

## Accepted Manuscript

Title: Effects of national culture on e-government diffusion—A global study of 55 countries

Author: Fang Zhao Kathy Ning Shen Alan Collier

PII: S0378-7206(14)00081-0  
DOI: <http://dx.doi.org/doi:10.1016/j.im.2014.06.004>  
Reference: INFMAN 2738

To appear in: *INFMAN*

Received date: 6-10-2012  
Revised date: 4-6-2014  
Accepted date: 8-6-2014

Please cite this article as: F. Zhao, K.N. Shen, A. Collier, Effects of national culture on e-government diffusionndashA global study of 55 countries, *Information and Management* (2014), <http://dx.doi.org/10.1016/j.im.2014.06.004>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



**Effects of national culture on e-government diffusion – A global study of 55 countries**

**Fang Zhao** (PhD)\* - *Corresponding author*

American University of Sharjah & The University of the South Pacific

PO Box: 26666, Sharjah, United Arab Emirates

Tel: +971 6 515-2575, Fax: +971 6 558-5065

Email: [fzhao@aus.edu](mailto:fzhao@aus.edu)

**Kathy Ning Shen** (PhD)

Faculty of business and management, University of Wollongong in Dubai

PO Box 20183, Dubai, United Arab Emirates

Tel: 971-4-3672436

Email: [kathyshen@uowdubai.ac.ae](mailto:kathyshen@uowdubai.ac.ae)

**Alan Collier** (PhD)

University of Otago, Dunedin, New Zealand

**Postal address:**

PO Box 1099

HAMILTON QLD 4007, Australia

Tel: 63-7- 3868-1177

Email: [acollier@corplink.com.au](mailto:acollier@corplink.com.au)

**Effects of national culture on e-government diffusion – A global study of 55 countries****Abstract**

This study aims to examine if and how national culture affects e-government diffusion. To explore the possible relationship, we analyse two sets of international-level indexes: (1) the indexes of five of the societal cultural practices of the GLOBE project [35], and (2) the e-government development and participation indexes from the most recent United Nations' e-government survey [71]. As economic development reportedly plays an important role in both e-government diffusion and cultural dynamics, we also examine the relationships between GNI per capita, culture, and e-government diffusion. A sample of 55 countries was studied. We find that culture does have an effect on e-government diffusion in various ways, and that economic development in the form of GNI per capita has a moderating effect on the relationship between culture and e-government diffusion. We discuss the implications of these findings for e-government strategy. In addition, we identify the limitations of the study and propose the areas for future research. This study is among the first to use the GLOBE approach to study cultural effects on e-government diffusion while endeavouring to explore the relationship between culture and e-government diffusion.

**Keywords:** E-government diffusion, Cross-cultural studies, GLOBE societal culture practices, E-government development index, E-participation index

## 1. Introduction

E-government is defined by the World Bank [76] as the use of information technology (IT) to improve the business processes and service delivery of government departments and other entities. E-government first began appearing only in the mid-1990s. After use for more than a decade, it has been embraced by almost all the Member States of the United Nations, although there is a significant variation among nations in its diffusion [71]. For the purpose of this paper, we use the term '*e-government diffusion*' to refer to e-government development and citizens' adoption of e-government (e.g. e-participation). International studies [28, 29] [32, 48] indicate that e-government is likely to provide citizens with added values of 'easier, more convenient, better quality, reduced turnaround times'. Additionally, the implementation of e-government initiatives has been reported as stimulating business process change, increasing internal efficiency, improving levels of information sharing and interoperability, levels of innovation and competitiveness, and social inclusion, while also resulting in greater transparency and accountability, and greater proximity to citizens [25, 24, 30, 44, 55]. However, e-government development and the realization of its potential benefits have faced serious issues and challenges due to the complexity of the technology involved, the constraints of providers' capacity, and the limited uptake of e-government by citizens [32, 71, 3].

We argue that a cultural perspective may lend insight on some of the issues and challenges facing e-government diffusion. Culture can be seen as a multi-level (i.e. national and organizational) and multi-facet (e.g. values, beliefs, artifacts, etc.) construct [63]. Culture is defined in many ways. Hofstede [33] defined it as 'the collective programming of the mind that distinguishes the members of one group or category of people from another.' According to this definition, we define national culture as a set of collective beliefs and values that distinguish people of one nation from those of another. It is widely acknowledged that culture has a significant influence on consumer behavior and technology diffusion [61, 21, 65]. However, the effect of culture on e-government diffusion has not yet received as much attention as it deserves in the world of e-government literature and official international surveys [45, 80]. For example, six consecutive e-government surveys conducted by the United Nations since 2001 took telecommunication infrastructure and level of education (being one socio-economic factor) as key components of a country's e-government development index. The surveys concluded that the level of e-government development is by and large commensurate with the level of economic development of a country [71]. However, the surveys barely touch on cultural values, religious belief, social norms, and social, political and legal systems, which may play very important roles in e-government implementation and adoption [10, 49, 64].

To contribute to the current e-government literature, our study aims to examine empirically if and how national culture has an impact on e-government diffusion. Given the apparently important role that a national economy plays in e-government diffusion [71] and cultural dynamics [62, 80] we also examine the possible relationship between them in our study.

The main rationale for this study is to understand the relationship between culture and e-government diffusion so that strategies can be developed to improve e-government development as well as identify areas for future research in the field of cross-cultural study

and e-government diffusion. To explore the possible relationship, we select two sets of indexes from: (1) the GLOBE (Global Leadership and Organizational Behavior Effectiveness) project [37], and (2) the most recent United Nations' e-government survey [71]. To develop credible conclusions from this international-level study, we use a sample of 55 countries from the [35] project for our statistical analysis.

Our study has three features that distinguish it from the existing literature. First, to our knowledge, our study is among the first to adopt the GLOBE approach to examining the possible effects of culture on e-government diffusion. Second, unlike other research which treats the association between culture and e-government diffusion as a linear relationship or a clear causal linkage, we argue that the relationship between culture and e-government diffusion is contingent upon economic development. Third, the data sets used for our study are the most recent: the GLOBE cultural dimension scores (compared with Hofstede's index scores) and the latest e-government index scores from the United Nations' E-government Survey 2012 [71].

The remainder of this paper is organized as follows. The next section outlines the theoretical basis underlining this study. After that, the paper reviews the key literature on culture and e-government diffusion followed by the development of a research model and a series of hypotheses for empirical testing. Then, the paper describes the methods and measures used for statistical analysis. After that, results are presented and discussed. Implications, limitations and areas for future research are identified before we draw the paper to a conclusion.

## 2. Theoretical basis – Contingency theories

In the management literature, contingency theories argue that organizational effectiveness is dependent on the congruency (i.e. fit) between several factors such as structure, people, technology and strategy. These contingency theories emphasize the importance of the effects of environment (a set of contingency factors) on performance, and the complex relationships and interactions among environment, organizations and individuals/groups [26]. Child [15] argued that the variation of values and belief from one culture to another can have a significant effect on organizational structures and the notion of effectiveness, and that contingency theories should integrate culture into the study of the interaction with environment. Many researchers have attempted to demonstrate that culture is an important contingency factor that determines the interpretation of situational parameters [67, 77, 11]). Drawing on cultural contingency theories, Newman and Nollen [50] conducted an empirical study of 176 work units of a large multinational corporation located in eighteen European and Asian countries. They found that financial performance was higher in the work units where management practices were congruent with the host country culture.

The use of contingency theories is consistent with the central theme of this study given that we are investigating contingency factors surrounding e-government diffusion. The contingency factors on which we focus are societal cultural practices and economic development. We argue that *cultural congruency* may affect the level of e-government diffusion in a nation.

Based on the theories of the Diffusion of Innovation [54] and the Technology Acceptance Model [17], studies show that a person's beliefs can influence attitudes towards e-government which, in turn, could lead to a propensity to use and, finally, actual usage

behavior [13,19,58,4]. In line with the theories, we argue that e-government diffusion is associated directly with culture, being the shared belief, value, social norms and attitudes (more discussion about this is provided in the next section). Therefore, we seek to explore e-government diffusion from a cultural perspective and examine what cultural characteristics of a nation may affect e-government diffusion. Based on the findings of this study, we feel able to provide government policymakers with suggestions for improving e-government diffusion based on cultural issues. This remedies an existing gap in understanding resulting from the limited empirical research published in this field, particularly at a national level [57].

Although contingency theories have their merits, critics argue that contingency concepts need to be clearly defined and the relationships between the concepts need to be specified [66]. While taking contingency theories as the underpinning theoretical framework for this study, we have attempted to address these concerns by elucidating the concept of culture in terms of its various dimensions and identifying and examining empirically its relationships with e-government diffusion and economic development.

