
CRITICAL SUCCESS FACTORS FOR TQM IN MANUFACTURING SECTORS: A SECONDARY DATA ANALYSIS

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ABSTARCT

TQM is an integral management philosophy which lays the foundation for sustainable development of a business firm. Total Quality Management is being practiced by various critical success factors like top management commitment, customer focus and so on. They are collectively called CSFs of TQM in an organization. The existence of critical CSF can improve quality performance, customer focus and thereby leading to increased profitability and long term survival.

This paper makes an attempt to identify CSFs of TQM in manufacturing sector by using Pareto analysis tool. In all 46 research papers have been reviewed to identify CSFs of TQM. The findings of this study can provide framework to test it empirically. This is the contribution of the study.

Key Words: TQM (Total Quality Management), CSFs (Critical Success Factors), Manufacturing sector, Pareto Analysis.

INTRODUCTION AND CONTEXT OF THE STUDY

Total quality management is considered one of the important management systems to gain sustainable competitive advantage and to improve overall business performance and effectiveness in achieving quality status at global level. TQM is being practiced by various critical success factors. From the last two decades awareness of TQM has considerably increased and it is become an established field of study where academics, consultants, engineers and quality practitioners have contributed their ideas towards its advancement (Arumugam et al., 2008; Talib et al., 2010). Voluminous work has been done and still been undertaken on CSFs of TQM in the manufacturing sector. Many studies show the strong and positive relationship between Critical success factors of TQM and firm performance in manufacturing (Massoud et al., 2013; Usha Devi, 2005; Mahesh Shukla and Prakash Agrawal, 2012; Dinesh Seth and Deepak Tripathi, 2006; Sudhanshu Singh and Dhalla, 2010). Various research studies (Neha karla et al., 2013; Masood ul et al., 2012; Musran Munizu, 2011; Fuentes et al., 2010; Sit et al., 2009; Ueno, 2008; Fryer et al., 2007; Mahapatra and Khan, 2006; Gloria et al., 2005; etc.) identified numerous CSFs as being crucial to successful implementation of TQM for manufacturing sector. This study makes an attempt to identify vital few CSFs from a very large number of CSFs of TQM identified in the literature and thus benefit the researchers and practitioners of manufacturing industries by using them.

THEORETICAL BACKGROUND OF THE TOTAL QUALITY MANAGEMENT (TQM)

The concept of TQM has dominated the management scene for some decades. It is quite old and was originated in the 1950's and was first introduced into the USA around 1980's (Prajogo, 2005). During the last two decades or so simple inspection activities have been replaced or supplemented by quality control, quality assurance has been developed and refined, and now many companies, using a process of continuous and company-wide improvement, are working towards TQM. Although continuous attention given to TQM in industrialized countries including USA, Japan, UK and other European countries, however, it is only during last ten years that researchers have started to scrutinize quality practices in developing countries (Hassan et al., 2012). Therefore Juran (1995) point out that where as the 20th century become famous for world productivity, the 21st century would become well recognized as the "century for quality". Many organizations all over the world have tried to use TQM to achieve increased competitiveness and improved financial result.

Total quality management is subjective so it is a difficult task to define. One important point to note is that TQM is a multi dimensional concept based on perceptions by individuals with different perspective on products and services. There is a wide range of definition of TQM. According to Flynn et al.(1994) TQM as "A management philosophy for continuously improving overall business performance based on leadership, supplier quality management, vision and plan statement, evolution, process control and improvement, product design, quality system improvement, employee participation, recognition and reward, education and training, and customer focus. Deming provides an operational definition of TQM which gives a motivational meaning of the concept. Sink states that TQM can be successful only if operational definition is translated into strategies by the leadership of the organization and which are crystallized into actions and communicated to all the people with conviction and clarity. According to Zairi and Youssef (1995) defined TQM is a positive attempt by the organization concerned to improve structural, infrastructure, attitudinal, behavioral and methodological ways of delivering to the end customer, with emphasis on consistency, improvement in quality, competitive enhancements, all with the aim of satisfying or delighting the end customer.

