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Service Sector Performance Management through Six Sigma

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Abstract:
There is still no universal definition for Six Sigma because it has yet to be referred to all practitioners and academics. Its philosophies have been defined with respect to its statistical prowess while at the same time some definitions try to relate its business applications more apparent. No matter which way a researcher tries to define Six Sigma, it is a methodology using different approaches to come up with the same goal. Determination of Critical Success Factors is the key to implement Six Sigma. This paper provides opportunity for understanding the concept of Six Six Sigma and its implementation in the service sector. Studies on factors influencing service sector performance management using six sigma are reviewed.

Key words: *Six Sigma, Performance Management, Service Sector*

1. Introduction

Six Sigma is a philosophy to continuously reduce variation in processes and aim at the elimination of defects or failures from every product, service and transactional process (Hoerl, 1998). By definition, Six Sigma is a statistical term that refers to 3.4 defects per million opportunities (or 99.99966 percent accuracy), which is as close as anyone is likely to get to perfect. A defect can be anything from a faulty part to an incorrect customer bill (Paul, 1996). Six Sigma is an organized and systematic method for strategic process improvement and new product and service development that relies on statistical methods and the scientific method to make dramatic reductions in customer defined defect rates (Linderman et al, 2002). Six Sigma is a highly disciplined process that focuses on developing and delivering near-perfect products and services continuously. Six Sigma is also a management strategy to use statistical tools and project work to achieve breakthrough profitability and quantum gains in quality (Wortman et al, 2001). There are some similarities among all the definitions provided.

The crucial aspects of the corporate-level preparation for the Six Sigma methodology include establishing key business performance measurements, ensuring organizational effectiveness, keeping ready the organization for Six Sigma, and establishing goals for improvement (Gupta, 2004). If an organization is able to put into place this foundation for Six Sigma, then it has the potential to generate sustained success, set a performance goal for everyone in the company, enhance value to customers, accelerate the rate of improvement, promote learning and be able to execute strategic change (Pande et al., 2000).

2. Six Sigma Critical Success Factors (CSFs)

CSF is the term for an element that is necessary for an organization or project to achieve its mission. It is a critical factor or activity required for ensuring the success of a company or an organization. The term was initially used in the world of data analysis, and business analysis. For example, a CSF for a successful Information Technology (IT) project is user involvement. "Critical success factors are those few things that must go well to ensure success for a manager or an organization, and, therefore, they represent those managerial or enterprise areas, that must be given special and continual attention to bring about high performance. CSFs include issues vital to an organization's current operating activities and to its future success. Success factors were already being used as a term in management when Rockart& Bullen, 1981 re-introduced the concept to provide greater understanding of the concept and, at the same time, gives greater clarity of how CSFs can be identified. The value stream for a business process is the series of steps that occur to provide the product, service and/or experience the customer desires. Thus steps that do not add value, that represent a waste or that a customer does not want and would not pay for, are not part of the value stream.

Ayonchakraborty 2004 et al. The study revealed that the applications are limited mostly to service industries in North America and Europe. Benefit-wise, these are mostly expressed in financial terms and not much is published about the benefits in process improvement terms. It is also important to note that the applications emphasized the proper identification of critical success factors (CSFs), critical to quality characteristics (CTQs) and key performance indicators (KPIs). These factors are:

- Top management commitment (Coronado and Antony, 2002; Goh, 2002).
- Education and training (Johnson and Swisher, 2003; Coronado and Antony, 2002; Goh, 2002).
- Cultural change (Caulcutt, 2001).
- Customer focus (Coronado and Antony, 2002; Goh, 2002).
- Clear performance metrics (Sehwall and DeYong, 2003; Goh, 2002).
- Attaching the success to financial benefits (Goh, 2002).
- Organizational understanding of work processes (Hensley and Dobie, 2005).

Further, Lixia Wang, 2011 found knowledge management as a vital element for Six Sigma strategy implementation. Coronado and Antony, 2002 identified 12 typical CSFs from their review of Six Sigma textbooks and related literature. To name a few these CSFs include the role of management, Belt's qualification, project selection techniques and deployment strategy, such as project management skills, organizational infrastructure and training. Further, papers have been published to confirm these critical success factors (Blakeslee Jr, 1999; Brue, 2002; Lanyon, 2003). However, all the studies that identify these issues are descriptive studies and there is a need to verify them empirically. In addition, there is a need to determine the specific issues in this context.

