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## Pareto analysis of total quality management factors critical to success for service industries

**Abstract:** Total quality management (TQM) is an integrated management approach that aim to continuously improve the performance of products, processes, and services to achieve and surpass customer's expectations. To accomplish this objective, some key factors that contribute to the success of TQM efforts are to be identified. These key factors are often termed as critical success factors (CSFs). The purpose of the present study is to identify and propose a list of "vital few" TQM CSFs for the benefit of researchers and service industries practitioners. A quality tool "Pareto analysis" was used to sort and arrange the CSFs according to the order of criticality. A few vital CSFs were identified and reported. The results of this study will help in successful implementation of TQM program in organizations. The managerial implications, research recommendations, and scope for future research work are presented in the end.

**Keywords:** total quality management (TQM); critical success factors (CSFs); top-management commitment; Pareto analysis; service industries.

## 1. INTRODUCTION

The concept of quality management (QM) is quite old and was first originated in Japan after Second World War with emphasis on improving quality and using quality control tools in the manufacturing sector. Later, the QM concept moved to USA, UK, and other countries and was applied initially in the manufacturing sector. Since then, the idea of QM has been growing fast. It has now been taken a shape in a series of international standards in the ISO 9000 series. Numerous approaches of QM were suggested, in order to help industries improve efficiency and competitiveness through improvement of quality. One of the most popular and often recommended approaches is the philosophy of total quality management (TQM) that seeks to integrate all

organizational functions to focus on meeting and surpassing customer's requirements and organizational objectives. There are many definitions of TQM. Youssef *et al.* (1996), defined TQM as: "An overall philosophy whose objectives is to meet or exceed the needs of the internal and the external customer by creating an organizational culture in which everyone at every stage of creating the product as well as every level of management is committed to quality and clearly understands its strategic importance". Demirbag *et al.* (2006) on the other hand, defined TQM as: "A holistic management philosophy aimed at continuous improvement in all functions of an organization to deliver services in line with customer's needs or requirements under the leadership of top-management". Also, Christofi *et al.* (2008) defined TQM as: "A supply-chain-wide quality

commitment-from the supplier, to the producer, to the consumer-of an organization, in order to achieve excellence in production and service management”.

There are several definitions given by different authors but the essence of these definitions share many common elements. First, they share the customer as the centre of attention and driving force in the TQM philosophy. Second, they consider management commitment as an essential component for success of TQM. Lastly, they consider cultural and organizational changes as necessary conditions for TQM success. To summarize, TQM is a management philosophy that helps managing organizations to improve its overall performance and effectiveness in achieving quality status at global level (Zhang *et al.*, 2000; Yousof and Aspinwall, 2000, 2001; Arumugam *et al.*, 2008). Further, Dahlgard *et al.* (1998) contended that there is no standard recipe for a good TQM program.

From the last two decades the awareness of TQM has considerably increased and become a well-established field of research for academia (Yusof and Aspinwall, 1999; Arumugam *et al.*, 2008). Voluminous work has been done and still been undertaken on TQM practices and business performance in the service sector. Many empirical studies have reported strong and positive results on the link between TQM practices and quality performance (Lakhal *et al.*, 2006; Prajogo and Sohal, 2003; Fryer *et al.*, 2007; Samat *et al.*, 2006; Wali *et al.*, 2003; Kaynak, 2003; Powell, 1995; Hafeez *et al.*, 2006; Mellahi and Eyuboglu, 2001) while some other studies also suggested a positive link between TQM practices and organizational performance (Anderson *et al.*, 1995; Flynn *et al.*, 1995; Choi and Ebock, 1998; Cua *et al.*, 2001; Kaynak, 2003; Wali *et al.*, 2003). In general, these studies provide support for the hypothesis linking TQM practices to quality and organization

performance. Prajogo and Sohal (2004) and Sureshchandar *et al.* (2001) suggested that TQM has been widely accepted as a management model if the approach is implemented successfully. The work by Jablonski (1991) and Hasan and Kerr (2003) on the relevance and impact of TQM, asserted that those implementing TQM will realize increased productivity, increased customer satisfaction, reduced costs, enchanted quality of work, and increased competitive advantage. A study by Talib and Rahman (2010a) on the impact of TQM in different service industries like: health-care, banking; food and distribution industry, education, and IT/IS, contribute the relevance of TQM in these service industries. The other important concerns of TQM include managerial issues, customer issues, implementation framework, TQM barriers, and application of tools and techniques.

