Vietnam using recently developed econometric techniques combined with more recent data. This paper aims to fill this research gap.

## 2 LITERATURE REVIEW

There are several studies in the literature which attempt to explain the demand for tourism for various countries (see for example, Dritsakis and Athanasiadis 2000, Naudé and Saayman, 2004; Sarma, 2007, Selvanathan et al 2012, Nkosi 2010, Falk 2014, Brown 2015, Borhan and Arsad 2016, Seetaram et al 2016). While several factors are suggested as affecting the tourism demand when it comes to empirical application of a particular country data issue restrict the number of variables that could be used to model the tourism demand in that particular country. In a recent review by Song and Li (2008), based on the studies they have reviewed they identify a number of common factors as determinants of the demand for tourism include exchange rate and income level of the tourists' home country, tourism price at the destination and tourism prices at alternate destinations, travel cost, foreign direct investment, warm weather and climate in the country, crime against tourists, and political instability in the destination country.

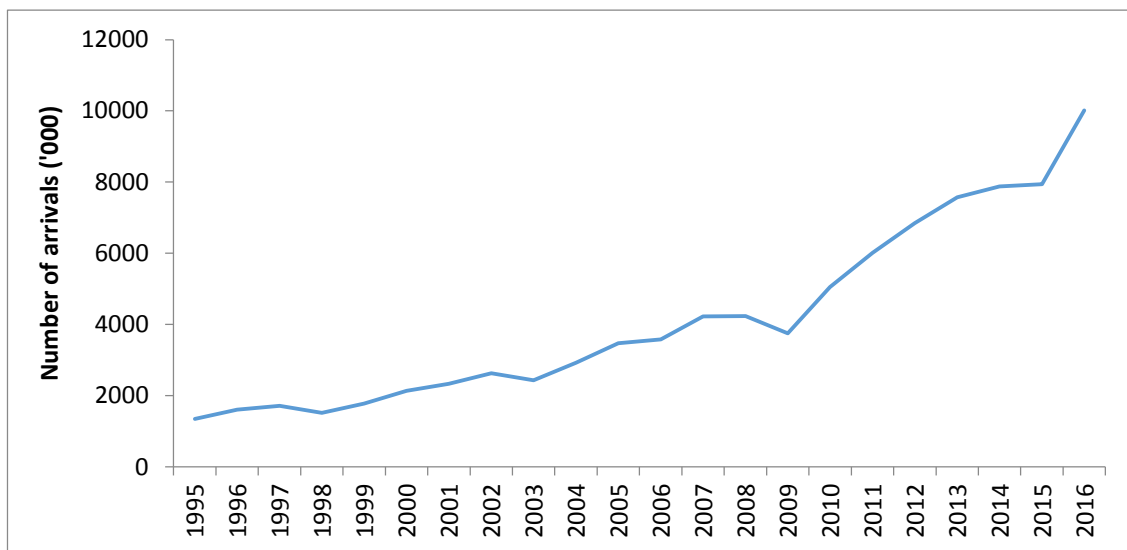
A number of other studies have analysed the factors that influence the demand for tourism and estimated elasticities of tourism demand with respect to the determinants included in their model (for example see Crouch 1992, Song, Romilly and Liu 2000, Hiemstra and Wong 2002, Song and Wong 2003). A number of other studies model the tourism demand for a particular country and provide forecast of tourist arrivals and tourism receipts of the country of concerned (for example see Witt and Witt 1992, Song and Witt 2006, Song, Witt and Jensen 2003, Choyakh 2009, Kadir and Karim 2009, Shen, Li and Song 2009).

In reviewing what has been published, Garcia (2002) examined the role of tourism, particularly the negative impact, on society and culture. A study by Naudé and Saayman (2004) on the determinants of tourist arrivals to African countries concluded that political stability, tourism infrastructure, marketing and the level of development in the destination country are key determinants of tourist arrivals to Africa. Typical "developed country determinants" of tourism demand, such as the level of income in the origin country, the relative prices and the cost of travel, are not that significant in explaining the demand for tourism to African countries as a tourist destination. A study by Kadir et al (2013), however, concluded that Malaysia needs to maintain a competitive relative price level to other similar destinations to attract more tourists from ASEAN countries.

### 3 DATA AND PRELIMINARY DATA ANALYSIS

In this section, we present a preliminary data analysis of the Vietnamese inbound tourism data. Tourist arrivals to Vietnam data are obtained from the Vietnam National Administration of Tourism, Ministry of culture, Sports and Tourism website<sup>29</sup>.

Figure 1 plots the annual total number of international tourist arrivals to Vietnam during the period 1995-2016. As can be seen, the inbound tourism to Vietnam has grown steadily with some fall in 1998, 2003 and 2009. The fall in 2009 could be attributed to the aftermath of the global financial crisis. Also, tourist arrivals to Vietnam have grown at a much faster rate from 2009 onwards and even faster since 2014.