### **3. E-government diffusion and national culture**

E-government has developed rapidly over the past decade and is gaining momentum in many countries around the world according to the most recent survey of the United Nations [71]. Corresponding with this rapid development is the emergence and increasing expansion of e-government diffusion literature. The majority of e-government diffusion research revolves around e-government technology (e.g. the usability of e-government websites), infrastructure and resources, user behaviour and intentions drawing on various technology acceptance models, government policies and strategies, and socio-economic issues such as access issues and digital divide [5,9,13,19,29,32,44,51,57,64,74].

National culture, as a source of acceptable norms and behaviours, may influence online expectations, preferences, and experiences of the public and their attitudes towards e-government. However, there is a dearth of empirical and rigorous research dealing with the importance of culture on e-government diffusion [57]. Among the few studies which examine the effects of national culture on e-government diffusion, most of them adopt Hofstede's cultural model and focus on one or a few individual countries and/or a regions such as Europe and Latin America, but do not project this to a global scale [2,7,14,29,57]. For example, a recent study of 26 European countries found that national culture explained the differences in the level of e-government adoption in the countries studied [7]. Aykut [7] found that European countries with higher power distance or higher uncertainty avoidance cultures tend to have a lower e-government adoption rate. On the other hand, European countries with high individualism and/or long-term orientation cultures are more willing to adopt e-government than the countries with a collective culture or a short-term orientation culture.

There appear to have been only three worldwide cross-country studies in our topic area. These three studies were the first of their kind in placing cross-cultural analysis at the forefront of e-government research. Two of these three studies adopt Hofstede's cultural model, while the third adopts the GLOBE model. Kovačić [47] investigated whether differences in worldwide e-government readiness levels can be explained by cultural variables. He adopted the four cultural dimensions of Hofstede [33] as a conceptual framework for the study. By using correlation and regression statistical analysis of worldwide e-government readiness indexes calculated from the United Nations Global E-Government Survey 2003 and the cultural indexes of the 95 countries used by Hofstede [33], this study found that only two out of the four cultural dimensions of Hofstede (namely, individualism,

and power distance) have a significant impact on e-government diffusion. In a similar study, Zhao [80] used five cultural dimensions (rather than the four dimensions of Hofstede [33]) to test the correlation between culture and e-government diffusion as measured by the E-government Development Index of the 2010 United Nations E-Government Survey. A total of 84 countries were selected for the study based upon the availability of data. This study found that in addition to individualism and power distance, long term orientation is also significantly correlated with e-government diffusion. However, like the other cross-cultural studies which relied on Hofstede's cultural indexes (which were generated mainly in the 1960s and 1970s) these studies suffered from the assumption that culture does not change over time. Many studies use a different scenario from that of Hofstede's cultural model. Several recent studies replicating Hofstede's model found that significant changes have occurred in the index scores since Hofstede's surveys, which indicates that culture is not static and changes over time [1]. Similarly, the empirical study by Tung et al. [70] identified dynamic changes and complexities in Chinese culture which have occurred over the past 30 years since China opened its door to Western businesses. The dramatic economic growth in China driven by international business is one of the main causes of this cultural change.

The work by Khalil [45] is the first found in the literature that uses the GLOBE cultural dimension model to study the association between national culture and e-government development. This study found that the majority (7 out of 9) of the GLOBE cultural dimensions are associated with e-government development. However, like the other two global studies, Khalil's study treated the relationship between the two as a linear one and barely explored the possible moderating effects of other factors. Moreover, the Khalil study used both sets of index scores of cultural values and cultural practices of the GLOBE and conjectured a negative correlation between cultural values and cultural practices in most of its nine dimensions. Consequently, the findings are confusing and self-contradictory in some cases. Our study addresses these two issues by testing explicitly the associations among economic development, culture, and e-government diffusion, and by choosing only one set of cultural dimensions, namely, *cultural practices* for measurement.

#### 4. Research framework and hypothesis development

Quite a few sophisticated models have been developed to analyze cultural differences across countries [20, 18, 33, 35, 38, 56, 63, 68]. The most influential ones appear to be Hofstede's cultural dimension model [33] and the GLOBE model [35]. The GLOBE study was an internationally collaborated research project, which focused on culture and organizational leadership at organizational and societal levels in 62 societies [36]. Although there is some overlap in cultural dimensions between House et al. and Hofstede, there are significant conceptual and methodological differences between the two [34]. The most notable conceptual difference is that the GLOBE study viewed cultural values and cultural practices as two variables, compared with Hofstede's 'onion' concept of cultural values driving practices (i.e. values and practices are assumed to be consistent). To verify empirically this assumption, the GLOBE project used two sets of indicators: *cultural values*, and *cultural practices* [37], to measure nine different facets of national culture. Javidan et al. [40] explained the approach further: cultural practices inform us about the current perceptions of specific cultures, whereas cultural values tell of the aspirations and direction that cultures wish to develop. For example, when measuring 'Performance Orientation', the GLOBE questionnaire item for cultural *practices* is: 'Students *are encouraged* to strive for continuously improved performance', whereas, the questionnaire item for cultural *values* is 'Students *should be encouraged* to strive for continuously improved performance'. Thus, the

GLOBE approach provided two different sets of cultural indexes: practices and values. The results of the GLOBE empirical study showed that there are significant negative correlations between values and practices for seven out of the nine cultural dimensions of House et al. [53]. The results provide strong empirical evidence to support GLOBE's approach to distinguish cultural values from cultural practices.

Javidan et al. [41] commented on the *choice* between cultural values and practices in cross-cultural research, saying that values are more related to some things (such as conceptions of effective leadership) while practices are more relevant to others (such as societal phenomena). Based on the sound theoretical arguments and empirical evidence of the GLOBE study, in this paper we adopt GLOBE's societal cultural practice construct, namely, the respondents' perception of current practices of specific cultures. This permits us to focus on examining people's behaviour (cultural practices) towards e-government. Therefore, we have elected to use *cultural practices* for our study because the *cultural practices* index provides a more direct and accurate measure than the *culture values* index.

Other reasons to choose the GLOBE model include the relative contemporaneity of its indexes and the scope of its cultural dimensions. Compared with Hofstede's cultural dimension indexes which were generated mostly in the 1960s and 1970s, the GLOBE indexes are more recent, having been published in 2004 in House et al.'s seminal work *Culture, Leadership, and Organizations* [35]. Given the cultural dynamics discussed above [1, 70] using the latest cultural dataset improves the validity of our research findings. Compared with Hofstede's model, the GLOBE project provides additional cultural dimensions which are relevant to our study but which have been largely neglected in e-government literature because most of the earlier studies adopted Hofstede's model. For example, the cultural dimension of performance orientation of the GLOBE project is a very useful concept for our study. It concerns aspiration for performance improvement and excellence which could be viewed as an attitudinal indicator in e-government diffusion.

In the GLOBE study, national cultures were examined in terms of nine dimensions. House et al. [36] described the nine dimensions as follows:

- 1 *Uncertainty Avoidance* is defined as the extent to which members of an organization or society strive to avoid uncertainty by reliance on social norms, rituals, and bureaucratic practices to alleviate the unpredictability of future events.
- 2 *Power Distance* is defined as the degree to which members of an organization or society expect and agree that power should be unequally shared.
- 3 *Societal Collectivism* (changed to Institutional Collectivism by House et al., [37]) reflects the degree to which organizational and societal institutional practices encourage and reward collective distribution of resources and collective action.
- 4 *In-Group Collectivism* reflects the degree to which individuals express pride, loyalty and cohesiveness in their organizations or families.
- 5 *Gender Egalitarianism* is the extent to which an organization or a society minimizes gender role differences and gender discrimination.
- 6 *Assertiveness* is the degree to which individuals in organizations or societies are assertive, confrontational, and aggressive in social relationships.
- 7 *Future Orientation* is the degree to which individuals in organizations or societies engage in future oriented behaviors such as planning, investing in the future, and delaying gratification.



- 8 *Performance Orientation* refers to the extent to which an organization or society encourages and rewards group members for performance improvement and excellence.
- 9 Finally, *Humane Orientation* is the degree to which individuals in organizations or societies encourage and reward individuals for being fair, altruistic, friendly, generous, caring, and kind to others.

As this shows, there are two levels of cultural dimension – organizational and societal. We focus on the societal level because our study examines the effects of cultural differences between countries. Of the nine dimensions of national cultural characteristics described by GLOBE, we use five in this study, namely: uncertainty avoidance; power distance; in-group collectivism; future orientation; and performance orientation. The cultural dimensions that we do not use in our study are: institutional collectivism; gender egalitarianism; assertiveness; and humane orientation. This is because these cultural characteristics are less important and relevant to e-government diffusion than the five we use. For example, we have chosen to use in-group collectivism over institutional collectivism because our study examines individual citizens' behaviour and attitude towards e-government which may, itself, be affected by the behaviour and attitude of other members of their group. In this regard, in-group collectivism is more important and relevant to our study than institutional collectivism. This selective approach to cultural dimensions has been used by many mainstream cross-cultural studies such as Kogut and Singh [46] and Waldman, et al. [73].