Empirical studies on TQM started to grow by 1989 when the critical success factors (CSFs) of TQM were first introduced and operationalized by Saraph *et al.* (1989). The survey approach by him set a new direction for TQM practitioners and researchers interested in identifying CSFs of TQM. Later, some authors have developed a similar approach to identify and investigate the CSFs. Oakland and Leslie (1996) explained CSF as a term used to mean the most important sub-goals of a business organization. Hoang *et al.* (2006); Fryer *et al.* (2007); and Zhang *et al.* (2000) identifies core practices in TQM implementation in both manufacturing and service organizations. In this respect, several studies have attempted to identify the CSFs of TQM process (Saraph *et al.*, 1989; Flynn *et al.*, 1994; Ahire *et al.*, 1996; Curry and Kadasah, 2002; Motwani, 2001). Review of the literature suggested that there are numerous CSFs that can be identified as being crucial to successful implementation of TQM. Some of the studies in the QM area that analyzed TQM CSFs in service industries were conducted

by Ahire *et al.* (1996); Black and Porter (1996); Al-Khalifa and Aspinwall (2000); Mahapatra and Khan (2006); Zhang *et al.*, (2000); Rahman and Siddique (2006); Talib and Rahman (2010b) and many other are detailed in the present study. These studies identified CSFs of TQM for service industries which are adopted by the managers and practitioners successfully in their organizations.

Further, the extent review of literature also suggested that the concept of TQM and its practices is increasingly being applied in the service sector, including financial services; IT/IS sector; health-care establishments; higher education institutions; hospitality industry; public sector etc. Therefore, the focus of this paper will be on CSFs of TQM in the service sector.

Keeping in view the above literature, the purpose of the present study is to identify and propose a few vital CSFs of TQM for the benefit of researchers and service industries practitioners. The outcome of this study will help researchers to carry out further statistical analysis and in developing models to measure and sustain the level of implementation of TQM in the service sector.

Furthermore, this study also presents a solution to the difficulties faced by researchers and practitioners of service industries in operationalizing and selecting vital CSFs from a very large number of CSFs proposed by the various empirical studies published on TQM and its practices from last two decades.

The remaining of this paper is structured as follows: in the next section, the review of the literature is presented concerning about what are CSFs and TQM CSFs in service industries. The following section provides the research objectives and methodology of the present study. The subsequent section discusses theory of Pareto analysis and reflects the details of the Pareto analysis of TQM CSFs. Finally, the results are concluded followed by

managerial implications, recommendations, and scope for future research work.

## 2. LITERATURE REVIEW

Earlier empirical studies in TQM suggested that the successful implementation of TQM will result in improved employee involvement, improved communication, increased productivity, improved customer satisfaction, and improved competitive advantage (Prajogo and Sohal, 2003; Antony *et al.*, 2002; Tsang and Antony, 2001). Also, a strong competitive pressure has forced service industries to adopt QM tools and techniques to offer higher quality products and services as a way to delight and keep their customers intact. Many organizations have implemented TQM and identified CSFs for better business performance in order to improve their position in the global market which is now become an important research area in TQM.

### 2.1. What are critical success factors?

A literature review of the previous empirical studies on TQM evolved that researchers and academicians have defined TQM CSFs in different ways although they are complementary to each other (Prajogo and Sohal, 2003; Terziovski and Samson, 1999). Generally speaking, the CSFs can be defined as “the critical areas which organization must accomplish to achieve its mission by examination and categorization of their impacts” (Oakland, 1995). On the other hand, according to Boynton and Zmud (1984), CSFs are those vital construct that must go well to ensure success for a manager or an organization, and therefore, they represent those managerial or organizational areas that must be given special and continual attention to bring about increased performance. Brotherton and Shaw (1996)

defined CSFs as “the essential things that must be achieved by the company or which areas will produce the greatest competitive leverage”. They emphasize that CSFs are not objectives, but are the actions and processes that can be controlled by management to achieve the organizations goals. The definition given by Boynton and Zmud is more universal which is equally applicable to all sectors. The importance of defining the CSFs of TQM for implementation is to increase the success rate, reduce costs, and prevent disillusionment with continuous improvement programs (Fryer *et al.*, 2007). Alternatively, it can be said that the CSFs are those vital few requirements that must be present in an organization to be able to attain its vision, and to be guided towards its vision (Wali *et al.*, 2003). Hence, better management of such CSFs will result in improved quality and increased financial performance for the organization.

## 2.2. Critical success factors of TQM in service industries

The extent review of the literature suggested that there are numerous CSFs (also referred as constructs or TQM practices in the literature) that can be identified as being crucial to the successful implementation of TQM. Table 1 presents a list of CSFs of TQM as recommended by various authors of the current literature review. CSFs as reported in the TQM literature have been investigated extensively by Saraph *et al.*, 1989; Brah *et al.*, 2000; Agus, 2004; Behra and Gundersen, 2001; Sila and Ebrahimpour, 2002; Samat *et al.*, 2006; Antony *et al.*, 2002; Sureshchandar *et al.*, 2002; Talib and Rahman, 2010b; and others . All these studies have described similarities among practices adopted by different service industries as well as by manufacturing and service industries both, and their implementation framework.