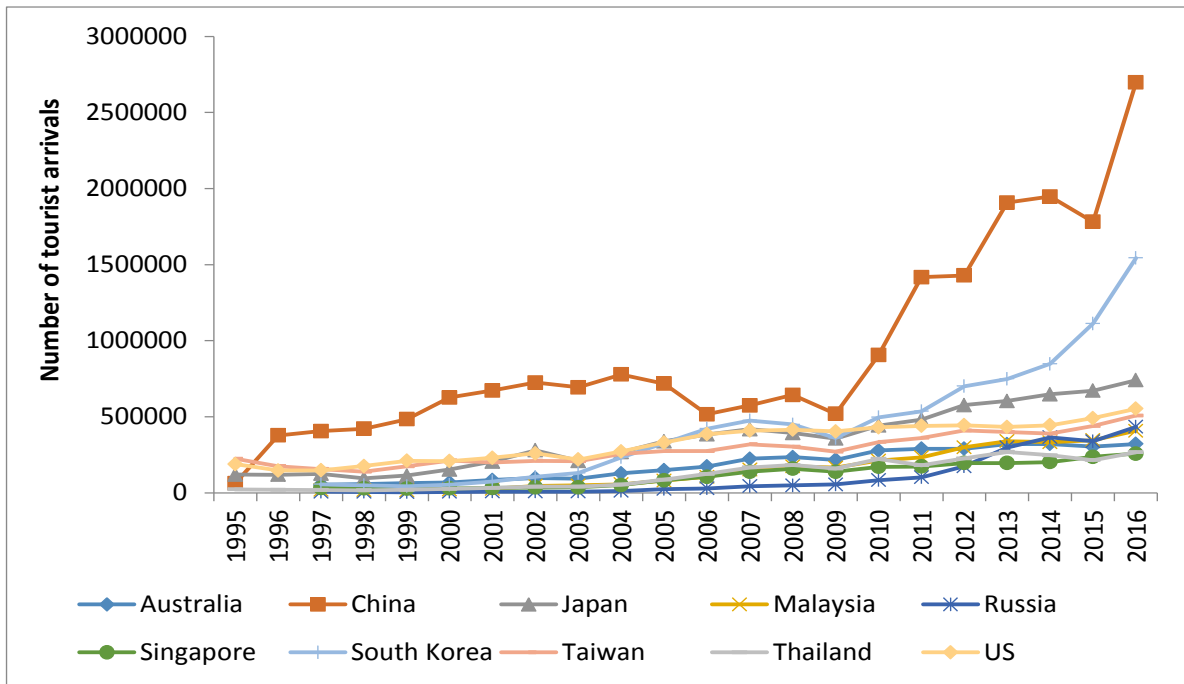


**Fig.1** - Number of inbound total tourist arrivals to Vietnam, 1995 -2016

Source: *International visitors to Vietnam, Tourism Statistics*, [www.vietnamtourism.gov.vn/ english, various years](http://www.vietnamtourism.gov.vn/english/ various years).

Figure 2 presents the number of tourist arrivals to Vietnam from its top 10 major tourists' countries, namely China, South Korea, Japan, US, Taiwan, Russia, Malaysia, Australia, Thailand and Singapore. As can be seen, the trend in inbound tourism to Vietnam has changed over the years, especially since 2009. Tourists from China, South Korea and Japan have been the major contributors to Vietnamese tourism over the years. The fall in tourist arrivals to Vietnam in 2009 is contributed by the fall in tourist arrivals from China, which is the main source of tourist arrivals to Vietnam.

<sup>29</sup> [www.vietnamtourism.gov.vn/english](http://www.vietnamtourism.gov.vn/english).



**Fig.2** - Number of tourist arrivals from top 10 major countries, Vietnam, 1995-2016

Source: *International visitors to Vietnam, Tourism Statistics*, [www.vietnamtourism.gov.vn/english,various\\_years](http://www.vietnamtourism.gov.vn/english/various_years).

Table 1 presents the inbound tourist arrivals from the top 10 countries as a proportion of total inbound tourist arrivals to Vietnam during 1997-2016<sup>30</sup>. These ten countries account for more than 70 percent of the total number of tourist arrivals to Vietnam. Figure 3 presents the share of inbound tourist arrivals from various countries to Vietnam in 2016. As can be seen, Chinese tourists have contributed about 27% of the arrivals, followed by South Korea (15.4%), Japan (7.4%), US (5.5%), Taiwan (5.1%), Russia (4.3%), Malaysia (4.1%), Australia (3.2%), Thailand (2.7%) and Singapore (2.6%). Tourist share from South Korea has been steadily increasing since 2000, tourist share from Russia has also increased lately, and tourist share from Australia, Japan, Singapore and the US have been stable throughout the sample period.

## 4 MODEL SPECIFICATION AND METHODOLOGY

### 4.1 Model specification

Most tourism studies in the literature have used either number of tourist arrivals or tourism revenue to analyse the demand for tourism for a country. In this study, we use the total number of inbound tourist arrivals to Vietnam to analyse the tourism demand to Vietnam. We model the demand for inbound tourism by expressing the number of tourist arrivals from country  $i$  to Vietnam ( $TA_{it}$ ) as

$$\ln TA_{it} = \beta_0 + \beta_1 \ln TA_{it-1} + \beta_2 \text{GDPG}_{it} + \beta_3 \ln \text{RCPI}_{it} + \beta_4 \text{ER}_{it} + \beta_5 T_t + \varepsilon_{it}, \quad (1)$$

$$i=1,2,\dots,10; t=1, 2, \dots, 20$$

<sup>30</sup> As data are unavailable for 1995 and 1996 for 5 of the 10 countries, we obtain the shares from 1997 onwards only.

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where

$TA_{it}$  is the total number of tourist arrivals<sup>31</sup> from country  $i$  (Australia, China, Japan, Malaysia, Russia, Singapore, South Korea, Taiwan, Thailand and the US) in year  $t$  to Vietnam;

$GDPG_{it}$  is GDP<sup>32</sup> growth rate of the country of tourists' origin  $i$  in year  $t$  which is used as a proxy for the income variable;

$RPI_{it}$  is the relative consumer price index<sup>33</sup> (2010=100) between Vietnam and the country of origin  $i$  in year  $t$ ;

$ER_{it}$  is the exchange rate<sup>34</sup> of the country of origin  $i$  in Vietnamese dong.

$T_t$  is the time trend variable; and

$\varepsilon_{it}$  is the error term.

**Tab.1** - Share of inbound tourist arrivals by country of origin (in %), Vietnam, 1997-2016

Year	Australia	China	Japan	Malaysia	Russia	Singapore	South Korea	Taiwan	Thailand	US	Total
1997	3.2	23.6	7.3	1.1	0.4	1.9	3.3	9.1	1.1	8.6	59.6
1998	3.9	27.7	6.3	1.2	0.4	1.9	3.3	9.1	1.1	11.6	66.4
1999	3.5	27.2	6.4	0.9	0.2	1.5	2.4	9.8	1.1	11.8	64.8
2000	3.2	29.3	7.1	1.0	0.3	1.4	2.5	9.9	1.2	9.7	65.6
2001	3.6	28.9	8.8	1.1	0.3	1.4	3.2	8.6	1.4	9.9	67.2
2002	3.7	27.6	10.6	1.8	0.3	1.3	4.0	8.0	1.6	9.9	68.8
2003	3.8	28.6	8.6	2.0	0.4	1.5	5.4	8.6	1.7	9.0	69.5
2004	4.4	26.6	9.1	1.9	0.4	1.7	8.0	8.8	1.8	9.3	72.0
2005	4.3	20.6	9.7	2.3	0.7	2.4	9.4	7.9	2.5	9.5	69.3
2006	4.8	14.4	10.7	2.9	0.8	2.9	11.8	7.7	3.5	10.8	70.3
2007	5.3	13.6	9.9	3.6	1.0	3.3	11.2	7.5	3.9	9.7	69.1
2008	5.5	15.2	9.3	4.1	1.2	3.7	10.6	7.2	4.3	9.8	70.9
2009	5.8	13.8	9.5	4.4	1.5	3.7	9.6	7.2	4.3	10.8	70.6
2010	5.5	17.9	8.8	4.2	1.6	3.4	9.8	6.6	4.4	8.5	70.8
2011	4.8	23.6	8.0	3.9	1.7	2.9	8.9	6.0	3.0	7.3	70.1
2012	4.2	20.9	8.4	4.4	2.5	2.9	10.2	6.0	3.3	6.5	69.3
2013	4.2	25.2	8.0	4.5	3.9	2.6	9.9	5.3	3.6	5.7	72.8
2014	4.1	24.7	8.2	4.2	4.6	2.6	10.8	4.9	3.1	5.6	72.9
2015	3.8	22.4	8.5	4.4	4.3	3.0	14.0	5.5	2.7	6.2	74.7
2016	3.2	26.9	7.4	4.1	4.3	2.6	15.4	5.1	2.7	5.5	77.2
Mean	4.2	22.9	8.5	2.9	1.5	2.4	8.2	7.4	2.6	8.8	69.6