Total quality control and quality management are two basic functions of TQM. Total quality control is a long-term success strategy for organization; whereas quality management is a way of planning, organizing and directing that will facilitate and integrate the capabilities of all employees for continuous improvement of anything and everything in an organization to attain excellence. Thus, TQM in an organization brings all the people together to ensure and improve product process quality, the work environment and working culture.

TQM have many benefits which include improved quality of product, lower cost, better job satisfaction to employees, increase market share resulting into better profitability and improved competitiveness.

These benefits ultimately culminate in a radical change in performance standard of the organization and ensure continued growth in a competitive market situation.

LITERATURE REIVIEW

According to S. K. Mandal (2006), critical success factors (CSFs) are those that must be continually emphasized and campaigned across the organization as enablers for achieving the strategic goals. Critical success factors of a manufacturing organization are identified around the world in recent years in many research studies.

The first survey to identify the TQM practices was attempted by Saraph et al. (1989). In the same way, several other important studies were made by researchers including by Flynn et al. (1995), Ahire et al. (1996) etc. to identify CSFs of TQM which have been summarized in Table 1.

Table 1
Critical Success Factors of TQM identified by different authors

Sr No	Authors	Critical Success Factors (CSFs)																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	Massoud et al. (2013)	x	x	x		x	x				x		x									
2	Neha karla et al. (2013)	x	x	x			x	x	x				x	x		x			x	x		
3	Masood ul et al.(2012)	x		x		x				x	x							x			x	
4	Keng-Boon et al.(2012)	x	x	x										x				x	x	x		
5	Deepak mittal et al. (2011)	x	x	x							x			x	x	x		x	x			x
6	Musran Munizu (2011)	x	x	x	x	x	x		x	x		x	x	x			x	x	x	x		
7	Arumugam et al.(2011)	x	x	x			x	x	x					x					x			
8	Faisal et al. (2011)	x	x	x		x	x												x			
9	Nitin et al. (2011)	x	x	x	x	x	x	x	x		x	x	x		x							

10	Vijaygiri et al. (2011)	x		x		x	x					x					x		x	x	
11	Khanna et al. (2010)	x	x	x	x		x	x	x				x		x			x	x		
12	Shahab Alam et al. (2010)	x		x		x	x					x							x		
13	Fuentes et al. (2010)	x	x	x		x		x					x					x			
14	Sit et al. (2009)	x		x	x			x				x							x		
15	Fotopoulos and Psomas (2009)	x	x	x	x	x	x	x				x						x			x
16	Ueno (2008)		x			x					x			x		x			x	x	
17	Bergman and Klefsjo (2007)	x		x		x		x										x		x	
18	Yusuf et al. (2007)	x	x	x		x		x			x	x		x		x					
19	Fryer et al. (2007)	x	x	x		x	x	x	x				x	x	x				x	x	
20	Phan Chi Anh et al. (2006)	x		x		x	x		x	x										x	
21	Samat et al.	x	x	x	x	x									x			x			

	(2006)																			
22	Singh et al. (2006)	x		x		x	x	x												
23	Rahman and Siddiqui (2006)	x		x		x						x								
24	Mahapatra and Khan (2006)	x	x	x		x	x	x	x	x	x	x	x			x	x	x	x	x
25	Miyagawa et al. (2005)	x	x	x		x	x					x		x				x		x
26	Tari (2005)	x	x	x			x	x				x					x	x		
27	Gloria et al. (2005)	x		x		x			x	x						x				x
28	Irani et al. (2004)			x		x			x				x				x			x
29	Quck Eng et al. (2003)	x	x	x		x	x									x		x	x	x
30	Wali et al. (2003)	x		x		x		x				x	x	x			x	x		
31	Antony Jiju et al. (2002)	x	x	x		x	x		x					x	x	x	x			x
32	Sila and Ebrahimpou r (2002)	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

