THE INTERNATIONAL JOURNAL OF BUSINESS & MANAGEMENT

Effectiveness of Quality Management Practices and Domain Quality Certification in Indian IT Companies: A Comparative Study

Maitreyee Das
Delivery Assurance Manager, Consultant, Tata Consultancy Services, India

Abstract:
This paper tries to identify few key quality management practices covering both hard and soft TQM practices that have helped Indian IT organizations to achieve their business target through improved performance. From the available literature the paper tries to find out the impact of certification of compliance with different international quality standards like CMMI, ISO 9001 on the business results of these companies. It also focuses on the recent trend of these organizations on getting certified with various domain specific quality models like TL9000 for telecommunication Industry, AS9100 for aerospace industry and ISO 13485 for medical devices and health care services. Where these models are extending over and above ISO 9001 guidelines and how they are helping the IT organizations in improving the operations of their industry specific individual vertical delivery units are also discussed.

1. Introduction

In the last two decades software Industry in India has witnessed a sporadic growth in terms of revenue and manpower. Export orientation of Indian IT firms has forced the organization to adopt international standards for the quality of their product and services. USP of these software industries has gradually moved from least cost to quality of delivery. Contribution of the work done by different quality gurus like Edward Deming, Joseph Juran in different times is significant. Firms gradually started understanding that Quality is not only a shop floor activity that is restricted only in post production inspection and defect fixing but spans across a much wider spectrum. Quality needs to be in-built from the strategy development to the end to end operations of the organization. Thus Indian software companies started imbibing the concept of TQM philosophy, whose foundation was established in Japan in 1950s, in their business operations and its implementation became instrumental for the success of the companies. Study has also shown that with business growth and specialization of functions, many companies are also showing a growing trend for full or partial outsourcing of their quality functions.

A number of studies have been conducted to estimate the impact of TQM implementation in business growth, critical success factors for TQM implementation and the implementation challenges faced by the companies. While most of the study result showed a positive impact on business growth through TQM implementation, it has been seen that handful of soft aspects of TQM quality practices, such as employee commitment, shared vision and customer focus and some hard practices like Knowledge Management, Configuration Management, Innovation, Software Design Framework, Automated Testing, Productivity Improvement through Reuse contributed to organizational performance. From these empirical studies it has been established statistically that the key factors from TQM philosophy that contributed towards the success and business excellence of the organizations are commitment from top management, employee empowerment and their involvement at all levels, innovation and continuous improvement and customer focus.

Implementation of Enterprise Resource Planning (ERP) and TQM also went hand in hand. Analyzing the success factors and challenges faced by different firms implementing ERP it has been found that, integration of all functions in the organization, business process reengineering, quality at every interface within the organization and encompassing the supplier and customer along with the full commitment of top management and customer orientation had been the critical success factor for ERP. Eventually these are also the basic principles of TQM philosophy. It has also been empirically proved that organizations with TQM built in their strategy have been more successful in managing resistance to change for ERP implementation.

Adoption of various quality models and certification has also proved to be immensely effective in implementing Total Quality Management in the organizations. Most preferred quality models adopted by different organizations are ISO 9001 and CMMI. While ISO provides general guidelines for implementing quality practices for all types of Industries, CMMI specifies software specific goals and practices that lead to effective implementation of quality management practices for IT firms.

Apart from ISO and CMMI, Six Sigma and Lean methodology for software process improvement have also drawn management's attention in various organizations. Six Sigma started in 1980s in Motorola. Robert Galvin, at that time CEO at Motorola, realized the importance of working systematically with variance reduction as the Japanese had done for a prolonged period. Together with

other quality practitioners he used the name Six Sigma. Especially after the remarkable success of the General Electric Company, its popularity grew many folded. Through the waste reduction technique in Lean and variation reduction technique in Six Sigma methodology, it related the software process improvement directly to improved revenue realization and bottom-line result. Use of statistical tools like hypothesis testing, analysis of variance, correlation & regression, paved the way for more measurement oriented performance evaluation, capability analysis, process yield and statistical process control.