Source: Compiled by the author based on International visitors to Vietnam, Tourism Statistics, [www.vietnamtourism.gov.vn/english, various years](http://www.vietnamtourism.gov.vn/english,various years).

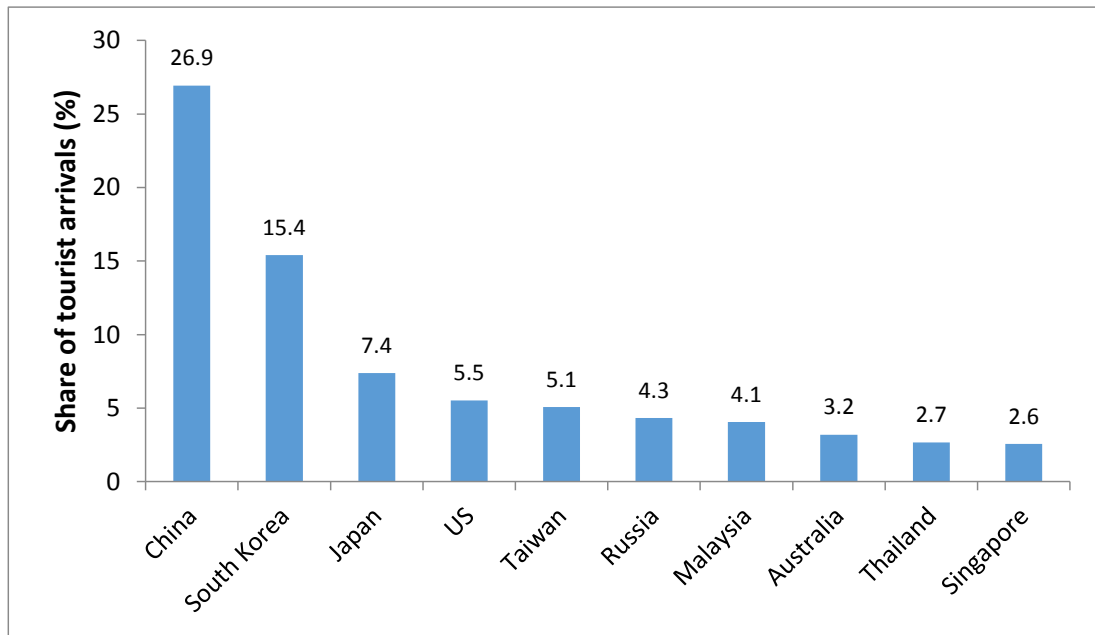
<sup>31</sup> Tourist arrivals to Vietnam data are obtained from the Vietnam National Administration of Tourism, Ministry of culture, Sports and Tourism website, [www.vietnamtourism.gov.vn/english](http://www.vietnamtourism.gov.vn/english).

<sup>32</sup> GDP at constant 2010 US\$ for the country of origin are obtained from World Bank (2017), *World Development Indicators* (WDI), Online database. Since some values of the growth rates are negative,  $GDPG_{it}$  is not considered in its log form.

<sup>33</sup>  $RPI = CPI_{Vietnam}/CPI_{Country\ of\ origin}$ , CPI data are obtained from *Consumer price index (2010 = 100)*, International Monetary Fund, International Financial Statistics and data files, <http://data.worldbank.org/indicator/FP.CPI>. TOTL.

<sup>34</sup> Exchange rates for the various countries are obtained from World Bank publications or OECD database or Penn World Tables.





**Fig.3** - Share of inbound tourist arrivals by country (in percentages), Vietnam, 2016

We have selected the independent variables GDPG, RPI and ER based on previous studies for similar countries. A number of studies found the information provided by the fellow countrymen/women who visited a tourist destination (lagged TA), income of the traveller's country of origin (proxied by GDPG), relative price between the country of tourist origin and the country of visit (proxied by RPI) and the exchange rate between the countries (ER) are the major determinants that influence the decision of a tourist to decide which country they should travel to instead of staying at home. General economic climates such as GFC (global financial crisis) or some health risk related events such as SARS (Severe Acute Respiratory Syndrome) or political instability such as civil war (Selvanathan, 2006) could also affect the tourists' decision to visit a country.

To avoid any spurious regression results, the first step is to investigate whether all the variables to be used in estimating Model (1) are stationary. We formally test for stationary of each time series using Phillips-Perron (PP) unit-root test. The null and alternative hypotheses are:

$H_0$ : Variable has a unit root (or the series is non-stationary)

$H_A$ : Variable has no unit root (or the series is stationary)

Table 2 presents the summary results from the unit root test for the 10 countries and the four variables. As can be seen, for all countries, we can conclude that all variables are stationary either in their level form or first difference form. This means that most of the variables included in model (1) are integrated of order 1, I(1).

