

The Role And Impact Of The Contributions Of Tqm And Six Sigma On The Service Organizations

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Abstract.

The Six Sigma concept represents a step forward in the evolutionary development of the approaches for providing competitive advantage based on continuous quality improvement. In that sense, this concept is the successor of TQM, and, as each new generation surpasses its predecessor, Six Sigma goes beyond TQM. The objective of this paper is to contribute a clear understanding of TQM & SIX SIGMA is helpful to the organizations. This paper contains the approaches of SIX SIGMA are DMAIC & DMADV. The main aim of this paper is to explore the most common challenges, difficulties, common myths and problems that both TQM and Six Sigma met in the service organization and the way they had been adopted and implemented.

Key words: TQM, SIX SIGMA, DMAIC, DMADV and Quality, Service Quality.

1. INTRODUCTION:

Quality is not only a strategic weapon for competing in the current marketplace, but it also means pleasing consumers, not just protecting them from annoyances. Therefore, a company's specific advantage is to identify and then compete on one or more of the dimensions of quality [1].

Six Sigma and other concepts, have grown in popularity and many organizations have shifted their strategies and practices towards these concepts. That view is supported by Pande et al. (2000), who assert that "TQM is less visible now than in the early 1990s due to problems including lack of integration, leadership apathy, a fuzzy concept, unclear quality goals and a failure to break down internal barriers" and conclude that Six Sigma can overcome these deficiencies, stating that Six Sigma's expansion heralds a 'rebirth' of the quality movement. Furthermore, Harry (2000) claims that "Six Sigma represents a new holistic, multidimensional systems approach to quality that replaces the 'form, fit and function' specification of the past" and *the financial Times* wrote in October 1997 that "Six Sigma is a program aimed at the near

elimination of defects from every product, process, and transaction".

Many organizations have come to realize that achieving zero-defect goods and services can lead not only to customer satisfaction but also to improved internal efficiency and reduced costs. The Six Sigma quality and management programme has been a key basis for the success of multinational companies such as Motorola. According to recent figures, fewer than 10 percent of companies are adopting a Six Sigma program to the point where it is going to make any sort of significant difference to the bottom line in any meaningful period of time.

1. The TQM philosophy:

Over the past decade, companies experienced dramatic changes in business environment characterized by such phenomenon as increasing consumer consciousness of quality, rapid technology transfer, globalization and low cost competition. After more than a year of continuous decline on international trade, the global economy begins to recover but this news can block the development and also can block policies adopted in order not to fall into a new crisis [2].

TQM is a systems approach to management that aims to enhance value to customer by designing and continually improving organizational processes and systems. It provides a new vision for management leadership. It places customers as principal focal point and redefines quality as customer satisfaction. TQM relies on fact-based decision-making. TQM is a broad-based approach used by world class companies to achieve organizational excellence, the highest weighted category of all the quality and excellence awards [3].

TQM implementation is based on three core elements:

- The TQM philosophy that comprises a set of TQM principles;
- The organizational culture – the present and desired state of culture that will be reached when the TQM philosophy is realized; and

- The implementation strategy – the approach to realizing the philosophy that will specifically include the activities to identify and offset TQM implementation barriers.

The competing value framework (CVF) proposed and tested by Denison and Spreitzer (1991) has been selected to identify types of organizational culture and explore underlying dynamics of culture in terms of TQM practices being supported by type of culture.

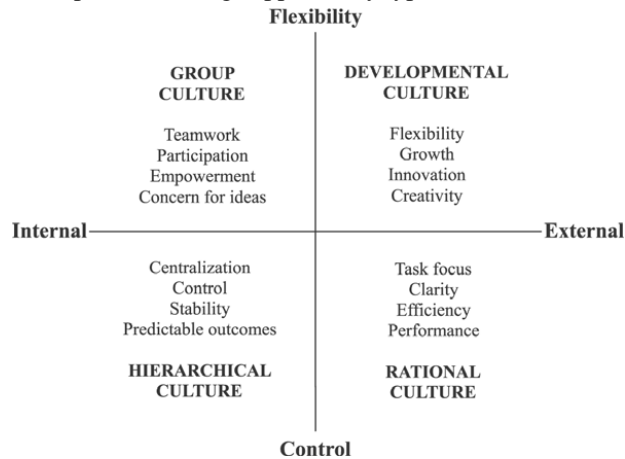


Figure 1. The competing values framework of organizational culture (adapted from Denison and Spreitzer, 1991)

