

SIEMENS LTD

Innovation in emerging economies

The country must develop an innovation ecosystem to stimulate innovations. Innovators must be challenged to produce solutions our society needs. And innovative solutions with potential must be nurtured and rapidly applied.

Dr. Manmohan Singh, Prime Minister of India, speaking at the 97th Indian Science Congress 2010, New Delhi

Innovation has become the buzzword of the Indian economy. Today, everyone from the Prime Minister of the country to a superstar in the Bollywood movie industry are talking about innovation and planning to transform India into the innovation hub of the century. Cut-throat competition and changing customer preferences are leading many companies to invest more resources on innovation. One such company is Siemens Ltd, a subsidiary of the giant German multinational, Siemens AG, which has been in the forefront of the innovation revolution in all spheres of technology development and business in India. This case study details the methods of total innovation that have been practised by this company and reveals the corporate strategies behind the many innovation successes of the company.

Innovation at Siemens AG is a multistage process with significant variations in primary processes as well as in corporate thrust and management practices. The innovation process is divided into seven stages dominated by a continual search for answers by comprehensive managerial inputs. These stages are: 1) determining potential demand for products and services in the market; 2) formulating ideas for product/service design concepts and evaluation; 3) problem solving through technical and market analysis; 4) forming prototype products or trial services through the adaptation of new or existing technology; 5) commercially exploiting these products and services; 6) transferring the data to manufacturing and/or service departments; and 7) searching again for new innovative inputs.

Traditionally, Siemens Ltd has followed in the footsteps of Siemens AG. Not only has the company developed a large number of products and processes to suit the needs of the Indian subcontinent, but it has also introduced innovative ideas across many management functions such as marketing, finance, human resources, operations and quality processes.

BACKGROUND OF SUBSIDIARY: SIEMENS LTD

Siemens AG is one of the oldest multinationals in the world, and has a strong reputation for innovation. It was established in 1847 as Telegraphen Bauanstalt von Siemens & Halske in Berlin by a German army officer, Werner von Siemens, along with Johann Halske, Johann Siemens

and just three workmen. Werner had the courage to enter into the giant territory of electrical engineering and shape it scientifically, technically and commercially at a time when the Industrial Revolution was about to transform the world. Inventive spirit, shrewd business sense, and a love for converting scientific and technological principles into practical solutions allowed the company to achieve many notable firsts in the history of engineering, including the pointer telegraph, dynamo, X-ray tube, the world's first electric railway, and laboratory samples of 64 megabyte chips.

The Siemens-Halske organisation continued to grow and innovate. In the early 1900s, the company's chairman initiated labour protection measures, work libraries, medical welfare, holidays with pay and a rest home for employees. Subsequent leaders of the organisation continued the company's innovation efforts through a focus on scientific research and technology. In the second half of the twentieth century it introduced many innovative products such as the silicon rectifier (originally developed by Siemens) for the first time in the German Federal Railways. In 1966, all the group companies merged together to form Siemens AG. In 1971, Peter von Siemens, the great grandson of the firm's founder, took over the chairmanship of the supervisory board of Siemens AG. Under his guidance the company soon became the fifth-largest electrical company of the world. The company also expanded its businesses to various parts of the world. In 1983, the company formed a strategic alliance with Philips to manufacture computer memory chips. This was followed in 1989 by a reorganisation of the company's business divisions, and it acquired French IN 2, British General Electric Company, and a 40 per cent stake in British Telecom. In 1991, the company made an agreement with IBM at Essones/France for joint production of 16-megabit DRAM chips.

In 1994, Siemens set a world record by producing high-temperature fuel cells with an output of 1.8Kw. In 1994, Dr Heinrich von Pierer, an economist, became the chairman of the supervisory board. Siemens had always previously been dominated by engineers. However, with von Pierer's appointment, it gained more market share through globalisation.

Within the company, von Pierer created a cultural revolution. He designed programs to make Siemens more competitive with Japan and responsive to market pressures. He replaced the traditional hierarchical structure with a new emphasis on innovation and service. His initiative reduced the workforce by 7.5 per cent, sold \$2 billion in non-core businesses, and slashed \$3.6 billion in operating expenses by the fiscal year end 1995. Corporate restructuring continued to streamline the business through the 2000s. In 2004, Siemens acquired the wind energy company Bonus Energy in Brande, Denmark, and formed a wind power division. In 2005, Siemens sold Siemens Mobile to BenQ, forming the BenQ-Siemens division. From 2005 to January 2007, Siemens was on a takeover spree and acquired almost ten companies. Since then, driven by innovation, the company has grown from strength to strength.