The development of our hypotheses, which follows, involves the five cultural dimensions identified above.

#### *Uncertainty avoidance*

The cultural dimension of uncertainty avoidance has been closely examined in the context of technology diffusion [21, 23, 60, 79]. Members of societies with strong uncertainty avoidance are likely to avoid or reduce risks induced by an unknown situation. Hofstede [33] posited that low-uncertainty-avoidance cultures make greater use of a recent technological innovation, the Internet, than do high-uncertainty-avoidance societies. E-government is also a relatively new concept to many people and, therefore, e-government diffusion potentially incurs risks. The study of Akyut [7] showed a negative correlation between uncertainty avoidance and e-government adoption across the European countries studied. However, the results of statistical analysis of global data conducted by Kovačić [47] and Zhao [80] disputed this correlation. These inconsistent results warrant more empirical studies and testing. Based on this discussion we hypothesize that:

**H1:** *Uncertainty avoidance is negatively related to e-government diffusion.*

#### *Power distance*

The study of Warkentin et al. [74] found that power distance is more likely to affect e-government adoption than the other cultural dimensions of Hofstede [33], and that people in

countries with high power distance are more likely to adopt e-government than people in countries with low power distance. The reason for this could be that e-government services make interaction with governments easier. However, the study of Aykut [7] drew a contrasting conclusion, namely that higher power distance countries tend to have a lower e-government adoption rate. This could be explained by Carl et al. [12] who concluded that in countries with high power distance, information is controlled by a hierarchy of power which limits access by the public. Innovation studies show that innovation is most likely to occur in countries that are high on individualism, low on uncertainty avoidance, and low on power distance. In line with this line of argument, we assume that e-government as an innovation is more likely to be embraced in countries with low power distance. Therefore, our next hypothesis is:

**H2:** *Power distance is negatively related to e-government diffusion.*

#### *In-group collectivism*

The cultural dimension of collectivism has been widely researched across the social and economic sciences [22, 27]. In-group collectivism refers to pride in, and loyalty to, family and/or organization and family and/or organizational *cohesiveness*. In terms of IT adoption, it is argued that high in-group collectivist cultures prefers face-to-face communication for maintaining relationships and, therefore, tend to have a lower IT adoption [8]. We argue that adopting a new concept such as e-government could be regarded as a conflicting attitude against the dominant group norm. Thus, countries with a strong emphasis on in-group collectivism may show a lower degree of e-government adoption. People from individualistic countries are accustomed to expressing their own views and are therefore more inclined to innovate and adopt new ideas [23]. The study of Khalil [46] found a negative correlation between in-group collectivism and e-government development. Based on the prior studies, we hypothesize that:

**H3:** *In-group collectivism is negatively related to e-government diffusion.*

#### *Future orientation*

Ashkanasy et al. [6] described a society with future orientation as one that tends to look into the future and develops and pursues strategic and long-term goals. Such a society is more likely to engage in future-oriented practices such as planning and investing in the future. House et al. [37] found a positive correlation between future orientation and the advancement of societies in the areas such as democracy, economy, science, social health, and savings. E-government is a relatively new development and has become an inexorable trend for future government service delivery because of its potential to offer efficient and effective services to the public. It has been identified as a key step towards sustainable development [71].

Therefore, we assume that a future-oriented culture is likely to be conducive to e-government diffusion. On this basis, our hypothesis is that:

**H4:** *Future orientation is positively related to e-government diffusion.*

#### *Performance orientation*

According to Javidan [42], ‘performance orientation reflects the extent to which a community encourages and rewards innovation, high standards and performance improvement.’ Thus, societies with high performance orientation tend to be more successful and competitive than those with low performance orientation. E-government is meant to enhance performance of government services offered to citizens and businesses through streamlining business process, increasing internal efficiency, improving information sharing and inter-operation and optimizing government resources [30, 44]. We assume that countries with high performance orientation culture are more likely to develop and adopt e-government services as they have the potential to improve performance and enhance the efficiency of government and administration systems. Therefore, we predict that:

**H5:** *Performance orientation is positively related to e-government diffusion.*

#### *Economic development*

*Economic development of a country has been seen as an important factor influencing the level of e-government diffusion. The latest United Nations e-government survey demonstrated that there is a clear gap in e-government development between developed and developing countries [71], with developed nations having higher rates of e-government diffusion.*

*Economic development has also been seen to have an impact on cultural change [62, 80]. Both Hofstede [34] and House et al. [37] suggested that many of their cultural dimensions are found to be correlated with national wealth which means that culture is affected by economic factors. For example, Javidan [42] explained that a performance oriented society can prosper because it values education more, and that better educated people contribute more economic benefit to their societies. Tang and Koveos [62] investigated the notion of cultural changes and argued that changes in economic conditions are the source of cultural dynamics. They found that national wealth, measured by GNI per capita has a curvilinear relationship with three of Hofstede’s cultural dimensions: individualism, long-term orientation, and power distance scores, while the other two dimensions of Hofstede: uncertainty avoidance and masculinity, are more stable and less likely to change over time.*

*As shown above, economic development plays an important role in both e-government diffusion and cultural dynamics. We, therefore, examine the relationships between economic development, culture, and e-government diffusion. Unlike a conventional approach, which*

*treats culture as a moderating variable in a relationship [50], we explore the direct effects of culture on e-government while positing that the level of economic development has a moderating effect on the relationship between culture and e-government. As shown in the literature, e-government is not simply an IT project where investment plays an important role, but rather changing the way that people interact with governments and reshaping potential power structures [14, 32, 38]. Thus, culture reflecting how people view power and make sense of social structures and relations may pose more profound and direct impact on e-government diffusion. Meanwhile, economic development, as a dynamic contextual factor, may indirectly affect the prominence of certain aspects of national culture in influencing e-government diffusion. We consider that our approach provides a novel lens to the intricate interplays among culture, economic development and e-government diffusion. Therefore, we develop the following hypotheses.*

**H6a:** *Economic development (measured by GNI per capita) moderates the effect of uncertainty avoidance on e-government diffusion.*

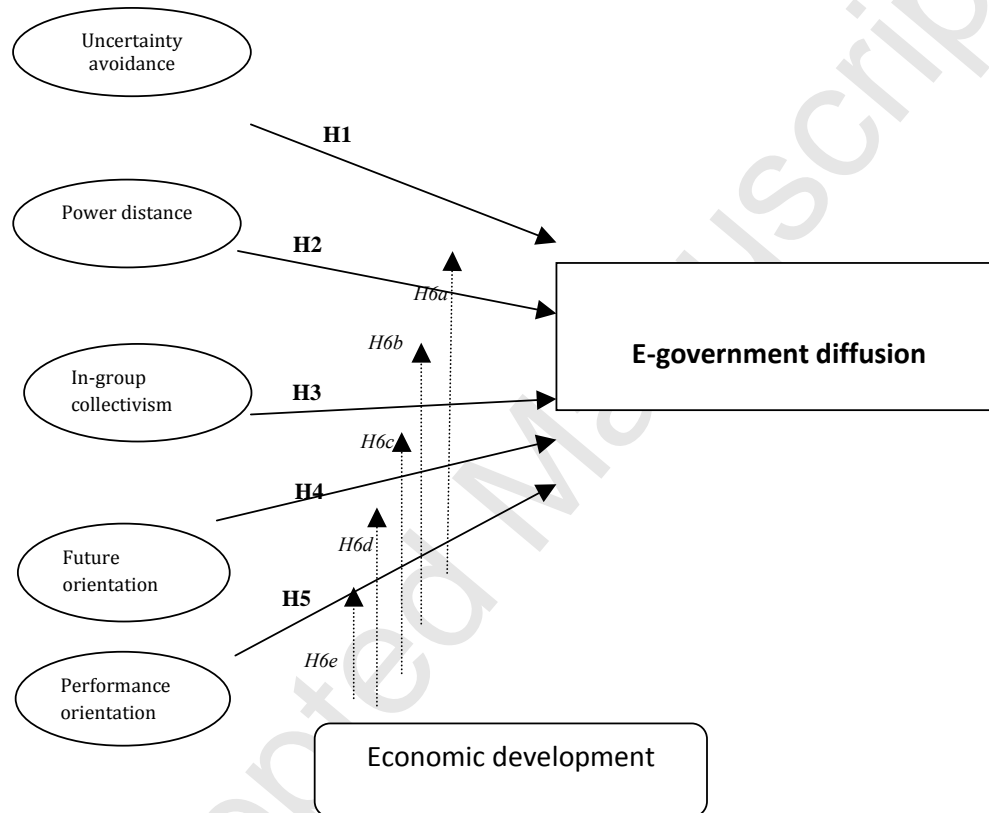
**H6b:** *Economic development moderates the effect of power distance on e-government diffusion.*

**H6c:** *Economic development moderates the effect of in-group collectivism on e-government diffusion.*

**H6d:** *Economic development moderates the effect of future orientation on e-government diffusion.*

**H6e:** *Economic development moderates the effect of performance orientation on e-government diffusion.*

Figure 1 presents our research model and illustrates the moderated relationships that we hypothesize for empirical testing.