**Tab.2 - Unit Root Test Results**

Country	TA	PCGDP	RCPI	ER
Vietnam	I(1)	-	-	-
Australia	I(1)	I(0)	I(1)	I(1)
China	I(1)	I(1)	I(0)	I(1)
Japan	I(1)	I(0)	I(1)	I(1)
Malaysia	I(1)	I(0)	I(1)	I(1)
Russia	I(0)	I(1)	I(0)	I(1)
Singapore	I(1)*	I(0)	I(1)	I(1)
South Korea	I(1)*	I(0)	I(1)	I(0)
Taiwan	I(1)	I(0)	I(1)	I(1)
Thailand	I(1)	I(1)	I(1)	I(1)
US	I(1)	I(0)	I(1)	I(1)

\* *I(1) at the 10% level of significance.*

Even if the variables are I(1), it is possible that the estimates obtained from Model (1) may not be spurious, provided that the variables in Model (1) are co-integrated. Therefore, the next step is to investigate whether the variables are cointegrated. For this purpose, based on Engle-Granger methodology (Engle and Granger, 1987), we use the residuals from each country estimation and investigate whether each residual series is I(0).

We use the following null and alternative hypotheses to test for cointegration:

$H_0$ : The error term has a unit root (not cointegrated)

$H_A$ : The error term has no unit root (cointegrated)

Table 3 presents the results. For all countries, the null hypothesis of the error term having a unit root (non-stationary) is rejected and hence there is some support for the alternate hypothesis that the error term is stationary and therefore the variables are cointegrated at the 5% level of significance. That is, there exists strong evidence for the presence of a cointegrating relationship between the variables, tourist arrival numbers, GDP growth, relative prices and exchange rate for all ten countries.

#### 4.2 Econometric Approach

In the last section we investigated the stationarity of the time series variables in order decide whether the estimated results are spurious or not. We also found that while a majority of the variables are I(1), some of them are I(0). In light of this, below we extend the analysis further by using the ARDL framework (originated by Pesaran and Shin 1995, Pesaran et al 1996, Pesaran

**Tab.3** - Test for cointegration of variables in model (1)

Country	Test statistic	p-value	Error term	Cointegrated?
Australia	-12.42	0.000	Stationary	Yes
China	-4.316	0.015	Stationary	Yes
Japan	-3.594*	0.058	Stationary	Yes
Malaysia	-5.334	0.002	Stationary	Yes
Russia	-6.704	0.000	Stationary	Yes
Singapore	-4.287	0.017	Stationary	Yes
South Korea	-9.868	0.000	Stationary	Yes
Taiwan	-4.418	0.013	Stationary	Yes
Thailand	-3.905	0.034	Stationary	Yes
US	-4.370	0.015	Stationary	Yes

\* Stationary at the 10% level.

1997, Pesaran et al 1998). This approach can also be used to test the existence of a relationship between variables without testing whether those variables are I(0) or I(1) or mutually cointegrated. Based on our Model (1), we can write the corresponding unrestricted error correction model for country i as

$$\Delta \ln TA_{it} = \beta_0 + \sum_{j=1}^m \beta_{1j} \Delta \ln TA_{i,t-j} + \sum_{j=0}^p \beta_{2j} \Delta GDPG_{i,t-j} + \sum_{j=0}^q \beta_{3j} \Delta \ln RPI_{i,t-j} + \sum_{j=0}^r \beta_{4j} \Delta \ln ER_{i,t-j} + \gamma_1 \ln TA_{i,t-1} + \gamma_2 GDPG_{i,t-1} + \gamma_3 \ln RPI_{i,t-1} + \gamma_4 \ln ER_{i,t-1} + \varepsilon_{it}$$

$$i=1,2,\dots,10; t=1,2,\dots,20 \quad (2)$$

where  $\Delta$  is the first difference operator. Equation (2) has two components, namely, the short-run and the long-run in that order. We can use a F-test to test the existence of a long-run relationship (or cointegration) by testing the null hypothesis

$$H_0: \gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = 0 \quad (\text{no cointegration or no long-run relationship})$$

$$H_1: \text{At least one } \alpha_i \neq 0 \quad i=1,2,3,4 \quad (\text{cointegration or long-run relationship exists})$$

It has been shown that the above F-test is based on a non-standard distribution (Pesaran and Pesaran, 1997). The critical values that correspond to this distribution are based on whether the variables included in model (2) are either I(0) or I(1), the number of regressors and whether model (2) has an intercept and/or a trend term. Asymptotic critical values are given in Pesaran and Pesaran (1997) and Pesaran et al (2001) and finite sample critical values are given in Narayan (2005). Two sets of critical values, named as lower bound critical value I(0) and upper bound critical value I(1), need to be used as critical values for the F-test above. If the value of the F-test statistic is higher than the I(1) critical value, we reject the null hypothesis and conclude that there is support for co-integration. If the value of the F-test statistic is lower than the I(0) critical value, we do not reject the null hypothesis and conclude that there is no support for co-integration and the variables are stationary in their level form. If the value of the F-test statistic is in between I(0) and I(1) then a conclusion cannot be made without knowing the order of integration of the underlying regressors. In this

situation it is recommended to perform the unit root tests for the individual variables before using the ARDL technique as we have done above.

Based on the F-test if we find evidence for a co-integrating relationship between the selected variables, then for country *i*, in the first step, we estimate an ARDL (*m, p, q, r*) model for the long-run relationship of the form

$$\ln TA_{it} = \beta_0 + \sum_{j=1}^m \beta_{1j} \ln TA_{i,t-j} + \sum_{j=0}^p \beta_{2j} GDPG_{i,t-j} + \sum_{j=0}^q \beta_{3j} \ln RPI_{i,t-j} + \sum_{j=0}^r \beta_{4j} \ln ER_{i,t-j} + \varepsilon_{it} \quad (3)$$

We use measures such as Akaike Information Criteria (AIC) and the Schwarz Bayesian Criteria (SBC) to determine the required number of lags *m*, *p*, *q* and *r*. For annual data, it is recommended that a maximum lag length of 2 (Pesaran and Shin, 1999).

If the variables are co-integrated then the short-run estimates can be obtained from the following Error-Correction model (ECM):

$$\Delta \ln TA_{it} = \beta_0 + \sum_{j=1}^m \beta_{1j} \Delta \ln TA_{i,t-j} + \sum_{j=0}^p \beta_{2j} \Delta GDPG_{i,t-j} + \sum_{j=0}^q \beta_{3j} \Delta \ln RPI_{i,t-j} + \sum_{j=0}^r \beta_{4j} \Delta \ln ER_{i,t-j} + \phi ECM_{it-1} + v_{it} \quad (4)$$

where the error correction term is calculated from the long-run estimated results from equation (3) of the form

$$ECM_{it} = \ln TA_{it} - \beta_0 - \sum_{j=1}^m \beta_{1j} \ln TA_{i,t-j} - \sum_{j=0}^p \beta_{2j} GDPG_{i,t-j} - \sum_{j=0}^q \beta_{3j} \ln RPI_{i,t-j} - \sum_{j=0}^r \beta_{4j} \ln ER_{i,t-j} \quad (5)$$

In model (4), the  $\beta$  coefficients measure the short-run dynamics of the model's convergence to equilibrium and  $\phi$  measures the speed of adjustment or convergence.