33	Sureshchander et al. (2001)	x		x	x	x		x										x	x	x	
34	Woon (2000)	x		x	x			x				x		x				x	x	x	
35	Kanji and Wallace (2000)	x		x		x		x					x	x	x			x			x
36	Zhang et al. (2000)	x	x	x		x		x	x	x	x	x	x				x				x
37	Al-Khalifa and Aspinwall (2000)	x		x	x	x		x		x	x	x				x	x	x	x	x	
38	Quazi et al. (1998)	x	x				x	x	x					x		x		x			x
39	Grandzol and Gershon (1998)	x	x	x		x		x						x	x			x	x		
40	Ahire et al. (1996)	x	x	x		x	x		x	x				x							x
41	Black and Porter (1996)			x			x	x					x	x	x	x			x	x	
42	Terziovski et al. (1996)	x		x		x	x						x					x	x	x	

43	Badri et al. (1995)	x	x			x	x	x	x					x		x			x	
44	Flynn et al. (1994)	x		x			x	x	x	x				x				x		x
45	Mohanty and Lakhe (1994)		x										x					x	x	
46	Saraph et al. (1989)	x	x			x	x	x	x					x		x		x		

Note: (1) Top management/ Leadership (Top-management commitment, management support, senior executive involvement, management leadership, executive commitment) (2) Education & Training (learning, training and learning, learning and education, quality training, education, employee training) (3) Customer focus/ orientation (customer satisfaction, customer relationship, customer service, relation with customers) (4) Information, Evaluation & Analysis (5) Employee Empowerment/Involvement (internal customer involvement, employee participation, employee fulfillment, employee interaction) (6) Supplier quality management (supplier partnership, supplier relationship, supplier quality management, vendor quality management, vendor relations, supplier cooperation, supplier involvement) (7) Process flow management (processes, process quality, process design) (8) Product Design (product design, service design, product and service innovation, serviceability of product) (9) Statistical process control (Process improvement ,process control, process orientation, statistical process usage) (10) Reward & Recognition (11) Benchmarking (competitive benchmarking, benchmarking on quality and services, use of benchmarking, benchmarking TQM CSFs) (12) Strategic quality planning (strategic management, develop a vision, strategic management) (13) Teamwork (teamwork structure, team building technique, culture of teamwork, team working, use of teams) (14) Quality information and performance measurement (quality data and reporting, information and data management, measurement, internal and external quality measurement, quality information systems, quality information flows, internal quality information) (15) Communication (information and communication, communication across organization, cross functional communication) (16) Role of quality department (quality department, quality specification, approval of quality standards) (17) Continuous improvement (improvement program, innovation strategies, new technology, quality continues improvement) (18) Human resource management (workforce development, workforce management, employee management, people and customer management, employee development) (19) Quality culture(work culture, service culture, corporate quality culture, improvement culture) (20) Quality systems (quality policies, quality tools and techniques, quality management, use of quality tools, quality standards, ISO 9000 standards) (21) Quality assurance (assurance, quality reliability, quality feedback, new product quality)

OBJECTIVE OF THE STUDY

The objectives of this study is to identify CSFs of TQM followed by manufacturing sector obtained from the present literature review and sorting them in descending order according to the frequencies of their occurrences by using Pareto analysis tool. Also this study give a list of “vital few” TQM CSFs for the benefit of researchers and manufacture practitioners.

RESEARCH METHODOLOGY

The methodology adopted for this study was in-depth literature review. The above objective is accomplished through literature review of published research studies on the current subject focusing on CSFs and practices which were statistically tested. A total of 46 research papers (published between years 1994 to 2013) were selected from Google search engine and Google scholar engine used to identify CSFs using Pareto analysis. The paper reviewed includes both studies on CSFs of TQM as well as TQM performance studies. Karuppusami & Gandhinathan (2006) used this statistical tool and method to identify CSFs (critical success factors) of TQM in manufacturing sector and Talib et al. (2010) used this statistical tool and method to identify CSFs (critical success factors) of TQM in service industries.