In early 2000 the IT organizations also showed an increasing trend for domain quality certification relevant to their operational scope. Some of these important domain standards the IT organizations are adopting are TL9000 for Telecom, AS9100 for Aerospace industry, ISO 13485 for medical devices. Companies are also showing increasing interest for quality standards for their internal operation excellence and are getting complied with BS OHSAS 18001 standards for operational Health, Safety or ISO 14001 for environment management and PCMM assessment models for the well being and work environment for its associates.

2. Literature Review

Literature Review shows that extensive studies have been conducted both in manufacturing and service industry to understand the influence of various soft and hard quality management practices on effective implementation of TQM and its relation to company's performance.

Faisal Talib (Aligarh Muslim University), Zillur Rahman (IIT Roorkee) and M.N. Qureshi (Baroda University) (2010) attempted to develop a TQM implementation and evaluation research framework that can be used as a guide in the formulation of an effective TQM implementation approach to Indian service sector. In another research work with a sample size of 600 firms four chosen service industries Healthcare, Banking, Information and Communication Technology (ICT), and Hospitality, the authors Faisal Talib, Zillur Rahman and M.N. Qureshi (2013) also empirically established the positive correlation between these TQM practices and quality performance. Research of M Hasan and R.M. Kerr, University of New South Wales, Sydney, indicated that Role of top Management and Customer Satisfaction are among the most important critical success factors of TQM in terms of their effect on organisation's performance. Chin S. Ou, Fang C. Liu, Yu C. Hung (Department of Accounting and Information Technology, National Chung Cheng University, ChiaYi, Taiwan, ROC), David C. Yen (b Department of Decision Sciences and Management Information Systems, Miami University, Oxford, Ohio) empirically examined the extent to which TQM and business performance are correlated and how TQM impacts various levels of business performance through improved operating performance by increased quality performance, increased customer satisfaction as well as market share. To establish a relationship between TQM and financial performance Kenneth M. York and Cynthia E. Miree from Oakland University, USA (2004) analysed the influence of TQM based quality models like MBNQA and other state quality awards the financial performance of the company measured in terms of increased sales, profit, market share. All these studies identified TQM practices namely Top-management commitment, customer focus, training and education, continuous improvement and innovation, supplier management, employee involvement, information and analysis, process management, quality systems, benchmarking, quality culture, human resource management, strategic planning, employee encouragement, teamwork, communication, and product and service design are the critical success factors for achieving business goals. It was also indicated that organizations that want to implement TQM effectively must have patience because TQM takes a long time to get implemented and to have fruitful results. It requires major changes in cultural aspects as well as employee mindset in an organization.

Some of the studies have been conducted to relate human resource factors of TQM with organizations performance. Ankur Jain from Symbiosis Law School, Noida and S. L. Gupta from Birla Institute of Technology, Mesra, Ranchi (2012) conducted a research to find the effects of Total Quality Management on Perceptual Human Resource Management Outcomes in Software Industry in India. To do this they identified 12 constructs for TQM namely Top management commitment & leadership, Organizational culture, Customer focus, Process Quality Management, Human resource management, Quality of work life, Continuous Improvement, Employee Empowerment, Benchmarking, Communication, Risk Management, Infrastructure & Facility as independent variables and four factors like Employee satisfaction, Employee motivation, Employee trust, Employee commitment and loyalty as the constructs for dependant variable for perceptual HRM outcomes. Research finding shows that most important TQM practices that explain the variance in employees' job perceptions are Employee empowerment HRM and Organization culture. In an attempt to build a conceptual design for total quality human resource management, Ms. Ankur Jain and Dr. S.L. Gupta identified two components – (1) Employee management system and (2) Empowered management system for the TQHRM Model. Unlike traditional performance appraisal system which is reactive and corrective in nature, employee management system focuses on continuous employee development through career planning, coaching, mentoring and reward.