**Figure 1**

Research model of hypothetical relationships between national culture and e-government diffusion moderated by economic development

## 5. Methodology

To test our six hypotheses and to investigate the relationships illustrated in our research model (Figure 1), we have used two data sets: (1) the indexes of five of the societal cultural practices of the GLOBE project [37]; and (2) the e-government development and participation indexes of the most recent United Nations e-government survey [71]. Both data sets provide independent and credible data for international comparison in terms of worldwide e-government diffusion and national culture. A total of 55 countries are included in our study because, of the 62 societies with cultural scores in House et al.'s work, only 55

are the Member States of the United Nations and were surveyed and scored in the United Nations 2012 E-government Survey. Nevertheless, the countries included are by and large representative of the majority of countries and regions in the world.

## 5.1 Measures

### 5.1.1. Dependent variable: e-government diffusion

In our analysis e-government diffusion (the dependent variable in our study) is measured using two index scores: the e-government development index (EGDI); and the e-participation index (EPI) in the United Nations E-Government Survey 2012 [71]. These indexes are widely recognised as authoritative measures of e-government performance [71].

#### *E-government development index (EGDI)*

Since 2003 the United Nations Department of Economic and Social Affairs has conducted six consecutive surveys (every two years) on e-government development over its Member States. E-government development can be hampered by constraints in public sector capacity on the supply side, as well as citizens' capacity to adopt e-government on the demand side. A country's economic strength, ICT development, and aggregate level of education are seen to be the key indicators of capacity [71]. Therefore, the EGDI is a *composite* of the level of the capacities and the state of national online services [71]. The index is based largely on the United Nations survey of the online presence of its 193 Member States, which rates the relative performance of national governments of the Member States. It is a weighted average of three normalized scores on the three most important dimensions of e-government: (1) online service, (2) telecommunication infrastructure, and (3) human capacity. The maximum possible value of the AGDI is one and the minimum is zero as follows:

$$EGDI = (\frac{1}{3} \times \text{online service index}) + (\frac{1}{3} \times \text{telecommunication index}) \\ + (\frac{1}{3} \times \text{human capital index})$$

#### (1) Online service index

The United Nations research team assessed each country's national website as well as the websites of the major ministries of a national government such as education, labour, social services, health and finance. Based on this assessment, a set of online service index values were obtained which reflected the scope and quality of online services. The online service survey revolved around the four stages of e-government development from the basic to the advanced: (1) emerging information services; (2) enhanced information services; (3) transactional services; and (4) connected services (see e-participation index below for more detail). Almost all questions in the survey required a binary response of yes or no, with 'yes' given one point and 'no' zero. These were worth up to ten points each. The value for a given

country was equal to the total number of points scored by that country less the lowest score for any country divided by the range of values for all countries in the survey.

## (2) Telecommunication infrastructure index

The telecommunication infrastructure index consists of five indicators: number of personal computers per 100 persons, number of Internet users per 100 persons, number of telephone lines per 100 persons, number of mobile cellular subscriptions per 100 persons and number of fixed broadband subscribers per 100 persons. Each of these indicators is standardized via the Z-score procedure to derive the Z-score for each component indicator. The source of the data for each country was derived primarily from the International Telecommunication Union (ITU).

## (3) Human capital index

The human capital index indicates a country's aggregate level of education which consists of two indicators: adult literacy rate; and the combined primary, secondary, and tertiary gross enrolment ratio. Two-thirds weight is assigned to the literacy rate and one-third weight is assigned to the enrolment ratio. These data are collected mainly by the United Nations Educational, Scientific and Cultural Organization (UNESCO). The method of calculation of the index was the same as that for the telecommunication infrastructure index.

### *E-participation index*

E-participation index indicates the level of citizen engagement in the connected presence stage of e-government development. It is actually an extension of the stage 4 online service survey. This index focuses on three dimensions: information sharing between governments and citizens (also called 'e-information sharing'); consultation with citizens ('e-consultation'); and citizens' engagement in decision-making processes ('e-decision making'). A country's e-participation index value reflects how well a country is performing in the three areas compared to other countries [71]. To measure e-government diffusion comprehensively, in our study we use both the e-government development index and the e-participation index.

### **5.1.2. Independent variable: national culture**

We measure national culture (the independent variable) in terms of the five societal cultural practice indexes of House et al. [37], namely: uncertainty avoidance; power distance; in-group collectivism; future orientation; and performance orientation. The indexes were generated from a questionnaire survey by the GLOBE research team. The sample size included 17,370 middle managers in 951 organizations in three industries: food processing, financial services, and telecommunication services in 62 societies. The questionnaire was developed based largely on individual interviews and focus groups with managers as well as a literature review of cross-cultural and leadership research. Two pilot studies were conducted in 43 societies before the launch of the formal survey. The questionnaire used a 7-

point Likert scale to rank participants' perception of the cultural practices in their societies against each of the cultural dimensions. A total of 78 items were included in the questionnaire [43].

Various statistical analyses were performed by the GLOBE research team to determine the aggregability, reliability and validity of the scales. For the societal cultural practices that we use in the present study, the average RWG(J) was 0.85, the average ICC(1) was 0.25 and the average ICC(2) was 0.93. The results demonstrate that the scales discriminated well among societies and had sound psychometric properties. The results of inter-class correlation analyses showed that the scales had reliabilities of 0.77 in terms of Cronbach's Alpha and within-society interrater agreement. The external validity of the scales was also tested against the works of Hofstede [33] and Schwartz [56], as well as the results of surveys such as the World Values Survey of Inglehart, Basanez and Moreno [39]. The test results provided sufficient evidence to demonstrate the convergent and discriminant validity of the scales [31].

Given the large sample size and the rigorous procedures of data collection and analysis used in the GLOBE project, we believe that the indexes of societal cultural practices we use in this study have a high degree of reliability and validity.

### 5.1.3. Moderating variable: economic development

We measure economic development (the moderating variable) using the World Bank's GNI per capita 2011 data. Like the previous surveys, the United Nations E-Government Survey 2012 found that there is strong evidence that high-income countries enjoy the top rankings in the e-government development index.

Table 1 below provides a summary of all the variables and measures and their sources for our statistical analysis.

**Table 1**

Summary of variables and measures

Variable/category	Measures	Data source
<i>E-government diffusion (DV*)</i>	E-government development index (EGDI), E-participation index (EPI)	United Nations [71]
<i>Culture (societal cultural practices) (IV*)</i>	Uncertainty avoidance, Power distance, In-group collectivism, Future orientation, Performance orientation	House et al. [35]
<i>Economic development (MV*)</i>	GNI per capita	World Bank [75]

\*Note: DV = Dependent variable; IV = Independent variable; MV = Moderating variable

### 5.2. Statistical procedures

We performed a regression analysis to answer the first research question about the relationship between cultural factors and e-government diffusion. To answer the second research question about the moderating effect of economic development, we first conducted the cluster analysis based on economic development and then compared the relationships



between cultural factors and e-government diffusion for two groups with different economic backgrounds. The software used for all our data analysis is SPSS Statistics 20. We report our results in the next section.

## 6. Results

Table 2 provides a summary of descriptive statistics and a correlation matrix. Our results show that all the cultural variables are significantly correlated to each other and most of them are correlated significantly to e-government development and/or e-participation. GNI per capita is also correlated to all the culture and e-government diffusion variables. To further test the relationship between culture and e-government diffusion, we next performed a regression analysis. Table 3 presents the results of this regression analysis.

**Table 2**  
Descriptive statics and correlations<sup>a</sup>

Variable	Mean	S.D.	1	2	3	4	5	6	7
1. Uncertainty Avoidance	4.14	.585							
2. Power Distance	5.16	.394	-.384**						
3. In-group Collectivism	5.16	.700	-.658**	.395**					
4. Future orientation	3.82	.455	.760**	-.466**	-.519**				
5. Performance orientation	4.06	.385	.639**	-.344*	-.311*	.626**			
6. E-govt. Development	.644	.185	.401**	-.072	-.601**	.417**	.240		
7. E- govt. participation	.457	.281	.297*	-.114	-.439**	.418**	.283*	.681**	
8. GNI per capita	24503	23151	.608**	-.271*	-.660**	.534**	.312*	.709**	.438**

<sup>a</sup> $N = 55$ ; \* $p < .05$ ; \*\* $p < .01$

**Table 3**  
Results of regression analysis: Culture and e-government diffusion

Variable	E-govt. Development			E-participation		
	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$
• Uncertainty Avoidance (H1)	-.069	.064	-.219	-.198	.108	-.412
• Power Distance (H2)	.132	.058	.282*	.140	.098	.197
• In-group Collectivism (H3)	-.176	.039	-.666**	-.199	.066	-.496**
• Future Orientation (H4)	.134	.072	.328	.282	.122	.457*
• Performance Orientation (H5)	.031	.071	.065	.126	.120	.173
<i>R</i> <sup>2</sup>		.444			.313	
<i>F</i>		7.826**			4.470**	

\* $p < .05$ . \*\* $p < .01$ .