Siemens Ltd, one of the subsidiaries of Siemens AG, Germany, was incorporated in 1956. It was then named Siemens Engineering and Manufacturing Company of India, Limited. The company first started manufacturing switchboard products and repairing Siemens Germany's products at its Worli Works factory in Mumbai. Thereafter, its business expanded into other product areas

such as power generation, power distribution and medical engineering products. By 1966, the company had four factories across the country, employing more than 2500 people.

Despite many changes and repeated divisional restructuring over the ensuing decades, the company could not obtain the desired results to counter competition. In an 18-month period in 1996-97, the company lost almost Rs 1.5 billion (around \$32 million), the first loss since its inception. This situation compelled Siemens' management to introduce intense, total innovation. The result was a new structure, rebuilding and rearranging the organisational orientation towards the global market and led to double digit growth in sales from 2003-04 to 2006-07.

Innovation continues to be a driver of growth and prosperity. The Siemens Group in India is now considered to be a leader in innovation and implementer of state-of-the-art technology-enabled solutions operating for various core business segments of industry, energy, healthcare and infrastructure and cities in India. The Group is made up of 13 companies that operate across these segments. It employs 19000 people across 21 manufacturing plants, 500 channel partners and a wide network of sales and service offices. Siemens, with its world-class solutions, plays a key role in India's quest for developing modern infrastructure.

INNOVATION IN HUMAN RESOURCE PLANNING AND THE PERSONNEL FUNCTION

In order to support continued growth, Siemens realised the need to transform its existing human resource management (HRM) strategy to a seamless process defining minimum standards. In order to achieve the necessary linking of employment strategy with Siemens' global business strategy, there was a need for:

- active employer branding
- world-class recruiting
- leadership and learning development
- a master data base
- effective key performance indicators (KPIs)
- systematic development, remuneration and retention of the talent pool
- integrated applications for all people processes
- a common language
- a global business view that worked seamlessly with a cluster view.

In order to achieve and maintain its level of innovation Siemens undertook a process of developing a high-performance culture through its 'People Excellence Program', which consists of four main aspects: 1) achieving a high performance culture; 2) increasing the talent pool; 3) strengthening expert careers; and 4) Siemens' Leadership Excellence Program.

People Excellence involves developing each member of the organisation to realise his or her full potential and ensuring that everyone works together to achieve both the organisation's and their

own goals and objectives. For Siemens, it is the people who produce the technology and generate innovation that results in competitive advantage. Siemens' former global CEO, Klaus Kleinfeld, summed up this attitude when he stated: 'Many times in my life I have seen how one individual can make a big difference, particularly when working in a great team. The quality of our people and of our teams is our most valuable resource, particularly in today's changing world where knowledge flows round the globe with lightning speed and is easily available' (Meghana, 2012).

Siemens AG has created a standardised process for managing performance and development of all employees. At Siemens, performance management is the driving force behind its Talent Management Program, which creates a direct linkage between the overall strategy of the organisation and each individual's development scheme. Performance management is the systematic process used to establish trust and open communication. This involves:

1. setting organisational and individual objectives
2. monitoring the progress made towards the achievement of those objectives
3. creating an ongoing dialogue between each employee and their manager
4. creating an environment supporting forthright and honest discussion.

In addition to the above innovations, from July 1997 to November 2001, the company introduced voluntary retirement schemes (VRS) four times for all its employees in factories at Worli, Kalwa and Joka, especially for those who were above 40 years of age or had completed 10 years of service. These rightsizing processes reduced the employee strength by more than 4500 employees. However, the cost of VRS, relocation and retraining of around 1000 (out of 4600) employees hit hard on the company's overall profit. During the financial year 1997-98, the company experienced a further loss of 560 million rupees (around \$12 million).

These innovative processes were not confined only to the production areas of a few divisions, but were also implemented in the other service areas of corporate systems. For example, in 1994, the personnel division introduced an enterprise resource planning (ERP) system, People-soft, to maintain employee data for its executives and managers. In addition to downsizing all the other divisions, the personnel division also initiated VRS and the relocation of some of its employees and managers and outsourced some of the HRM processes and activities to outside parties who had the requisite skills and experience. For example, the company outsourced the employee benefit schemes, such as the handling of Provident Fund (PF) and gratuity payments. The personnel division also outsourced the processes of salary payment to one of its affiliates, Siemens Information Systems Ltd (SISL). Then in 2000, in order to systemise the processes in the personnel function, the division adopted the ISO 9000 quality system to regulate the HRM processes and became one of the very few companies at the time holding independent ISO 9000 certification for its personnel function.