One of the earlier empirical studies in

the QM area by Saraph *et al.* (1989) have used data obtained from 162 managers of 20 manufacturing and service industries collected in the region of USA to identify the CSFs of TQM. They identified eight factors: top-management leadership, role of quality department, training, product design, supplier quality management, process management, quality data reposting, and employee relations. Meanwhile, Black and Porter (1996) developed an empirical framework for TQM using the criteria for the Malcolm Baldrige Quality Award (MBQA) as well as the perceptions and experiences of a range of total quality practitioners as the basis. Their study covered manufacturing and service industries and presented ten CSFs: corporate quality culture; quality improvement measurement systems; communication of improvement information; strategic quality management; teamwork; structure, people/customer management; operational quality planning; external interface management; supplier relationships; customer satisfaction orientation.

Behra and Gundersen (2001) discussed 11 TQM practices which contribute to success in a TQM program. They are: compensation, benchmarking, training management, empowerment, technology management, assessment, process management, participation, teamwork, and training and outcome measurement. Their study empirically developed 11 practices through a survey of 170 US service firms. Li (1997) developed six CSFs of TQM in hospitals based on the general and health service quality literature. They are: top-management leadership, information analysis, workforce development, organizational cooperation, technology leadership, service quality performance. A sample of 150 community hospitals in three diverse US regions of Florida, Ohio, and Oregon were used in the study.

Samat *et al.*, (2006) extracted seven

practices from 25 TQM practices as prescribed by Sila and Ebrahimpour, (2002). They are: management support and commitment, employee involvement, employee empowerment, information and communication, training and education, customer focus and continuous improvement.

A recent study conducted by Talib and Rahman (2010b) identified nine important CSFs of TQM in their literature review on implementation of TQM in service industries, they are: top-management commitment, customers focus, training and education, continuous improvement and innovation, supplier management, employee involvement, employee encouragement, benchmarking, and quality information and performance. Al-Marri *et al.* (2007) proposed 16 TQM practices for successful implementation of TQM in the banking service sector, they are: top-management support, customer focus, strategy, benchmarking, employee involvement, recognition and reward, problem analysis, quality technologies, service design, servicescapes, service culture, social responsibility, human resource management, continuous improvement, quality department, quality systems.

The study on the automobile service station by Saravanan and Rao (2004) defined 12 QM factors, they are: top-management commitment and leadership, benchmarking, customer focus and satisfaction, service marketing, social responsibility, human resource management, employee satisfaction, service culture, servicescape, continuous improvement, technical system, and information and analysis. While Sureshchander *et al.*, (2001) through review of the prescriptive, conceptual, practitioner and empirical literature on QM, identifies 12 critical dimensions of QM as critical for the institution of a TQM environment in service organization. The dimensions that they have identified are:

top-management commitment and visionary leadership, human resource management, technical system, information and analysis system, benchmarking, continuous improvement, customer focus, employee satisfaction, union intervention, social responsibility, servicescapes, and service culture.

Another study by Brah *et al.*, (2000) on TQM and business performance in Singapore service sector identified 11 constructs of TQM implementation, which are: top management support, customer focus, employee involvement, employee training, employee empowerment, supplier quality management, process improvement, service design, quality improvement rewards, benchmarking, and cleanliness and organization.

Beside this, Tari (2005) developed eight CSFs from his literature review of 106 ISO 9000 certified firms in Spain. They are: customer focus; process management; leadership; supplier management; learning; quality planning; continuous improvement; and employee management.

Other similar studies on TQM CSFs are presented in Table 1 and are considered in the present study for further review.

### 3. RESEARCH OBJECTIVES AND METHODOLOGY

The objectives of the present study are twofold: first, to apply a Pareto analysis quality tool and sorting of the CSFs in descending order according to the frequencies of their occurrences obtained from the present literature review. Second, to investigate and propose a compiled and final list of “*vital few*” CSFs of TQM which could benefit the researchers and practitioners of service industries.