The regression analysis shows that there is a significant negative correlation between in-group collectivism and e-government diffusion (i.e. both e-government development and e-

participation), which confirms our **H3**. Future orientation is seen positively correlated to e-government participation at a significant level but is not significantly correlated to e-government development. Therefore, our **H4** is partially supported. On the other hand, power distance is significantly correlated to e-government development but not to e-participation. This result partially supports our **H2**. As to the other cultural variables tested, namely, performance orientation and uncertainty avoidance, the results of correlations fail the significance test. Thus, **H1** and **H5** are not supported.

The results also show that the five cultural dimensions account collectively for about 44 per cent of variation ( $R^2 = .444$ ) in e-government development and 31 per cent of variation ( $R^2 = .313$ ) in e-participation. These results confirm that culture does have a significant impact on e-government diffusion. Of the five cultural dimensions, in-group collectivism receives the highest number in the beta  $\beta = -.666$  for e-government development and  $\beta = -.496$  for e-participation which are both significant at the .001 level. This indicates that in-group collectivism is the best predictor of e-government diffusion among other cultural dimensions. Future orientation is found to achieve the second highest beta score  $\beta = .457$  for e-participation and  $\beta = .328$  for e-government development.

To explore further how the relationships between culture factors and e-government diffusion vary for different levels of GNI per capita, we first conducted cluster analysis based on GNI per capita, resolving these into two groups. Group 1 contains 22 countries with an average GNI per capita of USD 49,314.59 (richer nations), while Group 2 contains 33 countries with an average GNI per capita of USD 7,962.21 (poorer nations). This approach is consistent with that used by the World Bank [77] to classify countries in terms of economic development. Table 4 presents the descriptive information for both groups. An ANOVA analysis reveals that these two groups have significant difference in all cultural dimensions except for power distance.

**Table 4**  
Group differences

		Mean	Std.	Std. Error	Minimum	Maximum
Uncertainty Avoidance**	1	4.576	0.565	0.120	3.520	5.420
	2	3.845	0.385	0.067	3.090	4.810
Power Distance <sup>ns</sup>	1	5.047	0.383	0.082	4.140	5.700
	2	5.242	0.389	0.068	4.310	6.140
In-Group Collectivism**	1	4.556	0.673	0.144	3.460	5.700
	2	5.555	0.344	0.060	4.390	6.370
Future Orientation**	1	4.095	0.484	0.103	3.180	4.880
	2	3.646	0.336	0.058	3.060	4.660
Performance Orientation**	1	4.221	0.419	0.089	3.340	5.040
	2	3.958	0.328	0.057	3.410	4.720

E-govt. development index**	1	0.803	0.083	0.018	0.596	0.913
	2	0.538	0.157	0.027	0.158	0.928
E-participation index**	1	0.615	0.256	0.055	0.132	1.000
	2	0.352	0.249	0.043	0.026	1.000
GNI per capita (IV)**	1	49314.59	15599.98	3325.93	26427.00	92501.00
	2	7962.21	6274.50	1092.25	776.00	24142.00

Group 1=22 countries; Group 2=33 countries

\*\* ANOVA significant level:  $p < .01$ ; ns ANOVA significant level:  $p > .05$

It is likely that for these two income groups, the cultural and economic factors may play out in different ways in influencing e-government development and e-participation. We then conducted a regression analysis for both income groups separately. As shown in Table 5, factors that show significant coefficients with e-government development and e-participation vary for different groups. Particularly, for Group 1 (countries with higher GNI per capita), two cultural factors have significant effects on e-government development: in-group collectivism ( $\beta = -.527$ ;  $p < .01$ ); and future orientation ( $\beta = .571$ ;  $p < .01$ ); while for Group 2 (countries with lower GNI per capita), only uncertainty avoidance is found to be marginally significant ( $\beta = -.293$ ;  $p = .056$ ). Even though the extent of economic development is significant in both groups, the magnitude of its impact is different. A follow-up test using group dummy variables indicates that GNI per capita has more impact on e-government development in Group 2 than Group 1. Although the explanatory power of economic and cultural factors on e-government participation is not as strong as that on e-government development, the overall effect on both groups is significant. Similarly, the factors influencing e-participation are also different between the two income groups. For Group 1, only future orientation ( $\beta = .736$ ,  $p < .05$ ) is significant; while for Group 2, the only significant factor is GNI per capita, while its impact is marginal ( $\beta = .349$ ,  $p = .063$ ). Based on the results of this analysis, all our moderating hypotheses are sustained except *H6b*.

**Table 5**

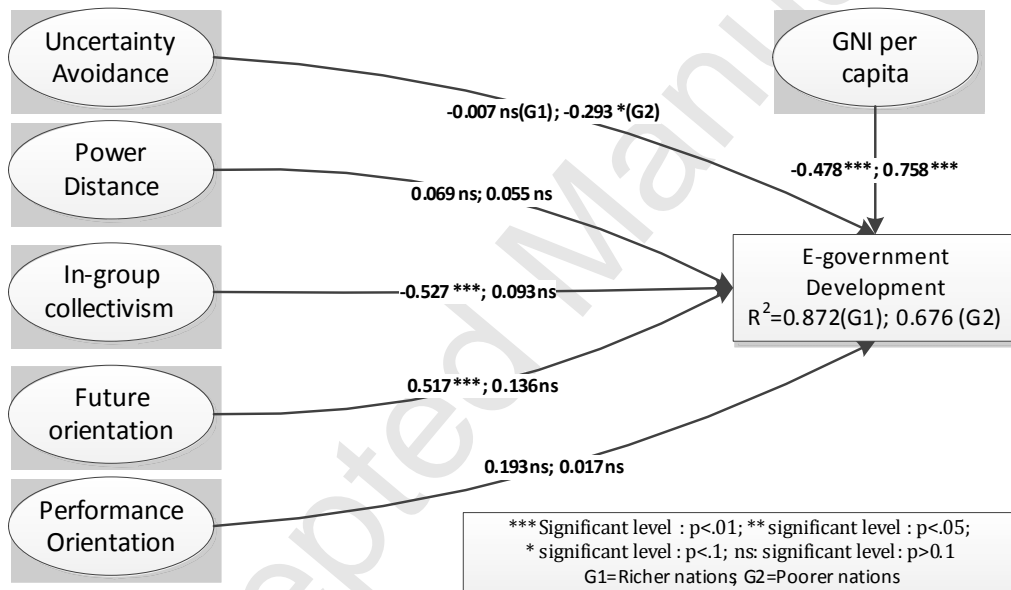
Regression analysis: Comparing two groups

Group 1 (n=22)		DV: E-government Development			DV: E-government Participation		
		Beta	T	Sig.	Beta	T	Sig.
	(Constant)		3.470	.003		.391	.701
	In-Group Collectivism	-.527***	-4.418	.000	-.329	-1.299	.213
	Future Orientation	.517***	3.502	.003	.736**	2.348	.033
	Performance Orientation	.193	1.672	.115	-.018	-.072	.944
	Power Distance	.069	.601	.557	.035	.143	.888
	Uncertainty Avoidance	-.007	-.045	.965	-.337	-1.012	.328
	GNI per capita (IV)	-.478***	-4.509	.000	-.301	-1.337	.201
	$R^2$			.872			.192
Group 2	(Constant)		.555	.584		-.340	.737

(n=33)	In-Group Collectivism	.093	.769	.449	-.073	-.359	.723
	Future Orientation	.136	.952	.350	.083	.348	.731
	Performance Orientation	.017	.107	.916	.404	1.544	.135
	Power Distance	.055	.454	.654	.129	.641	.527
	Uncertainty Avoidance	-.293*	-1.998	.056	-.386	-1.573	.128
	GNI per capita (IV)	.758***	7.092	.000	.349*	1.946	.063
	R <sup>2</sup>			.676			.009

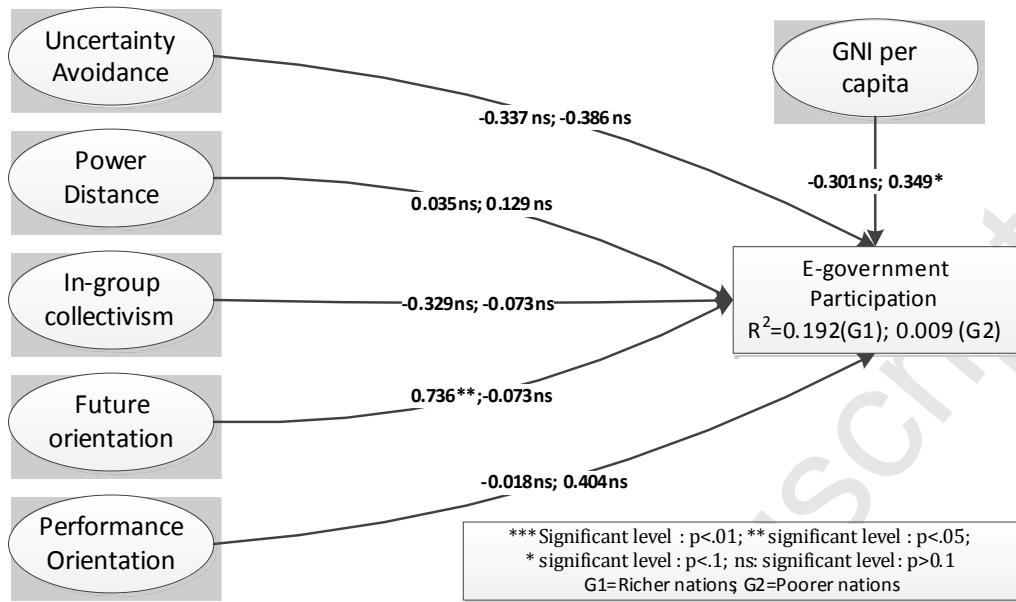
\*\*\* Significant level: p<.01; \*\* significant level: p<.05; \* significant level: p<.1.