ANALYSIS OF THE STUDY**Pareto analysis**

Pareto analysis is a relatively simple methodology in decision making for the selection of a limited number of tasks that produce significant overall effect. Pareto Analysis uses the Pareto Principle – also known as the "80/20 Rule"- As per this rule, 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 (Talib et al., 2010).

The results of a Pareto analysis are typically represented through a Pareto chart 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 (Talib et al., 2010).

Analysis of CSFs of TQM

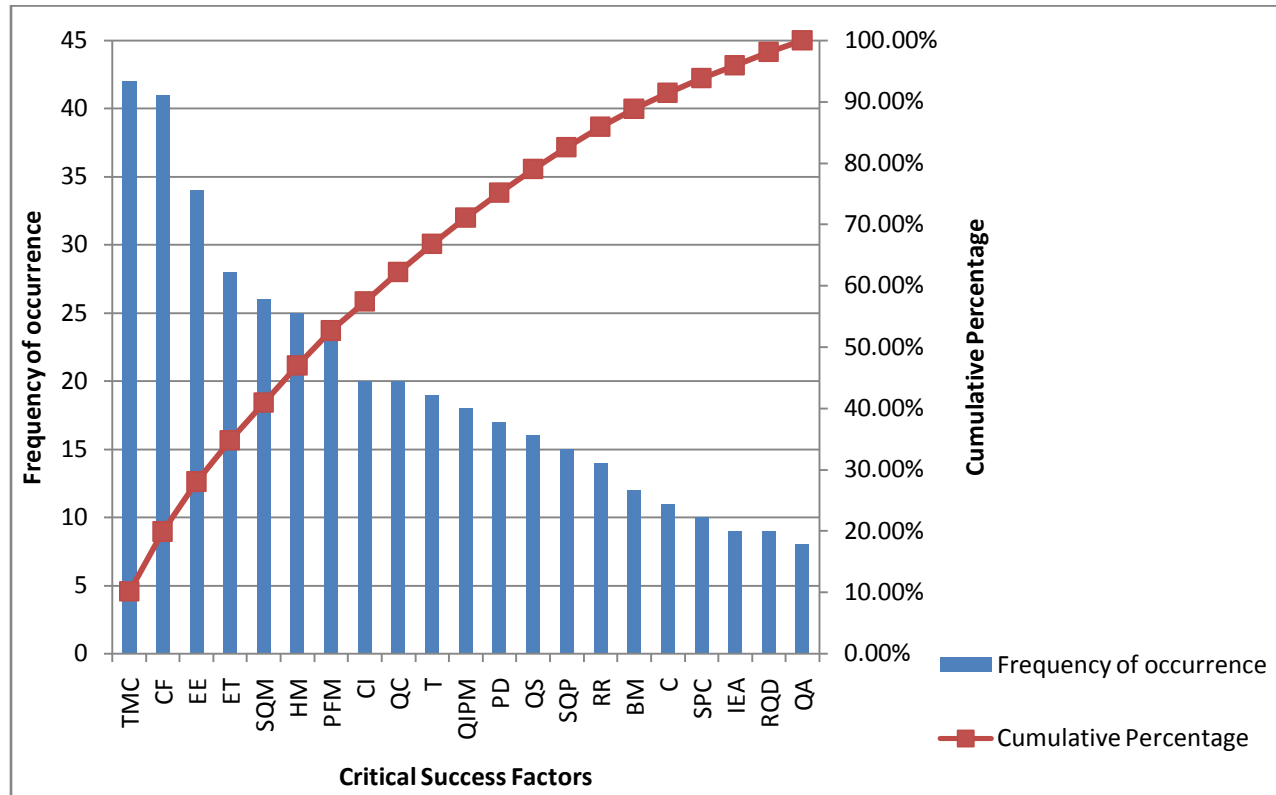
Only those CSFs of TQM has been taken for the Pareto analysis, which are recommended as effective implementing factors of TQM in manufacturing industries. Table 2 shows the Pareto analysis of CSFs compiled from 46 selected research papers. Also, Figure 1 presents a Pareto chart of CSFs of TQM which is created from the Table 2.