The methodology adopted in the present study was in-depth literature review of those studies focusing on

QM/TQM CSFs/practices either in service industries or in manufacturing and service industries both, and the studies that correlated the QM/TQM CSFs/practices with organization/business performance outcomes. The studies so chosen are either empirical or review studies and CSFs were statistically tested and validated in these studies. Although, there is a voluminous research papers published on TQM CSFs in the last two decades, but in this study, a comprehensive search was made using on-line data base to identify research papers published in referred journals between 1994 and 2010 (except one study by Saraph *et al.*, 1989). This study was considered because of its significance to the current study as TQM CSFs were first introduced and operationalized through this study. The results were further refined to identify the relevant TQM research papers using a set of keywords/phrases like “TQM practices”, “CSFs”, “empirical TQM”, “quality practices”, and “TQM CSFs in service industries” with a limitation on English language and scholarly peer-reviewed papers having full text available. The ProQuest Advanced Search Database was used. In this process, research papers related to QM/TQM CSFs/practices were identified and a total of 39 TQM studies on CSFs were chosen for further study as presented in Table 1.

#### 4. PARETO ANALYSIS

Pareto analysis is a statistical technique in decision making that is used for the selection of a limited number of tasks that produce significant overall effect. It is one of the most commonly used, and easy to implement method. Pareto analysis is a relatively simple methodology that is used when trying to determine which tasks or factors in an organization will have the most impact (Cervone, 2009). It ranks the data/factors in the descending order from the highest frequency of occurrences to the lowest

frequency of occurrences. The total frequency is summed to 100 percent. The “vital few” items occupy a substantial amount (80 percent) of cumulative percentage of occurrences and the “useful many” occupy only the remaining 20 percent of occurrences, which is also known as the 80-20 rule developed by the Italian Economist Vilfredo Pareto (Karuppusami and Gandhinathan, 2006).

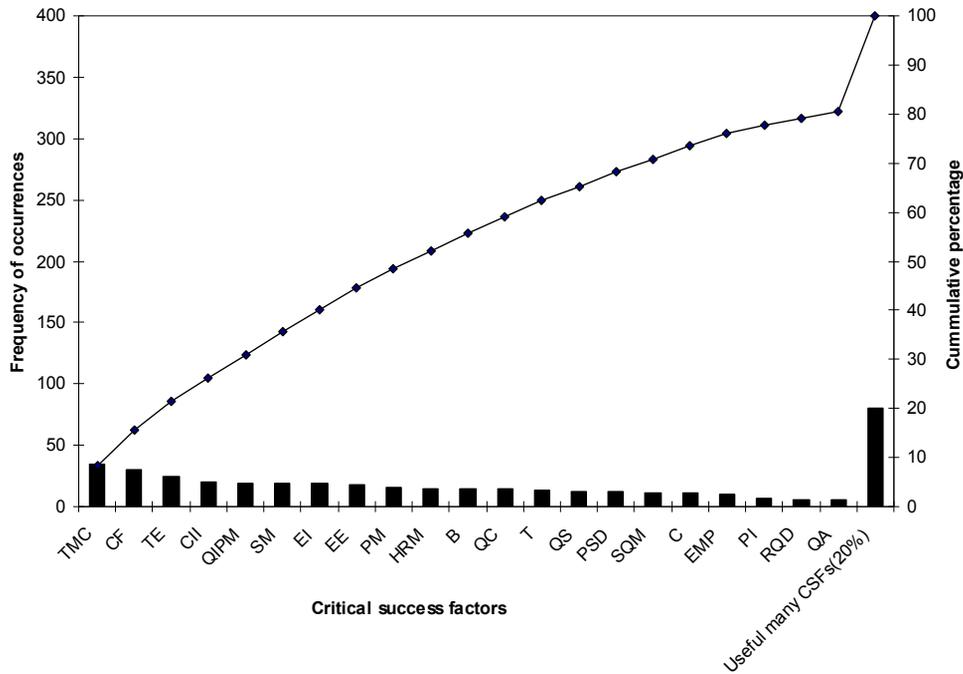
The results of a Pareto analysis are typically represented through a Pareto cart. The chart represents the various factors under consideration in ranked order. The presentation of this chart is in the form of a bar graph in descending order and helps to predict easily which factors are vital few by providing a clear indicator through superimposing a line graph that cuts an 80 percent cumulative percentage and also helps in determining those factors which have least amount of benefits and vice-versa. Joseph Juran extended this concept and found it to be applicable in a broad array of aspects in everyday life (Cervone, 2009). For example it can be applied in a number of contents such as searching for books on-line in digital library catalog, determining which tasks in a project will have the most impact, assessing major causes of customer complaints from products or services, identifying those products or services that account 80 percent of the profit and many more.

##### 4.1 *Pareto analysis of critical success factors of TQM*

To carry out the Pareto analysis of CSFs, only those TQM CSFs that are recommended by the authors for effective implementation of TQM in service industries, and manufacturing and service industries both are included for this analysis. However, such CSFs which are associated with the quality and financial performance of the organizations were also included for the analysis. The Pareto analysis of CSFs compiled from 39

selected research papers is presented in Tables 2, 3 and Figure 1. Also, Figure 1 presents a Pareto chart of TQM CSFs for

service industries which indicate “vital few” CSFs that accounted for 80 percent of occurrences in the study.