While most of the studies have been done to validate effect of TQM practice wise on organization's performance, some of the research work have sought for any direct influence of adoption of quality models and certification on factors like financial performance, company image and employee perception.

AKI HERAS SAIZARBITORIA from University of Spain (2006) tried to explore the value of Quality certification on company results. Feedback was collected from a group of panelists from assessors, auditors, academicians on their views on the effect of certification on operations, economic results, on workers motivation and commitment, effect on customers, effect on company image and on quality of products and services. While majority accepted that the implementation of both ISO 9000 and EFQM models has a positive influence on company results, mainly through the improvement of operations, efficiency and the costs of companies, internal activities, a small group opines that obtaining certificates or awards as an aim in itself, or in other words, quality as a mere advertising tool which means nothing more than short-term success, something that could have a negative bearing on the expansion of what has come to be known as the quality movement. Further empirical studies are necessary to analyze the real perceptions of the various agents (consumers, managers, suppliers, intermediary clients, workers, etc) with regard to the different concepts, systems, models or tools related to quality.

While Interest and increased adoption for TQM implementation continued for manufacturing and service sectors, Six Sigma, a more metrics based performance measurement and improvement methodology gained popularity. Sunil Thawani, certified Six Sigma Black Belt, IRCA UK (2000) focused on the implementation of Six Sigma in service industry which initially originated from manufacturing practices in Motorola and GE in 1980s. According to him the biggest challenge in implementing six sigma in service industry is defining a defect which, he mentioned should be in terms of customer's expectation about the service quality level. He also highlighted that standardized service processes like issuing credit cards, opening bank account, administering customer loyalty programs, purchasing, accounts payable, payroll, budgeting processes etc. can be strong candidates for applying six sigma. In a detailed case study on Wipro Technologies Dr. Manisha Sharma, Dr. Kapil Pandla, Prof. Prashant Gupta from Jaipuria Institute of Management (2007) mentioned how Wipro leveraged from six sigma implementation in its quality journey to emerge as a global IT giant. The main challenges that Wipro had to overcome in institutionalizing six sigma were creating a culture of quality within the organization through support from top management in providing an infrastructure, training and confidence on the processes, Selection and prioritising the improvement projects and resource allocation to execute the same. Results were directly reflected in the improved bottom line through considerable reduction in operating cost, increased productivity and on time completion of big projects.

3. Domain Quality Certification

As IT industry is moving more towards end to end business consultancy from mere software vendor, the demand of subject matter experts from different industry domains have increased. In the last decade most of the IT firms had gone for verticalised structure dividing their entire operations into industry specific sub units like banking, finance, insurance, telecom, healthcare, utilities, manufacturing and retail. While these vertical units directly interact with customers and mainly focus on domain competency, the horizontal units were developed with niche software and computer skill to address the needs of these vertical units. Seniors associates from different industries have been recruited and vertical units have emerged with a good mix of techno-functional skills. With this change in structure and mode of operation, modification and addition of some of the quality management practices as per the industry requirement became evident. Customers started expecting the inclusion of domain specific statutory and regulatory requirements in the software design itself. As a result the trend of IT organizations getting certified in different domain specific quality models like TL9000 for Telecom, AS900 for aviation or ISO 13485 for healthcare vertical has increased. All these models were developed as an extension of ISO 9001 and add or supplement requirements specific to that industry.