Figures 2 and 3 illustrate the above results:



**Figure 2**

Comparing richer nations with poorer nations in terms of the impacts of cultural dimensions on e-government development



**Figure 3**

Comparing richer nations with poorer nations in terms of the impacts of cultural dimensions on e-government participation

## 7. Discussion

The results of our study suggest that culture has both positive and negative effects on e-government diffusion. In-group **collectivism** is found to be negatively correlated to e-government diffusion while also having the strongest influence on e-government diffusion when compared with all the other cultural dimensions. This finding concurs with the earlier study by Khalil [45]. Our finding highlights the importance of in-group collectivism to citizens' decision on whether to adopt e-government or not. Moreover, based on our cluster analysis, the negative effect of in-group collectivism could be more significant on e-government development in countries with higher GNI per capita (i.e. richer nations) than on countries with lower GNI per capita (poorer nations). This new finding is particularly useful for formulating policies in countries with higher GNI per capita and in-group collectivism. For example, countries in the Persian Gulf region have higher GNI per capita due to their rich oil reserves and are generally ranked higher in in-group collectivism [37] and collectivism [33].

In our study, future orientation is found to be positively related with e-participation. Our explanation for this finding is that as countries with future orientation culture tend to have a longer vision and a more forward-thinking mentality, this makes them more willing to take up e-government because they see it as their country's future and they value the long-term benefits that e-government will bring to them. This finding suggests that strategic and forward thinking has a positive impact on e-government. However, the effect of future orientation is different for richer (Group 1) and poorer nations (Group 2). This result suggests that the effect of future orientation is significant only among richer nations and not to poorer ones. This new finding provides evidence to support our argument that the relationship between culture and e-government diffusion is not a linear one, and that economic development affects the relationship.

As far as power distance is concerned, this factor is found to be negatively correlated to e-government development. This confirms the previous findings of Aykut [7], Carl et al. [12]. However, our results do not find any significant effect of power distance on e-government diffusion in either Group 1 (richer nations) or Group 2 (poorer nations). This result could indicate that even if power distance is related to e-government development, its influence is not strong compared with in-group collectivism and future orientation.

## 8. Implications for strategy

Given the effects of culture on e-government diffusion as identified in the current study, it is advisable that policy-makers consider cultural issues when formulating e-government strategy. In countries which place high value on group cohesiveness and strong family and kinship networks, the use of computers for communication by individuals may not be encouraged or even well accepted. In these cultures, e-government services may need to be more interactive, engaging and personal to attract users. In this case maybe governments could best make use of interactive technologies such social networking tools to engage in e-consultation with their citizens in order to stimulate e-government take-up. As future orientation has a positive influence on e-participation, strategic planning and thinking should be embedded in e-government implementation processes if take-up is to be encouraged. E-government strategy needs to be future-driven and take a long-term and sustainable view. The key elements of such a strategy for governments include having a clear vision, setting clear and prioritized goals for the next 3-5 years, specifying strategic initiatives and expected outcomes, and having a detailed implementation plan.

Our cluster analysis, which classifies countries based on their GNI per capita, has developed some important insights into the relationship between culture and e-government diffusion. The results suggest that governments should consider culture, level of economic development, and probably other factors when formulating their e-government diffusion strategy. It also suggests that discretion is required when examining the suitability of best practices in other countries – such best practices may not be transportable to new environments without thoughtful adaptation.

## 9. Implications for theoretical development

The effects of national culture on performance have traditionally been studied either as a moderator [78, 11] or have a linear relationship with e-government development [45, 62]. The findings of our study, underpinned by contingency theories, suggest that some of national cultural characteristics have important *direct* effects on e-government diffusion while economic development moderates these effects. While this empirical conclusion validates our research model, it also opens up a novel lens through which to view and study the intricate interplays among culture, economic development and e-government diffusion in a nation. For example, future research could examine how economic development contributes to cultural change which may lead to the change in citizens' attitude and behavior towards e-government.

Based on our extensive search of the literature, our study appears to be among the first to use the GLOBE approach to study e-government diffusion across countries on a global scale. In this regard, our study should contribute to the advancement of cross-cultural research as well as e-government diffusion. For example, our research findings could be used to correlate the effects of culture on e-government diffusion with research by others who have adopted

different cultural models [47, 80]. Such research could lead to further theoretical development due to the convergent validity achieved by using various cultural models.

## 10. Limitations and suggestions for future research

This study aimed to examine the effects of national culture on e-government diffusion at national level. To achieve this we required large cross-country datasets to generate valid empirical findings. Collecting such datasets was beyond the resources and time available to our research team. To overcome these limitations we used archival data (or secondary data) accessible in the public domain. The main advantages of using reputable large archival datasets included the ability to use newer and more extensive statistics, and the reproducibility of our findings [59]. The cross-country datasets that we chose for this study were generated by reputable and credible research teams of the United Nations and the GLOBE project, while the reliability and validity of the instruments used to collect the multi-country data and the statistical procedures used to calculate the scores are well-documented and credible [36, 71].

However, we were also constrained by the coverage and formulation of the indexes in the datasets. In this study we used the synthetic composite index of e-government development compiled by the United Nations [71] as a key indicator of e-government diffusion together with the United Nations e-participation index. A study by the OECD [52] showed that using such a composite index has both benefits and pitfalls. A composite index can summarize multidimensional and complex indicators in an efficient way that permits ready cross-country comparisons which may assist in national policy making. However, some critics may argue that composite indexes tend to be simplistic and may overlook deeper causes of a phenomenon, in particular when such indexes are difficult to measure [52, 72]. Nonetheless, using three composite indexes, namely, online service index, telecommunication infrastructure index and human capacity index, to measure the level of e-government development does have merit, because it generates a single and internationally-comparable value (called the e-government development index value) for benchmarking against other countries. These same three indexes are also important indicators of e-government development. However, there are other important factors that may affect e-government development, such as the existence of a well-defined e-government development strategy and policy, leadership, and socioeconomic factors such as the digital divide which limits access to e-government services by poorer or poorly-served citizens within a single country. The issue of access is not limited, however, simply to access to infrastructure. Mossberger et al. [49] posited that the digital divide actually includes an access divide, a skills divide, an economic opportunity divide, and a democratic divide. Van Dijk and Hacker [72] described digital divide as a multifaceted concept that included mental access, material access, skills access, and usage access. Drawing on this line of discussion, we suggest that future research should consider these additional factors in developing improved metrics for e-government diffusion.

A recent critique of cross-cultural research concerns the relationship between culture (viewed as an independent variable) and other factors (being the dependent variables) as simply a linear relationship. We acknowledged this concern in our paper by conducting a moderation analysis. In particular, our results confirm that national economic development in the form of GNI per capita has a moderating effect on the relationship between culture and e-government diffusion. At the same time we suspect that there could be other potential moderators and factors at an individual or national level that may affect relationships which our study has not explored empirically. At the individual level, for example, factors could be

attitudinal such as trust of the Internet and e-government service providers, or could be demographic such as gender and age. At the national level, the political system and regime, the social structure or the legal system could be some important moderators. Some studies have shown that democratic political systems are in favour of e-government diffusion and demonstrate a commitment to providing efficient and transparent online services for their citizens in order to overcome barriers to e-government development. Kovačić [47] found that more democratic countries are ranked higher in terms of e-government diffusion than the less democratic countries. He found by using the Freedom House index (cited in [47]) that there was a significant positive correlation between e-government implementation and democracy. Unfortunately, the e-government development and e-participation indexes of the United Nations [71] do not measure any of these factors. Given the focus of our study and the constraints on our datasets, we have not been able to inquire more deeply into these issues. It is hoped that future researchers will take a more integrative and holistic approach to investigating the factors that may contribute to e-government diffusion from both a quantitative and a qualitative perspective, and which may lead to a better understanding of the relationships between culture, e-government diffusion and other factors.