**Figure 1: Pareto analysis of TQM CSFs**

*Table 1: TQM CSFs as recommended by various authors*

Authors	Number of CSFs	TQM CSFs
Saraph et al. (1989)	8	Top-management leadership, role of quality department, training, product design, supplier quality management, process management, quality data reporting, and employee relations.
Black and Porter (1996)	10	Strategic quality management, people and customer management, supplier partnerships, communication of improvement information, customer satisfaction orientation, external interface management, teamwork structures for process improvement, operational quality planning, quality improvement measurement systems, and corporate quality culture.
Antony et al. (2002)	11	Management commitment, role of the quality department, training and education, employee involvement, continuous improvement, supplier partnership, product/service design, quality policies, quality data and reporting, communication to improve quality, and customer satisfaction orientation.
Sureshchander et al.(2001)	12	Top-management commitment and visionary leadership, human resource management, technical system, information and analysis system, benchmarking, continuous improvement, customer focus, employee satisfaction, union intervention, social responsibility, servicescapes, and service culture.

Authors	Number of CSFs	TQM CSFs
Samat et al. (2006)	7	Management support and commitment, employee involvement, employee empowerment, information and communication, training and education, customer focus, and continuous improvement.
Sila and Ebrahimpour (2002)	25	Top management commitment, social responsibility, strategic planning, customer focus and satisfaction, quality information and performance measurement, benchmarking, human resource management, teamwork, employee involvement, training, employee empowerment, employee satisfaction, process management, process control, product and service design, employee appraisal, reward and recognition, supplier management, continuous improvement and innovation, quality assurance, quality culture, zero defects, communication, quality systems, just-in-time, and flexibility.
Ueno (2008)	7	Recruitment and selection, training, teamwork, empowerment, performance appraisals and rewards (including measurement and recognition), communication (two-way), and culture (of the organization).
Flynn et al.(1994)	11	Quality leadership, feedback, quality improvement rewards, selection for teamwork potential, teamwork, inter-functional design process, supplier relationship, process control, cleanliness and customer interaction, and new product quality.
Li(1997)	6	Top-management leadership, information analysis, workforce development, organizational cooperation, technology leadership, and service quality performance.
Ahire et al. (1996)	12	Top-management commitment, benchmarking, internal quality information use, employee involvement, training, empowerment, supplier quality management, statistical process control usage, design quality management, customer focus, supplier performance, and product quality.
Claver-Corter et al. (2008)	4	Training, information and communication technologies and information systems, environmental management, and performance.
Mohanty and Lakhe (1994)	4	Develop a vision, promote a policy on quality, create a total quality-oriented culture, and invest in training and education.
Badri et al. (1995)	8	Role of divisional top-management and quality policy, role of quality department, training, service design, supplier quality management, process management/operating procedure, quality data and reporting, and employee relation.
Khamalah and Lingaraj (2007)	7	Top-management commitment, benchmarking, quality improvement programs, teambuilding techniques, supplier involvement, training, and reward and recognition.
Bergman and Klefsjö (2007)	6	Focus on customer, focus on processes, base decisions on facts, improve continuous, let everybody be committed, and top-management commitment.
Sun (2001)	7	Leadership, information and analysis, strategic management, human resources, process management, supplier relationship, and customer focus.
Quazi et al. (1998)	8	Management leadership and quality policy, role of the quality department, training, product/service design, supplier quality management, process management, quality data and reporting, and employee relations.