While TL9000 (Telecom Leaders 9000) Quality Management System developed by QuEST Forum in 1998 is an unique extension of ISO 9001:2008 to meet the supply chain quality requirements for Telecommunication Industry, AS9100 developed by SAE (formerly the Society of Automotive Engineers) in collaboration with AAQG (American Aerospace Quality Group) and IAQG (International Aerospace Quality Group), is an international quality standards for establishing and maintaining a quality management system for aviation and aerospace industry. ISO 13485 quality standards were developed in addition to ISO 9001 to suit medical devices manufacturing and related service requirements. Since medical device industry is highly impacted by a complex set of regulatory requirements and national and international standards, the quality assurance focus is more on validation process, compliance with statutory and regulatory requirements and effective product traceability and recall system. At the same time aviation industry being a high risk sector and passengers safety being of paramount importance quality focus is strongest in the design process. Multiple design phases including creation of conceptual design, creation of preliminary design, preliminary design review, and creation of detailed design drawings of 3D models and assemblies, critical design review are important. In TL9000 standards, additional requirements are mainly in the areas of performance measurements based on the reliability of the product, specialized service functions like installation, provisioning and trouble shooting and lab safety for equipment vendors, telecom network operators and suppliers.

Telecom being an important line of business for software industry, almost all the top IT companies of the country got certified in TL9000 during 2000-2010. Wipro technologies being the first to get certified in year 2001, with a total of its 5 centres getting certified subsequently, followed by TCS that got its first TL9000 certification in 2006. 29 centres of Tata Consultancy Services Ltd. are TL9000 certified now. 7 centres of Cognizant Technology Solutions and 5 centres of Infosys are Tl9000 certified at present, the year of first certification being 2008 and 2009 respectively. For all these companies the scope of certification is limited to software and services and hardware wherever necessary. Software and Service scope includes design, development, support and sustenance of Software Solutions and Services for the Telecom Industry.

The common scope for ISO 13485 certification by IT organization generally includes the contract manufacture and repairing of PCB assemblies for medical devices, development of suppliers and development of precision machined parts for use in medical devices, the provision of product design services and engineering services for normal and implantable medical devices. Tata consultancy services and its 5 centres across India first got certified in ISO 13485 in 2007. TCS also got certified in AS9100C in the year 2006, the scope of audit being the design of airframe structure, avionic systems, aircraft assembly tools and engine external components, provision for engineering services and analysis, tech publication and manufacturing support, design and development and maintenance of support software.

4. Conclusion

The increasing interest and the growing trend of domain certification for the IT industry go in line with the improved overall and vertical business performance. The need of getting complied with the domain quality standards provides the vendors an in-depth understanding of the criticality of customers' business, driving factor for success, eventually helping them to improve their market share through a competitive advantage. This also enhances the customer's confidence level to work with their IT vendors as their end to end business partners.

If the growth pattern of IT company is observed post these certification for overall or vertical performance an increasing trend is noticed. Like for TCS post 2006, the year of TL9000 certification Telecom vertical maintained a steady growth rate between 15-20% and Healthcare vertical post 2007, the year of ISO 13485 certification maintained a growth rate between 25-35%. However this result cannot conclusively establish the contribution these domain certification for business growth as there are various other parameters to be considered to identify the effective contributing factors. The scope for further study and research exists to identify how much these practices from domain related quality models have helped the organizations to achieve their business goals or how much these quality awards or stamping have helped to win new or repeat business

5. References

1. http://www.questforum.org
2. http://www.qualitydigest.com/magazine/2002/may/article/aerospaces-as9100-qms-standard.html
3. http://www.sae.org/standardsdev/aerospace/2014_aerochart.pdf
4. http://tl9000.org/about/tl9000/mentor_program.html
5. International Journal of Reviews in Computing - Contribution of TQM and Six Sigma.pdf
6. IPEDR vol.12 (2011) © (2011) IACSIT Press, Singapore - Linking TQM and Financial Performance
7. Quality Management Practices - An Empirical Investigation of Associated Constructs in Two Kuwaiti Industries
8. QUALITY MANAGEMENT PRACTICES IN INDIAN IT INDUSTRY - IJRIM Volume 2, Issue 2 (February, 2012)
9. Significance of Quality Certification towards Business in Software Industry - International Journal of Innovation, Management and Technology, Vol. 2, No. 3, June 2011
10. Interdisciplinary Journal of Information, Knowledge, and Management - TQM for Information Systems.pdf
11. www.infosys.com/ ; www.cognizant.com, www.tcs.com, www.wipro.com/india