In recent years some definitions with a system emphasis have been suggested. These are based on a kernel of core values that seems to have converged [4]. One of these definitions is from Hellsten and Klefsjö (2000), who define TQM “as a continuously evolving management system consisting of values, methodologies and tools, the aim of which is to increase external and internal customer satisfaction with a reduced amount of resources”, see Figure 2. They argue that the methodologies (or “ways to work consisting of a sequence of activities”) and tools (that is, “more concrete diagrams or matrices, sometimes with a statistical base”) should consequently and continuously be chosen to support the values to be part of the culture. The three units together form in that way the whole.

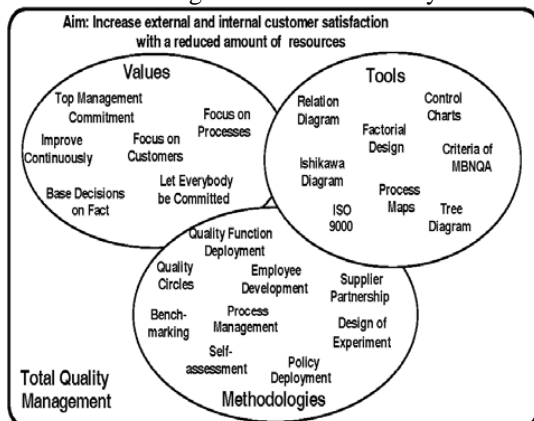


Figure 2: TQM seen as a management system consisting of values, methodologies and tools. The methodologies and tools in the figure are just examples and not a complete list.

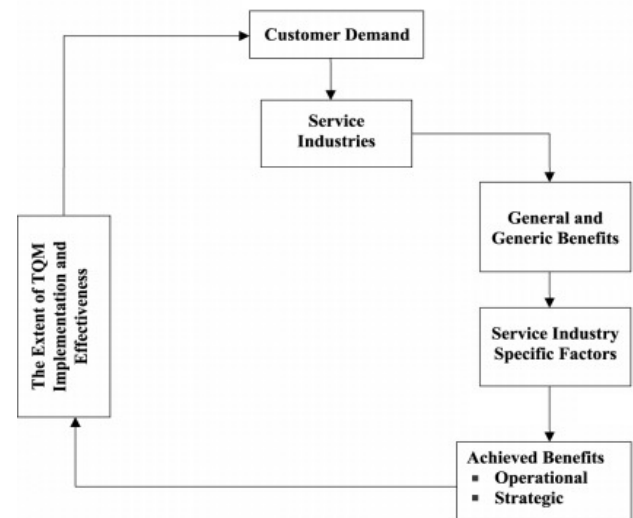
Although the system view is not always as clear as in Hellsten and Klefsjö (2000), many definitions of TQM of today contain the ingredient values (sometimes called core values, principles or cornerstones as well) and ways to work (also called methods, methodologies or techniques). TQM can, in most descriptions, be characterized by a number of values, illustrating how we should act in our profession. These focus on the six values mentioned in Figure 2 i.e., on continuous improvements, fact based decisions, participation of all the staff, process focus and, last but not least, a customer perspective in what we do.

Because quality means both producing products to specifications and meeting customer’s expectations, the needs of customers becomes a key input to TQM [5].

A review of the literature also shows that, according to some authors, TQM is rather than a mere set of factors, a network of interdependent components, a management system consisting of critical factors, techniques and tools [6].

Figure 3 show the benefits obtained by service organizations after the implementation on TQM.

Figure 3. A conceptual framework for TQM implementation and benefit in a service operational setting



Source: [Yasin, M. et al. 2004, p. 378] [7]

The TQM approach is characterized by an orientation towards quality which helps to prevent problems and to produce continuous improvement of the existing situation. This attention should permeate all levels of the company right from the top management down and all company functions[8].