Table 2
List of CSFs as per Pareto analysis

Sr. No	CSFs	Symb ol	Frequency of occurrence	Cumulative frequency	Percentage frequency of occurrence	Percentage of cumulative frequency
1	Top management/ Leadership	TMC	42	42	10.05	10.05
2	Customer focus/ orientation	CF	41	83	9.81	19.86
3	Employee Empowerment/Involvement	EE	34	117	8.13	27.99
4	Education & Training	ET	28	145	6.70	34.69
5	Supplier quality management	SQM	26	171	6.22	40.91
6	Human resource management	HM	25	196	5.99	46.90
7	Process flow management	PFM	24	220	5.74	52.64
8	Continuous improvement	CI	20	240	4.78	57.42
9	Quality culture	QC	20	260	4.78	62.20
10	Teamwork	T	19	279	4.55	66.75
11	Quality information and performance measurement	QIPM	18	297	4.31	71.06
12	Product Design	PD	17	314	4.07	75.13
13	Quality systems	QS	16	330	3.83	78.96
14	Strategic quality planning	SQP	15	345	3.59	82.55
15	Reward & Recognition	RR	14	359	3.35	85.90
16	Benchmarking	BM	12	371	2.87	88.77
17	Communication	C	11	382	2.63	91.40
18	Statistical process control	SPC	10	392	2.39	93.79
19	Information, Evaluation & Analysis	IEA	09	401	2.15	95.94
20	Role of quality department	RQD	09	410	2.15	98.09
21	Quality assurance	QA	08	418	1.91	100

Figure 1

Pareto analysis of CSFs of TQM



DISCUSSION

As the table 2 shows, 21 CSFs are extracted and grouped from the 46 research studies. The total frequency of occurrence of these 21 CSFs are found to 418 and the total cumulative frequency is summed to 100 percent. This table also depicts top management commitment with highest frequency and quality assurance with lowest frequency of occurrence.

After Pareto analysis of 21 CSFs, Pareto chart shows that first 13 “vital few” CSFs accounted for 80 percent frequency of occurrence and remaining 8 “useful many” CSFs accounted for only 20 percent frequency of occurrences. Regarding consistencies, the present study showed that 6 out of this 13 “vital few” factors stand out in several studies as being more central for manufacturing sector. They are: top management commitment, customer focus, Employee Empowerment/Involvement, Education & Training, supplier quality management, human resource management. They have stronger relationship for TQM implementation in manufacturing sector.

CONTRIBUTION OF THE STUDY

The finding of this study is equal to earlier studies made by Karuppusami & Gandhinathan (2006); U. C. Jha & Sunand Kumar (2010); Singla Nitin et al. (211) and Talib et al. (2011) in manufacturing sector and Talib et al. (2010) in service sector. In this result, there are many CSFs which are similar to the studies made by various researchers in manufacturing sectors and service sectors.

CONCLUSION

The paper has successfully presented the group of CSFs of TQM according to their frequency of occurrences as given by various researchers in their framework. This study gives a whopping comparison of 46 research studies in the light of 21 CSFs of TQM for manufacturing sector. From the study, it was observed that most of CSFs have similar description but with slightly different name. This study also offers a set of “vital few” CSFs of TQM which is highly emphasized by most of researches in their studies. Implementation of these “vital few” CSFs will add to the competitive position of a manufacturing firm. Therefore, TQM managers and practitioners should focus on these CSFs. This study also gives a list of “useful many” CSFs. It is concluded that top management commitment, customer focus and employee empowerment and involvement are three most important CSFs which stands out as being centre of manufacturing sector.

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