## 5 RESULTS AND DISCUSSIONS

We first estimate equation (2) to investigate the long-run relationship among the variables we considered in equation (1). Table 4 presents the calculated values of the F-test statistic to test the following set of hypotheses

$$H_0: \gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = 0 \quad (\text{no cointegration or no long-run relationship})$$

$$H_1: \text{At least one } \alpha_i \neq 0 \quad i=1,2,3,4 \quad (\text{cointegration or long-run relationship exists})$$

Column (2) of Table 4 presents the preferred form of the ARDL(*m, p, q, r*) model; column (3) gives the calculated value of the F-test statistics, columns (4) and (5) present the I(0) and I(1) critical values (as discussed in Section 4.2) and the last column gives the conclusion of the hypothesis testing. As can be seen, for all countries as the value of the F-test statistics in Column (3) are larger than the I(1) critical values we have support for the alternate

hypothesis that the variables in the long-run relationship are cointegrated or there is a long-run relationship exists for each country.

**Tab.4 - ARDL Bounds test results**

Country	Model	F-test statistic	Critical values at 5%		Conclusion
	ARDL( <i>m,p,q,r</i> )		I(0)	I(1)	
(1)	(2)	(3)	(4)	(5)	(6)
Australia	ARDL(3,-,1,2)	32.69	2.72	3.83	cointegrated at 5%
China	ARDL(3,3,3,3)	9.96	2.45	3.63	cointegrated at 5%
Japan	ARDL(1,3,3,3)	9.03	2.79	3.67	cointegrated at 5%
Malaysia	ARDL(1,2,1,2)	7.02	2.45	3.63	cointegrated at 5%
Russia	ARDL(1,-,2,3)	4.57	2.72	3.83	cointegrated at 5%
Singapore	ARDL(2,0,2,2)	4.11	2.72	3.77	cointegrated at 5%
South Korea	ARDL(2,3,3,2)	22.40	2.45	3.63	cointegrated at 5%
Taiwan	ARDL(1,1,2,0)	7.82	2.45	3.63	cointegrated at 5%
Thailand	ARDL(1,0,0,0)	7.07	2.45	3.63	cointegrated at 10%
US	ARDL(2,2,0,2)	4.58	3.47	4.45	cointegrated at 10%

Table 5 presents the diagnostic tests for serial correlation and heteroscedasticity. As can be seen, there is support for both hypotheses that the errors are serially uncorrelated and are homoscedastic.

We present the long-run estimation results in Table 6. As can be seen, for most countries the coefficient of the variable  $TA_{t-1}$  is positive and statistically significant. This means that the people who have visited Vietnam from each country in the past year have given positive reviews about Vietnam which has resulted in a positive influence on the travellers to select Vietnam as a preferred destination to visit in the following year.

The income (measured by the rate of economic growth) had positive and significant impact on the travellers from Singapore, Korea and Thailand in making the decision in selecting Vietnam as their travel destination. For the six remaining countries (except China) travellers' income is not a significant factor in making the decision to travel to Vietnam. For China, the income coefficient is negative and significant. This may be due to the fact that when Chinese travellers become affluent, they may look for other luxury countries to visit. For travelers from all ten countries, relative price of Vietnam has a negative impact in attracting travellers and the variable is statistically significant for majority of the countries (except Russia, Taiwan, Thailand and the US). Exchange rate between the country of origin and Vietnam plays a positive role in travelers making the decision to select Vietnam as their destination. The estimates of the trend term reveals that international travelers have a positive attitude towards visiting Vietnam.

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**Tab.5 - Diagnostic test results, Serial correlation and heteroscedasticity**

Country	Breusch-Godfrey Serial Correlation LM Test		Heteroscedasticity Test: Breusch-Pagan-Godfrey	
	Test statistic	p-value	Test statistic	p-value
Australia	2.65	0.150	2.10	0.983
China	1.34	0.342	0.77	0.665
Japan	2.58	0.403	2.66	0.229
Malaysia	3.83	0.075	0.37	0.923
Russia	0.19	0.832	0.29	0.960
Singapore	5.17	0.054	0.80	0.628
South Korea	0.20	0.832	1.70	0.366
Taiwan	0.13	0.884	0.72	0.674
Thailand	0.84	0.453	0.11	0.977
US	1.25	0.363	1.93	0.197

**Tab.6 - Long-run Estimation results by country**

	Constant	$Ln TA_{t-1}$	GDPG	$Ln RCPI$	$Ln ER$	Trend
Australia		0.787* (0.000)	0.003 (0.822)	-0.549* (0.036)	0.517* (0.028)	0.016 (0.134)
China		0.219 (0.317)	-0.082* (0.011)	-3.475* (0.033)	3.344* (0.008)	0.082* (0.043)
Japan	9.675* (0.018)	0.327 (0.164)	-0.033 (0.426)	-1.205* (0.012)	0.519 (0.108)	0.139* (0.009)
Malaysia		0.657* (0.001)	-0.004 (0.699)	-1.713* (0.003)	1.230* (0.002)	0.114* (0.006)
Russia		0.401** (0.076)	0.020** (0.054)	0.350 (0.335)	0.394* (0.037)	0.199* (0.009)
Singapore		1.090* (0.000)	0.012** (0.084)	-1.950* (0.013)	0.742* (0.014)	0.064* (0.013)
South Korea	10.21* (0.000)	0.360* (0.003)	0.051* (0.007)	-1.523* (0.000)	1.040* (0.004)	0.158* (0.000)
Taiwan	17.85** (0.053)	0.098 (0.788)	0.002 (0.627)	-2.146 (0.299)	0.409 (0.357)	0.062 (0.057)
Thailand		0.973* (0.000)	0.031* (0.014)	-0.425 (0.331)	0.361 (0.152)	
US	15.50** (0.063)	0.425** (0.062)	0.003 (0.862)	-0.149 (0.534)	-0.842 (0.239)	0.065* (0.042)

\* denotes significant at the 5% level, and \*\* denotes significant at the 10% level.