3. Organizational Performance

To remain competitive, businesses need to understand that the scope of the traditional quality management must be extended and redefined to include the new factors that influence quality and organizational success (Dasgupta, 2003). These essential factors are incorporated in the six-sigma concept.

Rucker, (2000) summarized some of the major savings and quality improvement efforts. They are presented in the following Table. He found that that six sigma reduces process time, improves cash management and increases customer loyalty and satisfaction.

Company	Savings
Motorola (1987-1994)	Reduced in-process defect levels by a factor of 200 Reduced manufacturing costs by $1.4 billion
Allied Signal (1992-1996)	Reduced new product introduction time by 16%
General Electric (1995-1998)	Companywide savings of over $1 billion

Table 1: Somecompanies and Their Six Sigma Results (Rucker, 2000)

Although the six sigma approach to quality and process improvement has been used predominantly by manufacturing organizations, currently the popularity of six sigma in service organizations is increasing with time. (George 2003) states that even within manufacturing companies, it is very common to have only 20 per cent of product prices driven by direct manufacturing labour with the other 80 per cent coming from indirect costs associated with support and design functions, including finance, human resources, and marketing. The objective of a six sigma strategy in service processes is to understand how defects occur and then to devise process improvements to reduce the occurrence of such defects which improve the overall customer experience and thereby enhance customer satisfaction(Harnett & Murphy, 1993). Manufacturing organizations build six sigma efforts on an established base of measurable processes and established quality management programs. In service organizations, it is often a struggle to develop and apply measurements of quality. Six sigma is attractive to many service processes today because of its customer-driven methodology (Taghaboni- Dutta and Moreland, 2004). In any industry the purpose of six sigma is to identify key processes critical to customer satisfaction.

4. Importance of Six Sigma in Service Sector

The most obvious reason why service companies keep away from six sigma is because they perceive it as a manufacturing tool. However, experts (Keim, 2001) say this is not true because there are some service companies which are saving millions of dollars for each project through

training the leaders on statistical tools on six sigma and they are able to balance the employment expertise. Lack of information is tangible in most of the service organizations. So frequently these organizations cannot purse a proper and comprehensive quality indicators and quality programs.

Most people feel that six sigma sounds too technical (Ravi Behara, 1995).The problems mentioned in the figure below lead to poor performance of service sector. The fear of metrics is another obstacle that stands in the way of the service sector and Six Sigma.

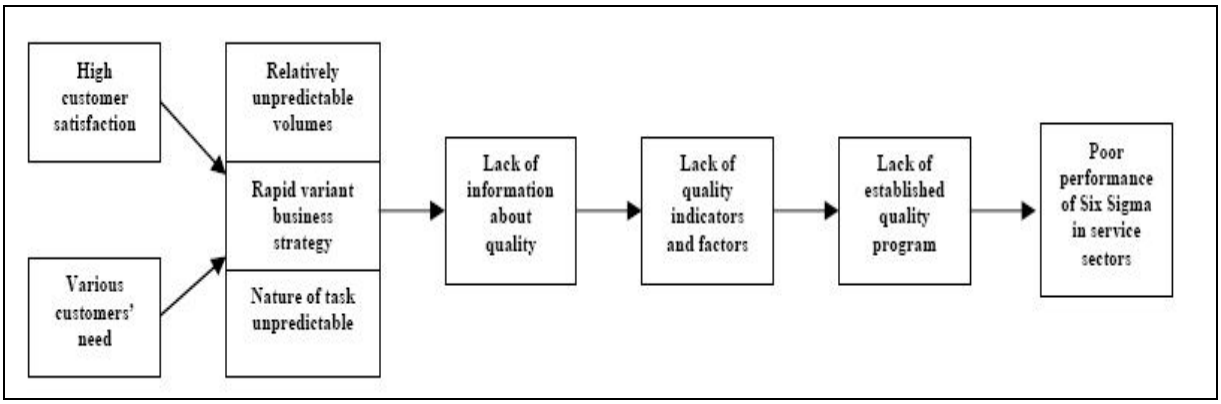

Figure 1: Major Causes For Poor Performance Of Service Sector (Mohammad, Rosnahmohd., 2003)

The importance of metrics is to give an insight into the business working processes. Service based companies need to focus all their attention on developing Six Sigma projects that specialized in their business needs like customer and cash generation. Convincing the service sector about the merits of taking up six sigma has proven to be a big challenge. Most service companies still believe that Six Sigma can only benefit the manufacturing industry.

