



ISSN Print: 2394-7500
ISSN Online: 2394-5869
Impact Factor: 5.2
IJAR 2016; 2(5): 238-244
www.allresearchjournal.com
Received: 08-03-2016
Accepted: 09-04-2016

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International Journal of Applied Research

The extent of TQM practices in Ethiopian manufacturing firms: An empirical evaluation

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Abstract

Total Quality Management (TQM) practices are primarily found in developed countries but little has been written on how TQM has been applied in least developed countries like Ethiopia. This study aims to investigate the status and levels of TQM practices among different manufacturing firms located in the industrial area of Addis Ababa, Ethiopia. The design of this research has quantitative approach. Six critical success factors for TQM practices were identified and a survey instrument was developed. The questionnaire consists of 61 statements, on a five-point Likert scale, to represent all the six critical success factors. From 300 sampled medium and large manufacturing firms a total of 122 valid responses were received. The survey findings are analyzed using statistical analysis package SPSS 20.0. Attempts at finding significant differences between medium and large companies were made. The result reveals that there no significance difference between medium and large companies on the levels of TQM practices. It also revealed areas lacking in implementation among manufacturing firms in Ethiopia. Manufacturing firms must be able to adopt TQM to help them meet world-wide challenges in the long run.

Keywords: Quality Management, TQM Practices, critical success factors of TQM, Operation Management, Manufacturing Firms, Ethiopia

1. Introduction

Ethiopia, a country with long world history and a population of more than 90 million, still remains as one of the least developing countries in the world. The manufacturing sector contributes no more than 11% to GDP and 5% to employment (The World-Bank, 2015)^[39]. The pace to maximize benefits from manufacturing industry is far below expectation due to quality management and other different problems. Recently Ethiopian manufacturing organizations are demanded to improve their products quality in order to improve their competitiveness and verify the current strategy of the government to export their products abroad. In the same time the government opened the Ethiopian market to receive a variety of foreign products from different markets. And also Ethiopia is in the accession to the World Trade Organization (WTO). Being a member to WTO requires the country to open up most of the sectors of the economy AACCSA, (2013), and in effect, the Ethiopian manufacturing organizations became locked in a battle to compete both in the global market and in a relatively open local market. Therefore, the product quality has emerged as a key issue in most of Ethiopian manufacturing industry and they have started implementing TQM to cope up with pressures from foreign competitors and improve their competitiveness. To support their effort towards higher quality levels, it is important to identify the degree to which TQM practices are implemented in Ethiopian firms. So, the objective of this study is to investigate the level TQM practices in Ethiopian manufacturing firms and to identify the most significant critical success factors with respect to TQM practices.

2. Literature Review

Total Quality Management (TQM) is a hot subject in business and scholastic circles. Business managers are intensely attempting to make sense of how to do it, while academicians are attempting to figure out what it is. So TQM can be characterized from multiple points of view; difference source can bring about different definition. According to Sadikoglu & Olcay (2014)^[29], TQM is a holistic and right-minded advance of the firms to continuously improve their products/services or processes involving all stakeholders in order to satisfy their customers and to enhance performance and sustainability. In today's

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Businesses there is a growing acknowledgment with in the manufacturing sector that isolated improvements in particular aspects of business are no longer sufficient and that a comprehensive strategy is required to bring competitive advantage in the market place. This can only be attained by implementation of TQM which is not just concerned with services and process development and customer delivery but also with the relationship with suppliers, customers, commercial and managerial processes and the contribution of all employees regardless of any place they work in the organization (Raja, Bodla, & Malik, 2011) [28].

TQM is a philosophy that underlines the organizational transformation that enables manufacturing and service organizations to reap real benefits from improvement in quality performance and competitiveness (Chang H., 2006) [6]. TQM ensures maximum effectiveness and efficiency within a business and secures commercial leadership by

putting in place processes and systems which will promote excellence prevent errors and ensure that every aspect of the business is aligned to customer needs and the advancement of business goals without duplication or waste of effort (Pattanayak & K. Maddulety, 2011) [26]. Thus growing number of companies use TQM practices as strategic foundation for generating a competitive advantage and improving organizational performance.