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**Tab.7 - Short-run Estimation Results by Country**

Country	Constant	DlnTA <sub>t-1</sub>	DlnTA <sub>t-2</sub>	DGDGP <sub>t</sub>	DGDGP <sub>t-1</sub>	DGDGP <sub>t-2</sub>	DlnRCPI <sub>t</sub>	DlnRCPI <sub>t-1</sub>	DlnRCPI <sub>t-2</sub>	DlnXR <sub>t</sub>	DlnXR <sub>t-1</sub>	DlnXR <sub>t-2</sub>	Trend	ECM <sub>t</sub>
Australia		-0.554 (0.001)	-0.339 (0.007)				1.186 (0.006)			0.464 (0.002)	-1.013 (0.000)		0.019 (0.000)	-0.508 (0.000)
China		-0.062 (0.387)	-0.597 (0.045)	0.050 (0.075)	0.017 (0.265)	0.017 (0.269)	0.017 (0.966)	-5.372 (0.045)	2.198 (0.113)	-1.255 (0.214)	5.438 (0.063)	3.431 (0.065)	0.096 (0.050)	-0.503 (0.050)
Japan				-0.008 (0.674)	0.252 (0.005)	0.172 (0.004)	1.400 (0.018)	-1.186 (0.036)	0.607 (0.150)	-0.749 (0.057)	-0.379 (0.130)	1.544 (0.003)		-0.550 (0.002)
Malaysia				0.035 (0.004)	-0.033 (0.003)		-1.883 (0.045)			1.387 (0.046)	0.994 (0.076)			-0.038 (0.000)
Russia	-0.081 (0.624)			0.024 (0.198)	-0.030 (0.015)					0.104 (0.812)	-0.597 (0.036)	-0.492 (0.061)	0.321 (0.003)	-0.966 (0.004)
Singapore	9.473 (0.001)	0.445 (0.044)					2.379 (0.061)	-3.017 (0.007)		-3.315 (0.007)	2.083 (0.016)			-0.068 (0.001)
South Korea		-0.326 (0.026)		0.171 (0.000)	-0.055 (0.006)	-0.020 (0.028)	1.261 (0.023)	-1.268 (0.015)	-1.922 (0.010)	2.846 (0.000)	-1.143 (0.010)			-0.802 (0.000)
Taiwan				0.004 (0.037)			4.297 (0.008)	-4.582 (0.003)					0.020 (0.000)	-0.939 (0.000)
Thailand														-0.027 (0.000)
US	19.827 (0.001)	0.369 (0.089)		-0.022 (0.131)	0.098 (0.001)					0.260 (0.719)	-3.121 (0.003)		0.024 (0.010)	-0.914 (0.001)

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The estimates in Table 6 for a particular country can be interpreted in the following manner. For example, in the long-run, if the consumer prices in Vietnam increase by 10 percent relative to the consumer prices in Singapore, the tourist number travelling from Singapore to Vietnam would fall by 19.5 percent. If the Singaporean dollar appreciate by 10 percent relative to the Vietnamese Dong, the Singaporean tourist number to Vietnam would increase by 7.4 percent.

We evaluated the structural stability of the regression model coefficients using the cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMSQ) and found that coefficients were stable at the 5% level of significance.

Table 7 presents the short-run estimation results. The lagged error correction term  $ECM_{t-1}$  for all countries are negative and statistically significant indicating that the variables are cointegrated. The error correction term estimates for Russia, South Korea, Taiwan and the US are in the range -0.8 to -0.9 indicating a fast rate of convergence to equilibrium. The error correction term estimates for Australia, China and Japan are in the range of -0.5 to -0.6 indicating a moderate rate of convergence to equilibrium while Malaysia, Singapore and Thailand error correction estimates are in the range of -0.03 to -0.07 meaning that the rate of convergence for these countries is very slow.

## 6 CONCLUSIONS

In this paper we have presented an econometric analysis of international inbound tourism demand in Vietnam. We have used annual time series data of tourist arrivals for the years 1995-2016. Between 1995 and 2016, the total number inbound tourist arrivals to Vietnam has increased seven fold, from 1.4 million to 10 million. We have focused our analysis with respect to the top ten tourist supplying countries to Vietnam, namely, China, Korea, Japan, USA, Taiwan, Russia, Malaysia, Australia, Thailand and Singapore. In 2016, these top 10 countries contributed around 77 percent of the inbound tourists to Vietnam. In this paper, we have identified the major determinants that influence tourist arrivals to Vietnam using ADRL and Error-Correction Models.

The estimation results reveal the following: (1) Level of income of the travellers from Russia, Singapore, South Korea and Thailand has a positive impact; (2) Relative price (the price level in Vietnam relative to the country of traveller's origin) has a negative impact; (3) Exchange rate of the country of origin with respect to Vietnam has a positive impact; and (4) word of mouth from travellers who visited Vietnam in the past year has a positive effect on their decision to select Vietnam as one of their preferred destinations. Using the error correction model we estimated the short-run and long-run impact of these determinants. For example, in the long-run, if consumer prices in Vietnam increase by 10 percent relative to consumer prices in Australia, tourist arrivals from Australia to Vietnam would fall by 5.5 percent. If the Australian dollar appreciates by 10 percent relative to Vietnamese Dong, tourist arrivals from Australia to Vietnam would increase by 5.2 percent. These results indicate that one possible way to attract more inbound tourists to Vietnam, the government should implement policies to maintain low consumer price levels relative to the consumer price levels in other countries.

It is also worth mentioning that a major limitation in interpreting the results of this study is the small sample size of 20 observations as it is the only published data available on Vietnam tourist arrivals. Therefore, some of the results reported in the paper should be interpreted cautiously. In addition, due to lack of data availability, some other important variables such



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as travel cost, competition between Vietnam and its neighbours (for example, Cambodia and Laos) are not incorporated into our model.

The estimated results can be further utilized for forecasting the inbound tourism demand to Vietnam so that future planning on transport and accommodation can be made.