TQM can be studied from three different approaches: contributions from quality leaders, formal evaluation models and empirical research. Taking the initial research as a basis, the critical factors of TQM found in the literature vary from one author to another, although there is a common core, formed by the following

requirements: customer focus, leadership, quality planning, management based on facts, continuous improvement, human resource management (involvement of all members, training, work teams and communication systems), learning, process management, cooperation with suppliers and organizational awareness and concern for the social and environmental context [6].

2. The Six Sigma methodology:

Six Sigma was started in Motorola by engineer Bill Smith in the late 1980s in order to address the company's chronic problems of meeting customer expectations in a cost-effective manner. Within improvement projects quality problems were systematically analyzed at the front end of the process and continued throughout the manufacturing process using four phases (Measure, Analyze, Improve, and Control). Jack Welch, the CEO of GE applied this program across all of GE integrating training of Six Sigma into the promotion structure.

The primary objective of the Six Sigma methodology is the implementation of a measurement based strategy, which focuses on process and sub-processes improvement through the application of Six Sigma best practice such as DMAIC and DMADV.

Six Sigma is a process-focused and data driven methodology aimed at near elimination of defects in all processes (i.e. manufacturing, service and transactional) which are critical to customers. As a powerful business strategy, Six Sigma has been around for almost 20 years and has grown exponentially in financial services sector during the past seven years or so in the USA and probably four years in the UK. The financial service companies which have made significant impact to the bottom-line include Citigroup, Bank of America, American Express, J. P. Morgan Chase, Zurich Financial Services, HSBC, Credit Suisse, Royal Bank of Scotland, Barclays Bank to name but a few here [9]. Six Sigma is a statistical measure whereby it measures variation in process around its mean. It considers any data point that is beyond customer specified limit, as defect. The measure is quite proven and one could always assume that there will be 3.4 defects per million opportunities to have a process at Six Sigma levels.

Six Sigma has evolved into an organizational approach to operational excellence by recognizing that it:

- Fundamentally changes an organization's culture.
- Has proven successful in all industries despite varying processes and functions.
- Is built on principles such as customer focus, proactive management (versus fire-fighting), and measurement of variation; all essential to achieving world-class operational capability.

Six Sigma enterprises are intensely customer-focused and reliable and consistent in the delivery of their products and services.

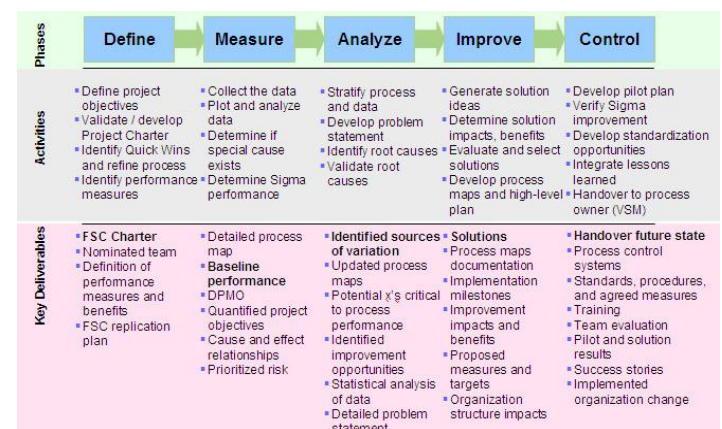
2.1 SIX SIGMA'S DMAIC AND DMADV APPROACHES:

Six Sigma drive for defect reduction, process improvement and customer satisfaction are based on the "statistical thinking" paradigm, a philosophy of action and learning based on process, variation and data. Statistical thinking provides practitioners with the means to view processes holistically[10].