Authors	Number of CSFs	TQM CSFs
Woon (2000)	8	Quality management, leadership and quality culture, use of information and analysis, strategic planning, human resource development and management, management of process quality, quality and operational results, and customer focus.
Singh et al. (2006)	5	Top-management leadership, customer focus, supplier relationships, employees, and business processes.
Yusuf et al. (2007)	12	Leadership and commitment, customer focus, continuous improvement, get things right first time, just-in-time, competitive benchmarking, cost of quality, employee involvement, teamwork, training, communication, and recognition and reward.
Rahman and Siddiqui (2006)	5	Top-management commitment, customer-centric advancements, benchmarking, relentless improvement, and strengthening the employee base.
Fryer et al. (2007)	13	Management commitment, training and learning, supplier management, customer management, quality data, measurement and reporting, corporate quality culture, process management, teamwork, communication, employee empowerment, organizational structure, product design, ongoing evaluation, and monitoring and assessment.
Al-Khalifa and Aspinwall (2000)	12	Top-management support, customer focus, strategy, benchmarking, employee involvement, recognition and reward, problem analysis, quality technologies, service design, servicescapes, service culture, social responsibility, human resource management, continuous improvement, quality department, and quality systems.
Saravanan and Rao (2004)	12	Top-management commitment and leadership, benchmarking, customer focus and satisfaction, service marketing, social responsibility, human resource management, employee satisfaction, service culture, servicescape, continuous improvement, technical system, and information and analysis.
Tari (2005)	8	Customer focus, process management, leadership, supplier management, learning, quality planning, continuous improvement, and employee management.
Fotopoulos and Psomas (2009)	10	Leadership, strategic quality planning, employee management and involvement, supplier management, customer focus, process management, continuous improvement, information and analysis, knowledge and education, and quality tools and techniques.
Kanji and Wallace (2000)	10	Top-management commitment, customer focus and satisfaction, quality information and performance measurement, human resource management, employee involvement, teamwork, process management, quality assurance, zero defects, and communication.
Zhang et al. (2000)	14	Top-management commitment, strategic planning, customer focus and satisfaction, quality information and performance measurement, benchmarking, training, employee involvement, teamwork, employee appraisal, rewards and recognition, process control, service design, continuous improvement and innovation, quality systems, and flexibility.
Behra and Gundersen (2001)	11	Compensation, benchmarking, training management, empowerment, technology management, assessment, process management, participation, teamwork, and training and outcome measurement.

Authors	Number of CSFs	TQM CSFs
Mahapatra and Khan (2006)	20	Leadership and top-management commitment, customer focus and satisfaction, policy and strategy planning, human resource management, process management and control, product/service design and control, continuous improvement, supplier management, training, employees satisfaction, employees participation, employee appraisal, reward and recognition, quality culture, quality assurance, quality system, impact on society, teamwork, flexibility, zero defect, and benchmarking.
Terziovski et al. (1996)	8	Customer focus; strategic alliance with supplier; leadership; innovative human resources practices; competitive benchmarking and performance measurement system; union commitment; flatter organizational structure; and the pursuit of new technology for strategic advantage.
Talib and Rahman (2010b)	9	Top-management commitment, customers focus, training and education, continuous improvement and innovation, supplier management, employee involvement, employee encouragement, benchmarking, and quality information and performance.
Wali et al. (2003)	12	Top-management commitment, customer focus and satisfaction, quality information and performance measurement, employee encouragement, work culture, teamwork, communication, employee empowerment, process improvement, worker-manager interactions, congenial inter-personal relations, and values and ethics.
Grandzol and Gershon (1998)	12	Top-management commitment, customer focus and satisfaction, training and education, continuous improvement and innovation, process management, employee satisfaction, employee fulfillment, service quality performance, organization cooperation/internal-external cooperation, operational, financial, and public responsibility.
Tsang and Antony (2001)	11	Top-management commitment, customer focus and satisfaction, training and education, continuous improvement and innovation, quality information and performance measurement, supplier management, employee involvement, quality culture, quality systems, communication, and supervisory leadership.
Agus (2004)	10	Top-management commitment, customer focus and satisfaction, training and education, continuous improvement and innovation, quality information and performance measurement, employee involvement, process management, workforce development, teamwork, and quality assurance.

**Table 2: List of CSFs-vital few (80 percent)**

Factor Number	CSF	Symbol	Frequency of occurrences	Percentage frequency of occurrences	Cumulative percentage
1.	<i>Top-management commitment</i> (leadership, management support, senior executive involvement, management leadership, executive commitment)	TMC	34	8.272	8.272
2.	<i>Customer focus and satisfaction</i> (customer orientation, customer satisfaction, customer relationship, customer service, relation with customers)	CF	30	7.299	15.571
3.	<i>Training and education</i> (learning, training and learning, learning and education, quality training, education, employee training)	TE	24	5.839	21.411
4.	<i>Continuous improvement and innovation</i> ( improvement program, innovation strategies, continuous improvement, new technology, quality continues improvement)	CII	20	4.866	26.277
5.	<i>Quality information and performance measurement</i> (quality data and reporting, information and data management, measurement, quality measurement, quality information systems, quality information flows, internal quality information)	QIPM	19	4.622	30.900
6.	<i>Supplier management</i> (supplier partnership, supplier relationship, supplier quality management, vendor quality management, vendor relations, supplier co-operation, supplier involvement)	SM	19	4.622	35.523
7.	<i>Employee involvement</i> (internal customer involvement, employee participation, employee fulfillment, employee interaction)	EI	19	4.622	40.145