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## The Influence of Hotels' Online Reputation on the Millennials' Booking Behaviour

*Gilda Hernandez-Maskivker, Andre Rauch*

### ABSTRACT

*The following study analyses how millennial travellers book hotels online. Furthermore, if millennials are more likely to consider online reputation than other quality signals in their booking decisions and which personal factors have a significant relationship towards willingness to pay more for a higher rated hotel. Online surveys from millennial travellers were used to collect data. The study shows that the online reputation of hotels may influence millennial travellers in their booking situations. Furthermore, when analysing millennials' willingness to pay, variables such as prior experience and previous comparisons between price & rating should be considered. These results may help hotel managers to understand the importance of online reputation in regards to Millennials' booking behaviour and which factors influence on it. Moreover, provides hotel professionals with the status quo in willingness to pay more for hotels' better online rating.*

**Keywords:** *online reputation, booking behaviour, millennials, willingness to pay*

**JEL Classification:** D9, D00, L8

### 1 INTRODUCTION

Internet is the top source for travel planning, this counts for leisure as well as business trips. Search engines play a vital role and are the most popular online planning sources for travellers (Google Travel Study, 2014; Fritsch, & Sigmund, 2013). Since the internet or search engines are the first step for tourists when considering to travel, online reviews may be a term which everybody who ever planned a trip online is familiar with. Some decades ago, the most trustful people for travellers were their family and friends. Reputation or word of mouth always played a huge role for travel planning. Nowadays, in a time where the whole world can be friends (e.g. Facebook), electronic word of mouth is one of the most important marketing instruments a company can use (Fritsch, & Sigmund, 2013).

According to prior literature in the hospitality industry online reputation plays an important role in the moment of a hotel booking decision (Anderson, 2012; Anderson, 2014; Book, Tanford, & Chen, 2016; Fritsch, & Sigmund, 2013; Kusumasondjaja et al. 2012; Tsao et al. 2015). And millennials cannot be left out when talking about online booking behaviour. They are the most recent and "grown up into internet" generation. As Lester et al. (2007) and Prensky (2001) show, millennials are the people who understand the purchasing behaviour triggered by e-commerce more than any other generation does. Added to this, millennials are very important for the future hospitality industry, since this will be the most educated generation with the highest spending behaviour (Motorola; 2014).

However, the literature has not addressed in-depth analysis of the relationship between the hotel online reputation and the online booking behaviour of millennials and the factors influencing on their decisions. This research generates new insights in order to remain

understanding the phenomenon of online booking behaviour and the influence of online reputation in the hotel industry. Specially, this work attempts to explore on the perception of millennials on online reputation in comparison with other hotel booking attributes (star category, price category) and the factors that can influence them when choosing a hotel with a higher rating.

## **2 LITERATURE REVIEW**

Prior literature suggests that there are several advantages of online travel purchasing such as: convenience, financial advantages, time saving, enjoyment, product variety and comparability (Jensen, 2009; Kim & Kim, 2004; Wong & Law, 2005). Further studies explain that a general relationship towards online shopping increases the intentions to purchase travels online as well (Bigne, Sanz, Ruiz, & Aldas, 2010; Lee, Qu, & Kim, 2007).

However, online travel shopping is still presumed to be a very complex process (Morosan & Jeong, 2008). Rheem (2012) concluded that some people get almost overwhelmed when they receive hundreds of different possibilities at once, when looking online for their holidays. There, social media enters the game, helping customers to make decisions. Nowadays it is more common that people inform themselves through, Facebook, TripAdvisor, Google+ Reviews, about their future travel target. Less and less people ask their friends in real-life about travel recommendations (Ayeh, Au, & Law, 2013). Recently, studies suggested that online reputation management (ORM) is the key factor for future marketing and feedback (TripAdvisor, 2014).

Thus, the online reputation of hotels develops to a key factor of marketing strategies. Since answering online reviews or posting photos costs just the time an employee invests, it is perfect not just for big hotels, but also for smaller hotels with lower marketing budgets (Fritsch, & Sigmund, 2013). Nielsen (pp2.,2012) went further and already said: “When you actively pursue endorsements, reviews and testimonials in your marketing strategy and communications, you are providing “social proof” and getting your clients selling for you”.

Therefore, online reputation and online travel shopping are strongly connected. There were studies conducted in regards to travel purchasing in general, relationships of online reputation to the online booking decisions and the importance of online marketing of hotels towards millennials (Anderson, 2014; Dennis, 2013; Horster and Gottschalk, 2012; Kusumasondjaja et al, 2012; Mangold, & Faulds, 2009; Nielsen, 2012; Rheem, 2012).

Millennials lead online shopping, they understand e-commerce purchasing behaviour, as well as consider social media for their everyday-life (Goossen 2008). Studies show that this market segment generally count much more on first impressions than anyone else does (Leen et al. 2012). Moreover, millennials are the generation who share their opinions, frustrations, annoyance and dissatisfaction through their own social media pages, company pages and other online review platforms. Therefore, most importantly, companies need to build trust with their millennial customers through developing a great online reputation, otherwise it could cause heavy brand image damage (Goossen 2008; Leen et al. 2012).

Added to this, when analysing millennials tourist behaviour, prior literature suggests to consider decision models with influencing factors (Gilbert & Cooper, 1991; Pizam & Mansfield, 1999). Hotel booking decisions are not isolated and factors such as price or higher online ratings may influence their decisions and their willingness to pay for services (Book, Tanford, & Chen, 2016).

### **3 METHODOLOGY**

Online surveys were conducted in order to analyse how online reputation of a hotel influence the booking behaviour of millennial travellers. The research was conducted through different social media channels, and targeted the German millennial traveller. The sample of this study consisted of 119 millennial travellers. They needed to be born between 1980 and 2000. Participants were from different education and income levels.

Additionally, hotel booking scenarios were carefully designed in the online survey in order to get more realistic answers (Saunders, Lewis, & Thronhill; 2009). In the first hotel booking scenario, the possible choices were Hotel Chandler and Hotel Marker. Both hotels were four star properties, Hotel Chandler with an online rating of 9.8/10 with a price of €210 per night and Hotel Marker with an online rating of 6.1/10 and a price of €160 per night. The author wanted to test if guests would pay more for a better rated hotel with the same star category.

In the second scenario, participants could choose between Park South Hotel, a four-star property with 6.1/10 online rating for €190 per night, and 414 Hotel a three-star property with 9.7/10 online rating for €190 per night. With this question the author wanted to know if millennials would still prefer the better rated hotel, even with a lower star category, but same price.