The Six Sigma DMAIC (Define, Measure, Analyze, Improve, and Control) method is applied for improving existing processes and looking for incremental improvement. The Six Sigma DMADV (Define, Measure, Analyze, Design, and Verify) is applied for developing new processes or products at Six Sigma quality levels. Six Sigma typically have exceptional human capital. Not all organizations peopled by exceptional personnel achieve excellent results, however. What sets Six Sigma organizations apart from others is application of a structured knowledge-acquisition/problem-solving approach known as DMAIC, an acronym that represents "Define-Measure-Analyze-Improve-Control" or its design methodology for new processes – Design for Six Sigma with its associated Define-Measure-Analyze-Design-Verify (DMADV) approach that creates synergy between genius and quality that is characterized by superior ideas proved to be so by superior results in areas of strategic import[11].

There is a logical thought progression from process-variation-data to define-measureanalyze-improve-control (DMAIC) shown in figure 4.

Figure 4. DMAIC implementation approach: Six Sigma methodology.



When all key processes within a business are completed for each of these five each phases, the business will naturally reach the Six Sigma quality. To ensure the success of a DMAIC methodology, the company's top leaders must undertake the role of Champion, giving active support and encouragement to all business process owners. The process owners in the specific Six Sigma project implementation must emphasize the bottom-line, which has a profit contribution to the business[12].

In contrast, *applications of Six Sigma* that focus on the design or redesign of products and services and their enabling processes so that from the beginning customer needs and expectations are fulfilled are known as *Design for Six Sigma (DFSS)*.

The focal aim of DFSS is to create designs that are resource efficient, capable of exceptionally high yields, and are robust to process variations. This aim produces a recasting of DMAIC that can be aptly characterized as **Define-Measure-Analyze-Design-Verify (DMADV)** and described as follows.

- **Define** customer requirements and goals for the process, product or service.
- **Measure** and match performance to customer requirements.
- **Analyze** and assess the design for the process, product or service.
- **Design** and implement the array of new processes required for the new process, product or service.
- **Verify** results and maintain performance.

Harry (2000) claims that “Six Sigma represents a new holistic, multidimensional systems approach to quality that replaces the ‘form, fit and function’ specification of the past” and *the Financial Times* wrote in October 1997 that “Six Sigma is a program aimed at the near elimination of defects from every product, process, and transaction”. Tools and techniques used in various of these phases include process maps, quality function deployment, Pareto charts, scatter diagrams, affinity diagrams, brainstorming, the nominal group technique, as well as more substantial quantitative approaches such as correlation analysis, design of experiments, and regression analysis[13].

The TQM concept has been blamed for being vague – let us therefore briefly look at some definitions found in recent literature of Six Sigma. Do we really have a consistent picture of what it means or is the definition of Six Sigma also vague?

“Six Sigma is a business improvement approach that seeks to find and eliminate causes of mistakes or defects in business processes by focusing on process outputs that are of critical importance to customers.” [14].

“A Six Sigma initiative is designed to change the culture in an organization by way of breakthrough improvement in all aspects of the business.” [15].

The key elements of Six Sigma implementation which service organizations must take in consideration are:

- Customer □ Customer Satisfaction;
- The customer is the center of the universe □ He defines the quality;
- Process □ Think from outside to inside;
- Quality requires watching your business from customer's perspective rather than yours. With this knowledge can add value significantly or

can improve the process of Customer Perspective □ CTQ's (critical to quality are customer needs translated into critical process requirements that are specific and measurable. A fully developed CTQ has five elements: Output Characteristic, Project Output Metric, Target, Specification/Tolerance Limits and Defect Definition);

- Employee → Management commitment;
- People create results. Fundamentally in quality approach is the involvement of all members/employees. The company is committed to providing opportunities and incentives for employees who focus their talent and energy in achieving customer satisfaction → For all employees.

This is why it can be beneficial to embed Black Belts in business units, where they can monitor processes regularly, collect feedback and make sound, data-based decisions. Six Sigma identifies several key roles for its successful implementation such as: Six Sigma Champions, Six Sigma Master Black Belt, Black Belts, Six Sigma Green Belt, and Six Sigma Yellow Belt.

3. Linking TQM and Six Sigma to business strategy of service organizations

Services are by nature very often bound by time in terms of the processes that are run and lead to the delivery of an outcome that benefits a customer.