Like national cultural indexes such as that in Hofstede [33], the societal cultural practices index of House et al. [37] used in this study were developed on the premises of cultural homogeneity within a given country. The fact is, however, that intra-national cultural differences and diversity exist in many countries, a factor which needs to be taken into account in future cross-cultural research [69]. We acknowledge that the assumption of cultural homogeneity, which is inherent in the data sets available to us, is likely to have affected the results of our study. For this reason we suggest that caution be taken in making any generalizations or formulating any strategies based on our results. For example, many indigenous peoples in developed countries such as Australia and New Zealand, can have different cultural values from non-indigenous groups and hold the view that relationships with government agencies must be conducted at a personal level to be effective [16]. E-government strategy is likely to be successful in multi-cultural countries only if it takes account of intra-national cultural diversity. We suggest that future research in this field considers the impact of both cross-national and intra-national cultural differences and diversity.

## 11. Conclusions

In this study we have taken a new approach to the analysis of the effects of culture on e-government diffusion by using the GLOBE cultural dimension measures [37] as well as exploring the moderating effect of economic development on the purported relationship between culture and e-government diffusion. Compared with adopting the much-studied Hofstede model, our new approach and findings offer a fresh insight into how culture affects e-government development and participation. For example, we find that in-group collectivism and future orientation, which have a significant impact on e-government, yet were not studied in Hofstede's model. Moreover, our results also show that the impact of cultural factors on e-government diffusion may vary across different economic environments. As a result, this paper makes an original contribution to both cross-cultural and e-government research. From a practical point of view, but within the limits we have noted, the findings of our study could be used to advance the development of national e-government diffusion strategies.

## References



- [1] A.B. Abdullah, K.S. Ling, Z. Samad, The relationship between national culture and e-adoption: a case study of Iran, *American Journal of Applied Sciences* 5 (4), 2008, pp. 369-377.
- [2] Y. Akman, A. Ali, A. Mishra, Arifoglu, E-Government: A global view and an empirical evaluation of some attributes of citizens, *Government Information Quarterly* 22 (2), 2005, pp. 239–257.
- [3] A. M. Aladwani, A contingency model of citizens' attitudes toward e-government use. *Electronic Government, an International Journal* 10(1), 2013, pp. 68-85.
- [4] S. Alateyah, R. M. Crowder, G.B. Wills, Factors Affecting the Citizen's Intention to Adopt E-government in Saudi Arabia. *World Academy of Science, Engineering and Technology* 81, 2013, pp. 601-606.
- [5] D. Aldrich, J.C. Bertotm, C.R. McClure, E-Government: Initiatives, developments, and issues, *Government Information Quarterly* 19 (4), 2002, pp. 349-355.
- [6] N. Ashkanasy, V. Gupta, M.S. Mayfield, Trevor-Roberts, Future orientation, in: R.J. House, P.J. Hanges, M. Javidan, P.W. Dorfman, V. Gupta (Eds.), *Culture, Leadership and Organizations: The GLOBE study of 62 societies*, Thousand Oaks, Sage Publications, Canada, 2004, pp. 282–343.
- [7] A. Aykut, Cross-cultural analysis of European e-government adoption, *World Applied Sciences Journal* 7 (9), 2009, pp. 1124-1130.
- [8] K. Bagchi, P. Hart, M. Peterson, National culture and information technology product adoption, *Journal of Global Information Technology Management* 7 (4), 2004, pp. 29–46.
- [9] K. Barzilai-Nahon, Gaps and bits: conceptualizing measurements for digital divides, *The Information Society* 22, 2005, pp. 269-78.
- [10] F. Bélanger, L. Carter, The impact of the digital divide on e-government use, *Communications of the ACM* 52 (4), 2009, pp. 132–135.
- [11] B. K. Boyd, K. T. Haynes, M. A. Hitt, D. D. Bergh, D. J. Ketchen, Contingency Hypotheses in Strategic Management Research Use, Disuse, or Misuse? *Journal of Management* 38(1), 2012, pp.278-313.
- [12] D. Carl, V. Gupta, M. Javidan, Power distance. in: R.J. House, P.J. Hanges, M. Javidan, P.W. Dorfman, V. Gupta (Eds.), *Culture, Leadership and Organizations: The GLOBE study of 62 societies*, Thousand Oaks, Sage Publications, Canada, 2004, pp. 513–563.
- [13] L. Carter, F. Bélanger, The utilization of e-government services: Citizen trust, innovation and acceptance factors, *Information Systems Journal* 15 (1), 2005, pp. 5-25.
- [14] L. Carter, V. Weerakkody, E-government adoption: A cultural comparison, *Information Systems Frontiers* 10 (4), 2008, pp. 473-482.
- [15] J. Child, *Culture, contingency and capitalism in the cross-national study of organizations*. University of Aston Management Centre, 1979.
- [16] R. Cullen, Addressing the digital divide, *Online Information Review* 25 (5), 2001, pp. 311-320.
- [17] D. Fred, Perceived usefulness, perceived ease of use, and user acceptance of information technology, *MIS quarterly*, 1989, pp. 319-340.
- [18] M.W. Dickson, D.N. Den Hartog, J.K. Mitchelson, Research on leadership in a cross-cultural context: making progress, and raising new questions, *The Leadership Quarterly* 14, 2003, pp. 729-768.

- [19] H. Doong, H. Wang, G.R. Foxall, Psychological traits and loyalty intentions towards e-Government services, *International Journal of Information Management* 30 (5), 2010, pp.457–464.
- [20] M. Douglas, *Cultural Bias*, Royal Anthropological Institute, London, 1978.
- [21] S. Dwyer, H. Mesak, M. Hsu, An Exploratory Examination of the Influence of National Culture on Cross-National Product Diffusion, *Journal of International Marketing*, 13 (2), 2005, pp. 1-27.
- [22] P.C. Earley, C.B Gibson, Taking Stock in Our Progress on Individualism-Collectivism: 100 Years of Solidarity and Community, *Journal of Management*, 24, 1998, pp. 265-304,
- [23] A.A. Erumban, S.B. de Jong, Cross-country differences in ICT adoption: A consequence of culture? *Journal of World Business* 41, 2006, pp. 302–314.
- [24] European Commission, E-government economics project (eGEP): Economic model final version, European Commission, Brussels, 2006.
- [25] European Commission, The impact of e-government on competitiveness, growth and jobs, IDABC e-Government Observatory, Background Research Paper, European Commission, Brussels, 2005.
- [26] Fiedler, E. Fred, The contingency model and the dynamics of the leadership process. *Advances in experimental social psychology* 11, 1978, pp. 59-112.
- [27] M.J. Gelfand, D.P.S. Bhawuk, L.H. Nishii, D.J. Bechtold, Individualism and Collectivism, in: R.J. House, P.J. Hanges, M. Javidan, P.W. Dorfman, V. Gupta (Eds.), *Culture, Leadership and Organizations: The GLOBE study of 62 societies*, Thousand Oaks, Sage Publications, Canada, 2004, pp. 438-512.
- [28] R.N. Gil-Garci-A, T.A. Pardo, E-government success factors: Mapping practical tools to theoretical foundations, *Government Information Quarterly* 22, 2005, pp. 187-216.
- [29] D. Gouscos, M. Kalikakis, M. Legal, S. Papadopoulou, A general model of performance and quality for one-stop e-government service offerings, *Government Information Quarterly* 24, 2007, pp. 860-885.
- [30] L. Guijarro, Interoperability frameworks and enterprise architectures in e-government initiatives in Europe and the United States, *Government Information Quarterly* 24, 2007, pp. 89-101.
- [31] P. J. Hanges, M. W. Dickson, Agitation over aggregation: Clarifying the development of and the nature of the GLOBE scales, *The Leadership Quarterly* 17(5), 2006, pp. 522-536.
- [32] R. Heeks, *Implementing and Managing eGovernment: An International Text*, Sage Publications, London, 2006.
- [33] G. Hofstede, *Culture's Consequences: Comparing Values, Behaviors, Institutions and Organizations Across Nations*, 2nd Edition, Sage Publications, Thousand Oaks, California, 2001.
- [34] G. Hofstede, What did GLOBE really measure? Researchers' minds versus respondents' minds, *Journal of International Business Studies* 37 (6), 2006, pp. 882–896.
- [35] R.J. House, M. Javidan, Overview of Globe, in: R.J. House, P.J. Hanges, M. Javidan, P.W. Dorfman, V. Gupta (Eds.), *Culture, Leadership and Organizations: The GLOBE study of 62 societies*, Thousand Oaks, Sage Publications, Canada, 2004, pp. 9-28.
- [36] R.J. House, M. Javidan, P. Hanges, P. Dorfman, Understanding cultures and implicit leadership theories across the globe: an introduction to project GLOBE, *Journal of World Business* 37 (1), 2002, pp. 3-10.
- [37] R.J. House, P.M. Hanges, M. Javidan, P. Dorfman, V. Gupta, *Culture, Leadership and Organizations: The GLOBE Study of 62 Societies*, Thousand Oaks, Sage Publications, Canada, 2004.