The CSFs of TQM differ from one study to another (Fening, Amaria, & Frempong, 2013) [13]. This lack of absolute common critical success factor, which explains the manner in which the TQM practices in order to bring about improved organization performance, has the problems of many researchers. Based on literature review, six critical success factors are adopted as a TQM construct for this study. These CSFs are also used by Abusa (2001) [1] and empirically proved by different TQM scholars (see Table 1).

Table 1: TQM critical success factors supported by different researchers

Critical success factor of TQM	Supported studies
Top Management Leadership & Commitment	(Samson & Terziovski, 1999; Nofal <i>et al.</i> , 2005; Kuo <i>et al.</i> , 2009; Shahin & Dabestani, 2011; Fening <i>et al.</i> , 2013; Mardani <i>et al.</i> , 2013; Sadikoglu & Okey, 2014)
Customer Focus	(Samson & Terziovski, 1999; Quazi <i>et al.</i> , 2002; Talavera, 2005; Talib <i>et al.</i> , 2010; Nitin <i>et al.</i> , 2011; Shahin & Dabestani, 2011; Sadikoglu & Okey, 2014)
Supplier Quality Management	(Kuo <i>et al.</i> , 2009; Shahin & Dabestani, 2011; Fening <i>et al.</i> , 2013; Sadikoglu & Okey, 2014)
People Management	(Talavera, 2005; Welikala & Sohal, 2008; Talib <i>et al.</i> , 2010; Thamizhmanii & Hasan, 2010; Fening <i>et al.</i> , 2013; Swamy <i>et al.</i> , 2013)
Process Management	(Flynn <i>et al.</i> , 1994; Chang & Lu, 1995; Kasul & Motwani, 1995; Motwani, 2001; Nitin <i>et al.</i> , 2011; Fening <i>et al.</i> , 2013)
Continuous Improvement	(Dahlgaard <i>et al.</i> , 1998; Chin & Pun, 2002; Boer & Gertsen, 2003; Samat <i>et al.</i> , 2006; Hand, 1993)

3. Research methodology

3.1 Questionnaire

To investigate TQM implementation status, structured survey questionnaire was used for data collection. Based on the comprehensive review of TQM literature, a total of 6 Total Quality Management practice constructs were adopted from several related studies; these are Abusa (2001) [1], Zhang (2000) [44], Claver *et al.* (2003) [10], Chileshe & Watson (2004) [8], Santos-Vijande & Alvarez-Gonzalez (2007) [31], Das *et al.* (2008), and Anil & Satish (2013). The questionnaires were tested, and refined, by means of a Pilot Study and then distributed to all sampled companies and addressed either to the General Manager, Quality and inspection Manager, operation/production manager or some other manager who is responsible for Quality. Following other similar studies Bas (2008) [4], Mallur and Hiregoudar (2010) [19], Bahri *et al.* (2012) [3] and Ullah (2012) [40], a five-point Likert scale was employed for scoring responses (1 = strongly disagree and 5 = strongly agree). The questionnaires have 2 main sections. Section 1 covers general information about the responding companies. The Second section are attempted to check the degree of total quality management practices on 6 critical success factors of TQM. A total of 61 statements are provided to be answered by the respondent companies. For each statement, respondent were asked to rate the extent of the current TQM practices in their organization.

3.2 Population and Sample

According to the 2010-2011 annual Large and Medium Scale Manufacturing industries survey of Ethiopian Central Statistical Agency (CSA), the total numbers of medium and

large manufacturing firms located in the industrial area of Addis Ababa were 870. A total 300 medium and large manufacturing firms from the list were selected using simple randomly sampling technique. The questionnaires were sent out using the face to face method for data collection to the targeted managers. Finally, 136 questionnaires were returned. According to their response 122 firms implemented TQM or, more specifically, part of TQM for the last three years. Therefore, 122 usable questionnaires were obtained for analysis purpose for the study. The usable questionnaire rate was 40.67%, normal for such research.

3.3 Methods of data analysis

The responses were assigned numeric codes and data entered into a SPSS (version 20.0) file for statistical analyses. Descriptive statistical analyses were conducted for demographic variable for the research respondent companies' i.e. industry type, sizes of the firm, etc. The validity of the instrument was conducted by a wide review of the literature and by using experts' feedback of quality and operations management in the industry. The reliability of the six critical factors of TQM was calculated by Crobach's alpha (see Table 2). Nunnally (1978) [25] advocates that reliability coefficients of 0.70 or more are considered good, although it may be reduced to 0.6 in exploratory research Hair *et al.* (1995) or even to 0.55 (Van de Ven & Ferry, 1979) [41]. Based on the table, value of Cronbach's α was well above the criteria. So, it can be concluded that the instrument used in this study was valid and reliable.