Factor Number	CSF	Symbol	Frequency of occurrences	Percentage frequency of occurrences	Cumulative percentage
9.	<i>Process management</i> ( processes, process quality, process design, process flow management)	PM	16	3.892	48.418
10.	<i>Human resource management</i> (workforce development, workforce management, employee management, people and customer management, employee development)	HRM	15	3.649	52.068
11.	<i>Benchmarking</i> ( competitive benchmarking, benchmarking on quality and services, use of benchmarking, benchmarking TQM CSFs)	B	15	3.649	55.717
12.	<i>Quality culture</i> (work culture, service culture, corporate quality culture, improvement culture)	QC	14	3.406	59.124
13.	<i>Teamwork</i> (teamwork structure, team building technique, culture of teamwork, team working, use of teams)	T	13	3.163	62.287
14.	<i>Quality systems</i> (quality policies, quality tools and techniques, quality management, use of quality tools, quality standards, ISO 9000 standards)	QS	12	2.919	65.206
15.	<i>Product and service design</i> (product design, service design, product and service innovation, serviceability of product)	PSD	12	2.919	68.126
16.	<i>Strategic quality management</i> (strategic planning, develop a vision, strategic management)	SQM	11	2.676	70.802
17.	<i>Communication</i> (information and communication, communication across organization, cross functional communication)	C	11	2.676	73.479

Factor Number	CSF	Symbol	Frequency of occurrences	Percentage frequency of occurrences	Cumulative percentage
19.	<i>Process improvement</i> (process control, process orientation, statistical process control and usage)	PI	7	1.703	77.615
20.	<i>Role of quality department</i> (quality department, quality specification, approval of quality standards)	RQD	6	1.459	79.075
21.	<i>Quality assurance</i> (assurance, quality reliability, quality feedback, new product quality)	QA	6	1.459	<b>80.535</b>

**Table 3: List of CSFs-useful many (20 percent)**

Factor Number	CSF	Frequency of occurrences	Percentage frequency of occurrences	Cumulative percentage
1	Information and analysis	6	1.459	1.459
2	Social responsibility	5	1.216	2.676
3	Employee satisfaction	5	1.216	3.892
4	Zero defects	4	0.973	4.866
5	Flexibility	4	0.973	5.839
6	Employee relations/Worker-manager interactions	4	0.973	6.812
7	Servicescapes	4	0.973	7.785
8	Cleanliness and organization development	4	0.973	8.759
9	Just-in-time	3	0.729	9.489
10	Recruitment and selection/Employee fulfillment	3	0.729	10.218
11	Service quality performance/Product service quality	3	0.729	10.948
12	Quality planning/Operational quality planning	2	0.486	11.435
13	Technical system	2	0.486	11.922
14	Union intervention	2	0.486	12.408
15	Organization cooperation/Internal-external cooperation	2	0.486	12.895
16	Technical leadership	2	0.486	13.381
17	Quality technology	2	0.486	13.868

Factor Number	CSF	Frequency of occurrences	Percentage frequency of occurrences	Cumulative percentage
18	Ongoing evaluation monitoring and assessment	2	0.486	14.355
19	External interface management	1	0.243	14.598
20	Feedback	1	0.243	14.841
21	Design quality management	1	0.243	15.085
22	ICT/IS	1	0.243	15.328
23	Business processes	1	0.243	15.571
24	Get the things right first time	1	0.243	15.815
25	Cost of quality	1	0.243	16.058
26	Service marketing	1	0.243	16.301
27	Impact on society	1	0.243	16.545
28	Based decision on facts	1	0.243	16.788
29	Pursuit of new technology for strategic advantage	1	0.243	17.031
30	Operational	1	0.243	17.274
31	Congenial inter-personal relations	1	0.243	17.518
32	Financial	1	0.243	17.761
33	Problem analysis	1	0.243	18.004
34	Public responsibility	1	0.243	18.248
35	Compensation	1	0.243	18.491
36	Supervisory leadership	1	0.243	18.734
37	Values and ethics	1	0.243	18.978
38	Training management	1	0.243	19.221
39	Supplier performance	1	0.243	<b>19.464</b>

Further, it was observed during literature review that most of the CSFs have similar description but are named with slight different name or labels. Such factors are grouped and presented under single label (italic letters in Table 2) and there frequency of occurrences is also shown.

In the present study, the total number of CSFs extracted and grouped from all 39 studies taken for review was 60. The total frequency of occurrences of these 60 CSFs was found to be 411. After Pareto analysis of these 60 CSFs, 21 “vital few” CSFs accounted for 80 percent (Table 2). The

remaining 39 CSFs accounted for only 20 percent frequency of occurrences and are reported as “useful many” CSFs (Table 3). From Table 2 it was observed that the first nine CSFs operationalized by the highest number of authors were: top-management commitment, customer focus and satisfaction, training and education, continuous improvement and innovation, quality information and performance measurement, supplier management, employee involvement, employee encouragement, and process management. They were laying in the range of 8.27 to 3.89 percent frequencies of occurrences.