- [38] R. Inglehart, C. Welzel, *Modernization, Cultural Change, and Democracy: The Human Development Sequence*, Cambridge, Cambridge University Press, Massachusetts, 2005.
- [39] R. Inglehart, M. Basañez, A. Moreno, *Human values and beliefs: A cross-cultural sourcebook*. Ann Arbor: University of Michigan Press, 1998.
- [40] M. Javidan, G.K. Stahl, F. Brodbeck, C.P.M Wilderom, Cross-border transfer of knowledge: cultural lessons from project GLOBE, *The Academy of Management Executive* 19 (2), 2005, pp. 59–76.
- [41] M. Javidan, P.W. Dorfman, M.F. Sully de Luque, R.J. House, In the eye of the beholder: cross cultural lessons in leadership from project GLOBE, *Academy of Management Perspectives* 20 (1), 2006, pp. 67–90.
- [42] M. Javidan, Performance orientation, in: R.J. House, P.J. Hanges, M. Javidan, P.W. Dorfman, V. Gupta (Eds.), *Culture, Leadership and Organizations: The GLOBE study of 62 societies*, Thousand Oaks, Sage Publications, Canada, 2004, pp. 239-281.
- [43] M. Javidan, R.J. House, P.W. Dorfman, P.J. Hanges, M.S. De Luque, Conceptualizing and measuring cultures and their consequences: a comparative review of GLOBE's and Hofstede's approaches, *Journal of international business studies* 37(6), 2006, pp. 897-914.
- [44] C.M. Kaylor, The next wave of e-Government: The challenges of data architecture. *Bulletin of the American Society for Information Science and Technology* 31 (2), 2005, pp. 18-22.
- [45] O.E.M. Khalil, e-Government readiness: Does national culture matter? *Government Information Quarterly* 28, 2011, pp. 388–399.
- [46] B. Kogut, H. Singh, The effect of national culture on the choice of entry mode. *Journal of international business studies*, 1988, pp.411-432.
- [47] Z. Kovačić, The impact of national culture on worldwide eGovernment readiness, *Informing Science* 8, 2005, pp.143-158.
- [48] K. Metaxiotis, J. Psarras, E-government: new concept, big challenge, success stories, *Electronic Government, an International Journal* 1 (2), 2004, pp.141-151.
- [49] K. Mossberger, C. Tolbert, M. Stansbury, *Virtual Inequality: Beyond the Digital Divide*, Georgetown University Press, Washington, 2003.
- [50] K. L. Newman, S.D. Nollen, Culture and congruence: The fit between management practices and national culture, *Journal of international business studies*, 1996, pp. 753-779.
- [51] Organization for Economic Co-operation and Development *Rethinking E-government Services: User-Centred Approaches*, Paris, 2009.
- [52] Organization for Economic Cooperation and Development, *Handbook on constructing composite indicators: Methodology and user guide*, Paris, 2008.
- [53] M.F. Peterson, Review of culture, leadership and organizations: The GLOBE study of 62 societies by R.J. House, P.J. Hanges, M. Javidan, P.W. Dorfman, V. Gupta, *Administrative Science Quarterly* 49 (4), 2004, pp. 641–647.
- [54] E. M. Rogers, *Diffusion of innovations* (4), New York: The Free Press, 1995
- [55] H. Scholl, *Applying stakeholder theory to e-government: benefits and limits*. New York Centre for Technology in Government, University of Albany, New York, 2001.
- [56] S.H. Schwartz, Universals in the Content and Structure of Values: Theoretical Advances and Empirical Tests in 20 Countries, In *Advances in experimental social psychology*, eds. M.P Zanna, Academic Press, New York 25, 1992, pp. 1–65.
- [57] W. Seng, S. Jackson, G. Philip, Cultural issues in developing e-government in Malaysia, *Behaviour and Information Technology* 29 (4), 2010, pp. 423-432.

- [58] A.H. Seyal, G.G.M. Pijpers, Senior government executives use of the internet: A Bruneian scenario, *Behavior and Information Technology* 21(3), 2004, pp. 197-210.
- [59] Shultz, S. Kenneth, C. C. Hoffman, R. Reiter-Palmon, Using archival data for IO research: advantages, pitfalls, sources, and examples 31, 2005.
- [60] M. Srite, E. Karahanna, The role of espoused national cultural values in technology acceptance, *MIS Quarterly* 30 (3), 2006, pp. 679-704.
- [61] D. Straub, M. Keil, W. Brenner, Testing the technology acceptance model across cultures: A three country study, *Information & Management* 33(1), 1997, pp. 1-11.
- [62] L. Tang, P.E. Koveos, A framework to update Hofstede's cultural value indexes: economic dynamics and institutional stability, *Journal of International Business Studies* 39, 2008, pp.1045-1063.
- [63] V. Taras, J. Rowney, P. Steel, Half a century of measuring culture: Review of approaches, challenges, and limitations based on the analysis of 121 instruments for quantifying culture, *Journal of International Management* 15 (4), 2009, pp. 357-373.
- [64] J.C. Thomas, G. Streib, The new face of government: Citizen-initiated contacts in the era of e-government, *Journal of Public Administration Research and Theory* 13 (1), 2003, pp. 83-102.
- [65] S. Tifferet, R. Herstein, The effect of individualism on private brand perception: a cross-cultural investigation, *Journal of Consumer Marketing* 27 (4), 2010, pp. 313-323.
- [66] H. L. Tosi, J.W. Slocum, Contingency theory: Some suggested directions, *Journal of Management* 10(1), 1984, pp. 9-26.
- [67] H. C. Triandis, The contingency model in cross-cultural perspective, In M. M. Chemers, & R. Ayman (Eds.), *Leadership theory and research: Perspectives and directions*, San Diego: Academic Press, 1993, pp. 167-188.
- [68] A. Trompenaars, C. Hampden-Turner, *NetLibrary I: Riding the Waves Culture Understanding Cultural Diversity in Business*, 2nd Edition, Nicholas Brealey Publication, London, 2000.
- [69] R.L. Tung, A. Verbeke, Beyond Hofstede and GLOBE: Improving the quality of cross-cultural research, *Journal of International Business Studies* 41 (8), 2010, pp. 1259-1274.
- [70] R. L. Tung, V. Worm, T. Fang, Sino-Western business negotiations revisited - 30 years after China's Open Door Policy, *Organizational Dynamics* 37 (1), 2008, pp. 60-74.
- [71] United Nations, *United Nations e-Government Survey 2012: E-Government for the People*. United Nations, New York, 2012.
- [72] J. Van Dijk, K. Hacker, The Digital Divide as a Complex and Dynamic Phenomenon, *The Information Society* 19 (4), 2003, pp. 315-356.
- [73] D. A. Waldman, M.S. de Luque, N. Washburn, R.J. House, B. Adetoun, A. Barrasa, C. P. Wilderom, Cultural and leadership predictors of corporate social responsibility values of top management: A GLOBE study of 15 countries, *Journal of International Business Studies* 37(6), 2006, pp. 823-837.
- [74] M. Warkentin, D. Gefen, P. Pavlou, G. Rose, Encouraging citizen adoption of e-government by building trust, *Electronic Markets* 12 (3), 2002, pp. 157-62.
- [75] World Bank, *The Worldwide Governance Indicators (WGI)*, 2011, available from <http://info.worldbank.org/governance/wgi/index.asp>. [15 June 2012].
- [76] World Bank, *Definition of e-government*, 2008, Available from <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/EXTEGOVERNMENT/0,,contentMDK:20507153~menuPK:702592~pagePK:148956~piPK:216618~theSitePK:702586,0.html>. [9 July 2009].

- [77] World Bank, How We Classify Countries, 2012, available from: <http://data.worldbank.org/about/country-classifications>.
- [78] Z. X. Xiao, A. S. Tsui, When brokers may not work: The cultural contingency of social capital in Chinese high-tech firms, *Administrative Science Quarterly* 52, 2007, pp. 1–31.
- [79] X. Zhang, L.M. Maruping, Household technology adoption in a global marketplace: Incorporating the role of espoused cultural values, *Information Systems Frontiers* 10 (4), 2008, pp. 403-413.
- [80] F. Zhao, An empirical study of cultural dimensions and e-government development - Implications of the findings and strategies, *Behaviour and Information Technology* 32 (3), 2013, pp. 294-306.

## Highlights

We use the GLOBE model to study e-government diffusion across 55 countries.

Some of national cultural characteristics have a direct impact on e-government diffusion.

Economic development has a moderating effect on culture and e-government diffusion.

The results could advance the development of national e-government diffusion strategies.

Accepted Manuscript