Mean for individual items and over all mean for each construct were calculated to analyze the current level of

TQM practices. T-test of Hypothesis for the Mean Difference also used to see the significance difference between medium and large company. Correlation analyses

were conducted to observe the degree of relationship between TQM critical success factors.

Table 2: Reliability analysis of critical success factors of TQM

Variables/Indicators	No. of items	Cronbach's α	Description
Top management Leadership	12	0.901	Reliable
Customer focus	11	0.846	Reliable
Supplier management	7	0.814	Reliable
People management	12	0.896	Reliable
Process management	10	0.856	Reliable
Continuous improvement	8	0.799	Reliable

4. Results and Discussions

4.1 General Profile of Respondent Companies

Table 3: General Profile of Respondent Companies

No.	Formal Position	NO. of respondents	Percent
Q1	Quality and Inspection Head	67	54.9
	Production Manager	21	17.2
	General Manager	34	27.9
Highest Education Level			
Q2	Bachelor Degree	75	61.5
	Master Degree	47	38.5
Q3	Educational Background		
	Engineering	43	35.2
	Business	26	21.3
	Science	53	43.4
Industry type			
Q4	Food and Beverage Industry	32	26.2
	Metal, Steel and Mineral Industry	19	15.6
	Leather and Textile Industry	24	19.7
	Chemical Industry	15	12.3
	Building material industry	6	4.9
	Wood and Furniture Industry	10	8.2
	Electric and Electronics industries	7	5.7
	Plastics and other industry	9	7.4
Size of firms			
Q5	Medium size	41	33.6
	Large size	81	66.4

The response rate of the survey was 40.67% where, 66.4 % was from large companies and 33.6% was from medium size industry. The majority of individuals who participated in this research were having position within the company as a quality and inspection manager (54.9%), having level of education Bachelor degree (61.5%) with a science background (43.4%) (See Table 3). It is very clear that the questionnaire were completed by the person who is responsible for quality in the company. Furthermore, all participants possessed minimum Bachelor's Degree and have sufficient knowledge on quality management system as well as a good understanding of the terminology used in the questionnaire.

The participant companies were from eight different industry groups which is the: Food & Beverage(26.2%),

Metal & Steel (15.6%), Leather & Textile Industry (19.7%), Chemical (12.3%), Building material (4.9%), Wood & Furniture (8.2%), Electric & Electronics (5.7%) and Plastics & other industries (7.4%). It is clear that the wide area of manufacturing industrial groups of Ethiopian economy has been well covered.

4.2 Levels of Implementation for TQM Practices

Mean for individual question and over all mean for each 6 dimension were calculated to analyze the implementation levels of TQM practices. For easier interpretation of the results of the study, researcher refers to the interpretation of scores 1.00-1.80= worst, 1.80-2.60= low, 2.60-3.40= enough, 3.40- 4.20= high and 4.20-5.00= very high (Sugiyono, 2008; Munizu, 2013; Bahri *et al.*, 2012)^[3].

Table 4: Results for Mean Value & Std. deviation of TQM Practices

No.	Variables/CSF	Mean	SD	SR	Description
	TQM Practices	3.17	.402	2.6 – 3.4	Enough
1	Top Management leadership & commitment	3.17	.393	2.6 – 3.4	Enough
2	Customer Focus	3.00	.434	2.6 – 3.4	Enough
3	People Management	3.30	.461	2.6 – 3.4	Enough
4	Supplier Quality Management	2.97	.500	2.6 – 3.4	Enough
5	Process Management	3.32	.513	2.6 – 3.4	Enough
6	Continuous Improvement	3.24	.595	2.6 – 3.4	Enough

Mean values of each critical success factor range from 2.97 to 3.32 shown in Table 4, which some extent lower than the level of TQM practices in Indonesia SMEs which ranges between 3.82-4.18 (Bahri *et al.*, 2012)^[3], between 3.34 and 3.83 in Turkey SMEs (Bas, 2008)^[4], and between 3.32 to 4.49 in Singaporean SMEs (Quazi & Padibjo, 1998)^[27]. Although, the TQM practices highlighted by above study (Quazi & Padibjo, 1998; Bas, 2008; Bahri *et al.*, 2012)^[27, 4, 3], were slightly different from those proposed, there were some similar ones, such as emphasizing the importance of leadership, customer focus, People management and process control.