Six sigma is useful in the field of sales and marketing as well. According to six sigma data (Thawani, 2004), during sales, too much face time with a customer can prove to be counter-productive. Changing this process can result in an increase in the percentage of sales per product.

Type Of Service Function	**Potential Areas Where Six Sigma May Be Employed**
Banking	Fund transfer processing time, number of processing errors, number of customer complaints received per month, number of ATM breakdowns, duration of ATM breakdowns, etc.
Healthcare	Proportion of medical errors, time to admit in an emergency room, number of successful surgical operations per week, number of wrong diagnoses, waiting time to serve at the reception in a hospital, etc.
Accounting and finance	Payment errors, invoicing errors, errors in inventory, inaccurate report of income, inaccurate report of cash flow, etc.
Public utilities	Late delivery of service, number of billing errors, waiting time to restore the service after a fault has been reported, call centre of the utility company, etc.
Shipping and transportation	Wrong shipment of items, wrong shipment address, late shipment, wrong customer order, etc.
Airline industry	Baggage handling, number of mistakes in reservation, waiting time at the check-in counter, etc.

Table 2: Applications of Six Sigma in Service Sector (Mohammad Aazadnia Et Al, 2008)

Other industries that six sigma has assisted in the past are the financial service sector, insurance companies, management companies, educational institutions, high-tech companies, state agencies and many more. Six sigma is a powerful business strategy that yields a dramatic reduction in defects, errors, or mistakes in service processes (Antony, 2005). It is a powerful methodology developed to accelerate improvement in service quality by focusing relentlessly on reducing process variation and eliminating non-value added steps or tasks (Kwak and Anbari, 2004). Improved processes lead to improved customer satisfaction, increased productivity, increased market share, business profitability, and so on. Six sigma provides business executives and leaders with the strategy, methodology, infrastructure, tools and techniques to change the way businesses are run (Antony and Banuelas, 2001). In spite of a number of six sigma success stories in manufacturing organizations, many service organizations are yet to be convinced of the benefits from the introduction, development, implementation and deployment of six sigma within the service industry.

Research carried out by Yilmaz and Chatterjee (2000) has shown that most service processes such as shipping, invoicing, billing, payroll, customer order entry, baggage handling processing, etc., are being performed at less than a 3.5 sigma quality level, with a defect rate of over 23,000 ppm or 97.7 per cent yield. If the sigma quality level of the above mentioned processes is improved to a 4 sigma quality level, the defect rate will drop to 6,210 ppm. This clearly indicates a 3.7-fold improvement in process performance. The process yield will be increased to 99.38 per cent. This would bring significant financial returns to the bottom line of any organization engaged in continuous improvement programs such as six sigma. Service processes create scrap and rework in the form of costs of

poor quality just like manufacturing processes (Bisgaard and Freiesleben, 2009). In fact, most developed countries no longer have a manufacturing-based economy. The real economy in these countries involves such fields as financial services, health care, e-commerce, and logistics, but less manufacturing, this has tended to move offshore to low-cost locations. Six sigma can be used in this case to reduce the costs of poor quality so that a more consistent process for service delivery may be achieved. Another important reason for the introduction of the six sigma strategy in many service companies is that customers of today feel "process variability" in the delivery of the service provided and not just on "process average or mean". The objective of a six sigma strategy is to reduce "process variability" around the acceptable target service performance.

5. Conclusion

The paper explains the concept of Six Sigma in details and reviewed several studies to implement of six sigma in service sector. Six Sigma can be used in service sector for reducing processing time, processing errors, customer complaints, payment errors, invoicing errors, errors ininventory, inaccurate report of income,inaccurate report of cash flow, delay in service delivery, billingerrors, waiting time. Six Sigma can also be implemented to solve issues related to wrong shipment of items, wrong shipmentaddress, late shipment, baggage handling, number of mistakes inreservation, and waiting time at the check-incounter in airports. Depending the nature of the service industry activities the influencing factors for successful implementation of six sigma can be identified on a case by case basis and necessary process improvements can be made to achieve break through results.

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