On comparing with previous study conducted by Talib and Rahman (2010b), the authors identified and ranked nine CSFs of TQM which were similar to the CSFs identified in this study except “benchmarking” which is ranked at number 11 in current study and having 3.64 percent frequency of occurrences. Also, a CSF “process management” with 3.89 percent of frequency of occurrence was not factorized by Talib and Rahman (2010b) study and is ranked at number nine in this study. Further, as depicted from the Table 3, the CSFs numbered from 12 to 18 under “useful many” category, the frequency of occurrences was two while the CSFs numbered from 19 to 39 was one only. This suggests that these 28 CSFs categorized under “useful many” (numbered 12 to 39, Table 3) are rarely used for TQM implementation in service industries.

## 5. DISCUSSION AND CONCLUSIONS

Based on extent review of literature on TQM CSFs, present study offers a set of “*vital few*” CSFs of TQM for service industries (Table 2). An examination of 39 TQM studies on CSFs resulted in listing of 60 CSFs offered and used by different researchers and practitioners of service industries. A Pareto analysis was conducted on these 60 CSFs to sort out “*vital few*” (80 percent) CSFs for service industries in descending order according to their frequency of occurrences and hence, 21 CSFs of TQM were extracted. These “*vital few*” CSFs were found to be key factors in almost all the research papers and are repeatedly used by different researchers. Therefore, TQM managers and practitioners should focus on these “*vital few*” CSFs (80 percent) in the service sector and also, they must ensure that the remaining 20 percent CSFs (useful many) (Table 3) should not be totally ignored. However, it is important that they

must understand the importance of CSFs and include “*vital few*” CSFs in their work.

While it is true that there exists other sets of TQM CSFs and in future, more factors could be developed or defined differently, but this set appears to capture most of the important aspects of effective TQM implementation in service industries as recommended by leading researchers and practitioners.

As far as the implementation of the CSFs is concerned, one can understand TQM framework as constructing a house. First, placing “top-management commitment” to TQM as the base or foundation is recommended. Of the 39 research papers reviewed, 87 percent of them regard “top-management commitment” as a vital CSF of service industry. It concludes that without the visible and active support of the senior officers and top-management support TQM program is unlikely to succeed. Once the foundation is in place, the second pillar of TQM program is “customer focus and satisfaction”. This factor is second most vital for effective TQM implementation and is supported by 77 percent of research papers of the present literature review. Thus, service industries must continuously evaluate the customer perception and expectation on regular basis for continuous improvement. Measures need to be made where improvement is possible, rather than merely monitoring people’s work. Other vital factors that service industries can select in future may range from 6 to 9 CSFs as reported in this study.

This paper examined the work of leading authors to ascertain the “*vital few*” and “useful many” CSFs for successful implementation of TQM program in service industries for effective business performance and improvements in quality service. It is concluded that top-management commitment is listed as the top CSFs with customer focus and

satisfaction close behind.

Further, it is recommended that:

- Top-management of service industries needs to understand the importance of quality culture as a strategic weapon.
- Top-management of service industries needs to communicate and describe quality goals and policies to internal employees.
- Regular participation of top-management team in the process will motivate employees to take active part in quality activities.
- Service industries needs to train and educate their employees regularly on industries operations and statistical skills.
- Service industries needs to ensure that they should maintain and think about continuous improvement and innovation. This is never ending task. They should adopt new strategies to improve company responsiveness to customer's complaints.

Once these objectives are put in place and enriched, than factors like quality information and performance measurement, supplier management, employee encouragement (reward and recognition), and process management should be incorporated.

Some of the managerial implications of the present study are:

- The results of the present study will help managers and practitioners in smoother implementation of TQM program in service industries.
- Managers can use a set of "vital few" CSFs in their organization and link them with both

operational and organizational performance.

- Managers can benchmark their organizations with "vital few" CSFs and can identify gaps.
- Managers can get the full benefits of TQM by training all employees at all levels in order to develop awareness, interest, and action towards TQM program. Thus, role of top-management commitment and leadership might be fruitful in the development and successful implementation of appropriate training program on TQM.
- Managers and practitioners of service industries should also consider suppliers as important business partners. They have to be involved in development of improved products and services, improved process, quality information and data management, and initiating the quality policy. This may result to better quality and hence, increased customer satisfaction.

Finally, some more research need to be carried out to validate 21 "vital few" CSFs identified and recommended by Pareto analysis in the service sector by conducting empirical analysis using a research questionnaire. Further, in-depth interview and personal contacts should be followed to verify the applicability of the present list of "vital few" CSFs of service industries which can be used as a basis to develop a TQM model that meets the needs of service industries and may be a scope for future research work.

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