In the third scenario, the authors wanted to figure out if millennials would still choose a hotel with a better online rating, lower star category, but this time with a higher price. With question five the participants could choose between Park South Hotel, a four-star property with 7.2/10 online rating for €175 per night and 414 Hotel, a three-star property with 9.7/10 online rating, but this time for €200 per night.

Added to this, crosstabs and chi square test were conducted in SPSS in order to measure statistical association between ‘willingness to pay more for a better rated hotel’ (WTP) and factors of influence such as gender and prior customer experiences.

### **4 RESULTS AND DISCUSSION**

The results of the self-projecting scenarios are displayed in table 1. Concerning the scenario 1, 87 people decided to book Hotel Chandler whereas just 32 people decided to book Hotel Marker. This table shows us that 73% of the customers would pay €50 more per night for a hotel with the same star category but better online rating. Thus, millennials seem they are more likely to consider a hotel’s online rating over price in their booking behaviour of hotels.

Results of scenario 2 shows that 80% of the consumers would pick the 414 Hotel even with a lower star classification for the same price. This showed a high significance of online rating over star category. Millennials are more likely to consider a hotel’s online rating over star category in their booking behaviour of hotels.

Regarding the scenario 3, 55% of the millennials would choose the lower priced, lower rated but higher star category hotel, whereas 45% still consider the better rated three-star property of higher value. Thus, although millennials are less likely to consider a hotel’s online rating over a better price together with a better star category; there is still a high percentage of respondents who are likely to consider it.

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**Tab.1** - Results of the hotel booking scenarios

	<u>Frecuency</u>	<u>Percent</u>
<b><u>Scenario 1:</u></b>		
Hotel Chandler	87	73,1
Hotel Marker	32	26,9
<b><u>Scenario 2:</u></b>		
414 Hotel	83	18
Park South Hotel	13	5
<b><u>Scenario 3:</u></b>		
414 Hotel	54	45,4
Park South Hotel	65	54,6

Moreover, table 2 presents the results of the chi-square tests. Thus, associations between ‘Willingness to pay more for a better rating hotel’ and factors such as gender, prior experiences booking online and previous comparisons rating & prices were tested. The results of the analysis were interpreted, compared and discussed in relation with prior literature on the subject.

**Tab.2** - Cross-tab analysis – frequencies of dependent and independent variables

<u>Variables</u>	<u>WTP (Yes)</u>	<u>WTP (No)</u>	<u>Chi-square</u>	<u>Sig.</u>
Gender			,199	,428
Female	56	11		
Male	45	7		
Prior experiences booking a hotel online			6,585	,018
Yes	87	11		
No	14	7		
Prior comparison rating & prices			4,767	,040
Yes	88	13		
No	6	12		

To check whether there is a significant relationship between Gender and WTP more, a chi-square test was conducted. With the p-value (0,428), there was no significant relationship between the dependent and the independent variable. This means there is no significant association between Gender and WTP more for a hotel with a higher rating. Although there are researchers who clearly confirmed that men have a higher WTP (Halkos, & Matsirori,

2012), there are studies that show that there is no relationship between WTP and gender (Bishai & Lang, 2000; Mmopelwa et al., 2007).

When testing WTP more and prior experience in online hotel booking, the p-value for this relationship was 0.018. This means there was a relationship between those two variables. This indicates that Millennials who have prior experiences in online booking of hotels are willing to pay more for a hotel with a higher rating. Research on tourist behaviour (Swarbrooke, & Horner, 2007; Pizam, & Mansfield, 1999) have widely supported the influence of prior experience on consumer behaviour. Added to this, familiarity with a service or a brand may influence the decision to purchase a service. McGuire and Kimes (2006) explain that familiarity has to do with going through similar prior experiences over time. When customers experienced familiarity with the method; positive perceptions, such as fairness, increase.

As a last significant relationship, willingness to pay more is related to previous comparisons on online ratings & prices before making booking decisions. The p-value showed 0.04, which means there is also a significance noticeable in this relationship. This indicates that people who compare online ratings and prices before booking decisions are willing to pay more for a hotel with a higher rating. Previous research showed, that hotels who increase their online rating by one point on a five-point scale e.g. 3.4 to 4.4 can increase their price by 11.2% and still maintain the same occupancy level (Anderson, 2012). Furthermore, prior literature shows that if hotels receive positive eWOM and positive ratings, their booking is less likely to be influenced by room price and star category (Wang et al. 2015). Different researchers confirm this statement, but go even further and say that positive reviews are more effective than negative reviews in increasing booking performance (Tsao et al. 2015). Moreover, research shows that higher online ratings, also increase the willingness to pay in consumers' booking decisions. When negative reviews are consistent, no price reduction is sufficient to offset the impact of those opinions, whereas when negative reviews are not consistent, an extreme price reduction is sufficient to influence booking decisions (Book, Tanford, & Chen, 2016).

## **5 CONCLUSIONS**

Results demonstrate that millennials generally consider online reputation as a very important factor in their hotel booking decision. Furthermore, millennials seem that they care less about star category or price category if online ratings are high. Online reviews are already on the same level of trust or lower than personal recommendations or information provided by hotels. Thus, hotels should not only rely on the credibility that star category and price give them, but also, they must make efforts to increment their online credibility. In times of the internet, hotel managers can react and use online reviews as an inexpensive marketing instrument.

These insights may help marketing managers to understand and predict millennials' behaviours before and after the purchase decision and not only to influence them at the time of purchase. Added to this, hotel managers can target those market segments with the highest potential earning capacity and the willingness to pay higher for a better rating hotel. People with higher incomes are also a market segment willing to pay extra compared to people with lower incomes.

Analysing the booking behaviour of millennials leads to discover that consumers don't act in isolation. Consumers' decisions are conditioned to certain variables that managers can't ignore. Prior experiences appear as a key factor to consider when analysing millennials online



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booking behaviour. Additionally, millennials who have previously compared rating and prices, appear as people with greater willingness to pay for higher rated hotels. Understanding how customers act allow companies to rethink booking systems and marketing strategies implemented. Not all consumers face hotel online booking in the same way and, consequently, they should be addressed in different ways.

## 6 FUTURE RESEARCH

The authors would suggest to study the relationship between WTP, online rating and Millennials in a different market. As this study focused on the German speaking travel market, results in different cultures might be different, and interesting to compare. A further recommendation would be, to do the same research project in five years from now, with the increasing numbers over the past years, the trend shows, that there might be an even higher relationship between WTP, online rating and Millennials.

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