In 2005, the personnel division introduced a new initiative on performance management to be known as Employee Dialogue for Growth and Entrepreneurship (EDGE). EDGE was developed by concentrating on the need for the overall growth and development of employees from a holistic

and long-term perspective. In the same year as the company's shared service initiative, HRM processes across all its entities were streamlined and aligned under one organisation.

INNOVATION IN FINANCIAL PLANNING

From its beginnings, the company had engaged an auditing firm to carry out its regular financial audits. However, despite improved results, the company fell short of working capital at the end of each year and had to borrow capital from banks and other lenders at high interest. Thus, at the end of every financial year, after the interest was paid to the creditors, the company again fell short of working capital to run the business. These recurrences produced another innovative idea in the Siemens management.

In 1997-98, the company appointed a new auditing firm to look after its financial audit. During the preliminary audit by the new audit firm, it was observed that a large amount of inventory items were lying in stock, both as finished goods and raw materials, some of which were not being turned over for a considerable time and were, therefore, being continuously audited as stock. Similarly, there were some customers who did not pay their outstanding accounts. Hence, the new audit firm advised the company to write off the old stock as well as the long-outstanding customer accounts.

These measures were undertaken, but further added financial losses to the company during 1997-98. The company hoped it could dispose of some of the obsolete stock and recover the accounts due from customers at later dates. The revenue generated would then be added as surplus to the organisation. The debt/equity ratio of the company in 1997-98 was 1.3:1. In 2002-03, this figure declined further to 0.01:1, which demonstrated how innovation in financial planning helped the organisation to overcome the problem of working capital. From 2004-05 to 2008-09, the debt ratio further went down to such a minimal amount that it was not reported in the company's annual report.

INNOVATION IN PROCESSES AND SYSTEMS ACROSS DIFFERENT DIVISIONS

In addition to optimising the manpower in some strategic business units and innovative financial planning, in 1997 the company introduced time optimised processes (TOP), with the objective of removing outdated and uneconomical processes in order to further cut costs and improve the total quality of business. The company further looked at capacity utilisation in its factories. It was observed that the investments made earlier in the different factories were not paying the sufficient planned dividends during the budget period in terms of return on capital. Therefore, Siemens decided to initiate an innovative form of outsourcing some of its services in the different factories to achieve operational efficiency through a process of cost minimisation. At the same time, the company also introduced stringent quality measures, such as ISO 9000, to revive and renew the organisation.

INNOVATION IN THE HEALTH CARE DIVISION (HCD)

Siemens India began manufacturing medical products in 1957 at the Worli Works in Mumbai. Early in 1993, operational restructuring processes were initiated in the Medical Solutions Division with the objective of manufacturing some of the high-end medical solutions products for Siemens AG, catering to the South-East Asian market. In 1994, after several searches, a new manufacturing location was chosen in Goa, which had a government incentive of tax exemption for the first five years of operation. Simultaneously, the Indian Central Government exempted corporate taxes for those setting up industries at Goa, also for a period of five years. Overall, however, this project was projected to not produce the economic advantage as was required by its principal in Germany. The company subsequently decided to restructure the existing manufacturing facility, in phases, over the next three years in order to counter the increased manufacturing cost at its Worli factory. By 1997, the Medical Solutions Division had a staff of 375 people (including all officers) in the factories, 340 at Worli and 35 at Goa.

In mid 1997, the company began to outsource the manufacturing of low-end products to local vendors who had the requisite technology and could spare their facilities for manufacturing these products with the idea to close the manufacturing location at Worli. However, the company continued manufacturing the core technology products such as oil immersed multi-pulse X-ray generators at its Goa factory. In mid 1997, despite a great deal of opposition from the employees' union at Worli about relocation, the company was able to resolve the issue and offered employees transfers to different departments/divisions within the organisation.

With the all-round success of VRS during that time, the company was able to handle the major issues. By 1999, the company was running the business of low-end products at the Goa factory only, using just 35 employees but producing the same 250 million rupees (around \$5.4million) sales turnover that in earlier years was produced at Worli with 340 people. With this innovative restructuring, the low-end medical device products of the company became competitive and the company was able to sustain itself due to higher margins.