It is difficult to argue that any change management philosophy or methodology is new. TQM development has followed two major strands, namely mechanistic perspective TQM and organic perspective TQM. Parallels can be drawn with the current measures and process focus of Six Sigma, along with its tentative people development. It is contended that Six Sigma is a specific development of TQM, and that Six Sigma currently belongs to the mechanistic development of TQM, although it may be developed in a more holistic manner. Many of the organizations currently claiming success from Six Sigma have also long established TQM programmes, e.g. Motorola, GE, Nortel, Boeing [16].

It is quite a common view among many people engaged in service organizations that Six Sigma requires complicated statistical tools and techniques. The truth is that Six Sigma is not about a collection of statistical tools and techniques. In fact, service organizations do not simply need many of the tools and techniques of the Six Sigma toolbox. The majority of the process and quality related problems in service organizations can be readily tackled using the simple problem solving tools of Six Sigma such as process mapping, cause and effect analysis, Pareto analysis, control charts and so on[10].

The main weakness of traditional TQM concepts is the exclusive focus on customer requirements. Six Sigma in contrast focuses on quality from both the customer's and the investor's perspectives with the aim to meet

customer requirements fully and profitably. Nevertheless, like TQM, Six Sigma requires a strong incorporation of the corporate control system to enable companies to objectively measure and monitor their long-term development within, and monetary outcome of TQM using statistical techniques[17].

There is a cause-and-effect relationship between the TQM practices and corporate performance, measured by employee relations, productivity, customer satisfaction, or profitability [1].

The results are:

- Better employee relations. Employees experienced more job satisfaction, there was a higher rate of attendance, and there was less turnover, absenteeism and accidents.
- Improved operating procedures. Companies increased the reliability and on-time delivery of their products or services and reduced errors product lead-time, and cost of quality.
- Greater customer satisfaction. There were fewer customer complaints and a greater number of customers stayed with the company.
- Increased financial performance. Each company also improved its market share and increased profitability.

Many processes in the finance sector can be performed in a standardized way, especially in the field of processing customer related outputs like payments/credit cards transactions, processes using self service devices like ATMs, securities settlement and loan approval processing. A similar potential can be found in the insurance sector, e.g. application handling, contract issuing, and processing of claims [18].

Table 1 shows how an organization can pursue its business strategy across the similarities and differences between TQM and Six Sigma.

Table 1. Different approach for TQM and Six Sigma for better business strategy

TQM	Six Sigma
Not necessarily part of the Business Strategy	A strategy from the top of the Business Unit
No bottom line accountability	Projects frequently have a profitability hurdle
Improve and uniform processes	3.4 defect per million opportunities
Usually not targeted to a process or business	Targeted areas
Management and employees' involvement.	Management takes an active role in all phases of Six Sigma

Since the goal of any organization is to make profits, Six Sigma projects make business processes profitable while attacking variability which leads to high scrap rate, high rework rate, low productivity etc. In every single project, the link between the project objectives and the business strategy should be identified[19].

4. CONCLUSION:

This paper explores the contribution of TQM and SIX SIGMA in the organizations. TQM has been used successfully in variety of organizations, including manufacturing and service organizations.

It is widely accepted that TQM takes a long time to implement as it requires major organizational changes in culture and employee mindset. To get the benefits from TQM, one must be patient. It improves performance in the long-haul. Finally, we believe that TQM has still a long way to go.

Recent surveys show that about 30 percent of manufacturing plants in United States have widely embraced TQM (Tanincez, 1997).

TQM and Six Sigma are two different approaches that can be very strong together if they are implemented in a service organization with a good business strategy. While TQM is focused on customer, Six Sigma focused on improving quality and obtaining zero defects in all the processes of an organization. While TQM it advocates for increasing customer satisfaction, Six Sigma can act as an enabler for cultural change. Nowadays because of the global crisis, almost all service organizations have suffered and it's very important for them to know what their customers think about the services offered and how they can improve their process with the objective of increasing their customer's satisfaction, which is the goal of any competitive organization.

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