During 2008-09, the Health Care Division launched a number of new products in the Indian market and was credited with many 'firsts'. The division had also introduced a 24x7 365-day service response to customers, a first in the industry. Table 18.1 details the sequence of innovative changes that took place in the Medical Solutions Division.

TABLE 18.1 SEQUENCE OF INNOVATIVE CHANGES IN SIEMENS MEDICAL SOLUTION DIVISION

Year	Sequence of change to gain competitive advantage
1956	Commenced manufacturing two pulse generators and manual X-ray examination stands and tables at the Mumbai factory

Year	Sequence of change to gain competitive advantage
1964	Introduced semi-automatic production processes and started making motor-operated X-ray tables
1974	Introduced an improved vacuum impregnation process in the assembly of oil immersed X-ray generators
1977	Introduced motor-operated examination tables with automatic screen frames
1984	Introduced digital displays into the controls of generators
1988	Introduced 50 kilowatt multi-pulse generators for examination tables
1991	Introduced 4 kilowatt multi-pulse generators for mobile X-ray units
1993	Introduced 10 kilowatt multi-pulse X-ray generators for manual X-ray examination tables
1993	Restructured the entire medical engineering division in phases
1994	Selected a new manufacturing location at Goa to produce and market high-end products
1998	Suspended medical products manufacturing at Worli
2000	Reduced the manufacturing of all products to 35 people at Goa
2005	Completed 50 years of manufacturing in India

INNOVATION IN THE ENERGY SECTOR

With the growth of industry in India, demand for power reached its peak after the company's second five-year plan, so it decided to expand manufacturing of switchboard products. In 1960, the company set up a workshop at Kolkata (Calcutta) for the manufacturing and repair of power distribution equipment for the eastern region of the country. In 1980, with the further demand for power, the factory was relocated to Joka, a suburb from Kolkata, and eventually this manufacturing facility was transformed into a subdivision of the Energy Division (later renamed the Low Voltage Distribution Systems Division).

In 2000–01, the low voltage industry was suffering from excessive manufacturing capacity due to the presence of a large number of local companies and dwindling demand due to depressed market conditions. The overall market for the Low Voltage Distribution Systems Division remained stagnant and was characterised by intense competition, putting tremendous pressure on the price of low voltage products. As a consequence, the Low Voltage Distribution Systems Division posted a 40 per cent decrease in product turnover and order value. At the end of 2001, the company closed the Joka factory and transferred some of the employees to Siemens Metering Ltd. After the closure of this operation, the division began procuring the low voltage

products orders from the switchboard factory, thus making full-scale utilisation of free capacity at its Kalwa factory.

The twin initiatives of closing the high-cost manufacturing operation at Joka and integrating a completely new business process deploying a lean cost structure while maintaining high-quality standards supported the division's turnaround with the business objectives being achieved within less than two years. As a result of this integrated focused market approach, the division achieved a substantial increase in market share.

The division also developed new technology products. The concentrated focus on its spare parts and service business helped it to achieve a record fourfold increase in product turnover over the next three years. Finally, in 2005, this division was renamed the Power Transmission and Distribution Division and joined the Energy Sector of the company's business along with Power Generation Division. Table 18.2 details the innovative Energy Sector changes in the eastern region of the country.

TABLE 18.2 SEQUENCE OF INNOVATIVE CHANGES OF SIEMENS ENERGY SECTOR IN THE EASTERN REGION

Year	Sequence of changes to gain competitive advantage
1960	Creation of a workshop for repairing energy equipment for the power sector at Kolkata
1964	Manufacturing of small switchboards for eastern region
1980	Manufacturing location shifted to Joka, near Kolkata
1995	Achievement of all-time-high production of 3500 panels
1996	Became largest producer of low voltage switchboards among all units of Siemens worldwide
2000	Total restructuring of the division
2001	Introduction of a fresh VRS at Joka
2002	Closure of the Joka factory and procurement of products from Kalwa

CEO PERSPECTIVE ON INNOVATION AT SIEMENS

In order to gain further insight into the innovation strategy at Siemens Ltd, we initiated a series of conversations with Mr Vijay Paranjape, who at this time was CEO at Siemens (he retired from that position in 2011) concerning various aspects of innovation including strategy, operating practices, resources, measures of innovation performance, the behaviour and culture expected from people

working on innovations, as well as recognition and rewards for innovation. His views on innovation at Siemens Ltd are summarised as follows:

- Siemens provides state of the art products and innovative solutions in the areas of industrial automation, drive technology, industry solutions, mobility and building technology.
- Innovation is the life blood at Siemens. Innovation is one of Siemens' core values. So, obviously, it is perceived as fundamental when working with any technology solution provider. Siemens always tries to build its products with what is right for the task/job. A number of times this results in more than the customer has asked for or the technical standards have prescribed, since Siemens refuses to compromise on its philosophy of providing what is right for the job.
- The inputs for the development of these products are provided by business development teams and are based on various sources such as usage by key customers, competitive offerings and overall business trends. The performance of Siemens' products is always based on applicable statutory and regulatory standards.
- Siemens' focus is to enhance its innovativeness and hence its competitiveness in the markets served. As such, product development activities and the allocation of resources are always guided by this.
- Siemens follows a structured approach towards the entire life cycle of the products, during which inputs are systematically collected from business development. These inputs are thoroughly analysed by the development team before realisation. During the entire realisation phase, a cross-functional team consisting of people from various areas such as marketing, manufacturing, purchasing and development is formed.
- The 'Go/No go' decision is made based on such criteria as investment constraints, market share, development time, supplier competencies, type of manufacturing set-up required and compatibility with existing/global product architecture. Typically, new product development is based on either regional or global requirements to optimise development efforts and cost. Periodically, product competitiveness is checked to maintain alignment with market requirements.
- Typically, electrical products such as motors, contactors and breakers are based on mature technologies and are in conformance with international standards. Indian customers typically want to use such products for at least 20 years and sometimes up to 30 years. New products, therefore, need to be introduced anywhere between 10 to 20 years to offer enhanced benefits to customers. The old products are still required to be supported for 10 to 15 additional years to cover their useful life. These requirements mean Siemens needs to have overlaps between core products and new products.

- Typically, Siemens uses its internal resources for innovation, while it may use external test labs to validate the results. There is a dedicated team of R&D engineers connected within its global development network for the purposes of knowledge sharing.

COMMENTS FROM THE MANAGING DIRECTOR

This innovative strategy was further endorsed by Armin Bruck, Managing Director (MD) of Siemens India. In an article in *The Economic Times* he said: 'We plan to invest over Rs 6,000 crore (US\$1.33 billion) into localized "base level" products for the Indian rural market. Simple-to-use base level products are based on standard technology designed for basic requirement of domestic markets in a cost effective way. Our estimate is that India is 70% "base level"' (Bruck, 2010). Bruck believes the best way to obtain a large share of the mass market is provide low-cost solutions. He said, 'We need to re-design technology. But that is also a difficult task since the company will not want to lose its reputation for quality in the pursuit of low cost solutions' (Bruck, 2010).

Bruck further added, 'With eight base-level products and solutions in India in the market, we plan to install six new hubs that will make products and solutions for the base-level segments. Three of them will focus on low-end signalling systems, solutions for iron and steel making equipment, and EPC execution for full turnkey power plant solutions. The other three will focus on wind turbines, ring main units, and steam turbines.' He concluded the article by saying, 'With our expertise in many technologies like offshore wind parks and solar thermal power, there is a huge growth potential in India.'

FUTURE OUTLOOK OF THE COMPANY

The loss that the company made for the first time in 1996 ignited the processes of innovation in this subsidiary, which was reflected in its all-round cleansing operations such as downsizing, optimising of all functional processes, outsourcing products and services, concentrating more on core competencies, and keeping the quality standards ahead of all future actions. These actions included maintaining high employee morale during the changes.

When Siemens felt there was a need for financial restructuring, it did not delay taking action and the continuous shortage of working capital forced the company to change the auditing systems. Although this action continued to produce losses to the company, in the long run it helped management to reduce the heavy interest burden. Above all, this course of operational restructuring finally helped the organisation return to profitability. From 2000-01 onwards, the company made a turnaround and started earning regular profits, resulting from the processes of total innovation that continue today within the organisation.

DISCUSSION QUESTIONS

1. Explain the importance of leadership characteristics [see Chapter 3] as a key factor in organisational innovation, particularly with respect to Siemens India's approach.
2. How well does Siemens in India use and adapt to local circumstances, the innovation culture and the processes of its European heritage, and what adaptations were required?
3. What are the strengths and weaknesses of Siemens India's human resources approach: can you suggest further innovations?
4. What are the strengths and weaknesses of Siemens India's structure and operations: can you suggest further innovations?
5. Evaluate the financial and future prospects of Siemens India.
6. Do you think that Siemens India's innovation activities make it a good prospective place to work, and to invest in? Why?

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