CSF 1

“Top management commitment and leadership” with a mean value of 3.17 has one of moderately practiced in Ethiopian firms, and this demonstrates that top management has actively involved in developing and communicating vision, mission, goals, plan and values for quality program. In addition, they encourage and motivate employees’ involvement and empowerment in quality management activities. While the average mean values of TMLC dimension is above 3, some individual items fall below this value (see Appendix A). The result shows that top management focuses on short-term profit; didn’t allocate adequate resource; and discussion on quality related issues in top management meetings were very weak. This mean value (3.17) reflects a lower degree of practice compare to Singaporean manufacturing firms which has a mean rating 4.36, Pakistan (3.98), Indonesia manufacturing firms (4.18) and Turkey SMEs (4.49) in a survey conducted by (Quazi *et al.*, 2002; Bas, 2008; Bahri *et al.*, 2012; Hassan *et al.*, 2012)^[4, 3, 16]. This finding implies that Ethiopian manufacturing still have a long way to go in the journey towards TMLC.

CSF 2

“Customer focus” has one of the lower mean values (3.00), and this demonstrates that manufacturing firm in Ethiopia lacks to give more attention for customer needs and requirements; customer focused strategies are not reviewed continuously; after-sale strategies and warranty are not considered as important strategy for their businesses. While the average mean values of most of items were below 3, some items were above this value (see Appendix A). The result indicates that firms have well established complaint process and guidelines; they were give top priority for quality related customer complaints; and training & communications were emphasized on customer focuses. This mean value (3.17) reflects a lower degree of practice compare to Indonesia manufacturing firms which has a mean rating 4.00 in a survey conducted by Bahri *et al.* (2012)^[3]. It can be concluded that firms in Ethiopia could be still struggling to implement customer focus successfully.

CSF 3

“People management” with a mean value of 3.30 was ranked second highest by the respondents. This result clearly indicates that firms have effective selection and recruitment process; open and continuous communication; excellent occupational health & safety practices; transparent & effective employee performance appraisal system. Findings from the above country also indicate that adequate people management focus determines the likely

effectiveness of the quality initiatives undertaken. Nevertheless, as direct comparisons cannot be made from these findings, it is concluded that Ethiopian manufacturing firms have not been left behind in this critical success factors based on a mean practice of 3.30 as compared to Quazi *et al.* (2002) survey results

CSF 4

“Supply quality management” with a mean value of 2.97 was ranked least by the respondents. This clearly demonstrates that firms haven’t strong and long term cooperative relation with their supplier; and limited participation & audits on supplier quality performance. Eventually, there is some evidence that may raise some concerns on the supplier quality management because most reference from literature was discovered to have low level of practice. Take for example this study, where it is recorded as lowest (2.97) among the 6 critical success factors presented. Similar survey results were obtained in Turkey manufacturing firms. In Singapore companies recorded a mean of 3.36. The above findings suggest that some measures must take place to increase awareness among organizations. Supplier quality management is an important aspect of TQM since materials and purchased parts are often a major source of quality problems (Zhang *et al.*, 1999). Hence, organization that pursues good supplier quality management will be able to reduce total quality costs and improve product quality in the long run.

CSF 5

“Process management” with a mean value of 3.32 was ranked highest by the respondents. This clearly demonstrates that firms have standardized and well documented operating procedures; process design and capability of firms were designed based on the skill and capacity requirement of their companies; and performed inspection effectively on the incoming raw materials, semi-processed materials and the final products. While the average mean values of people management dimension is above 3, some individual items fall below this value (see Appendix A). The result shows that regular assessments of process & procedure is not effective; maintenances of production equipment is not performed according to the plan; and companies are not well net and clean.

CSF 6

“Continuous improvement” has one of the highest mean values (3.00), and this demonstrates that manufacturing firm in Ethiopia have, quality improvement body to coordinate and improve different activities in the company; clear documented quality manual, procedures and instructions to guide and maintain consistency of the activities in the company. However, this mean value (3.17) reflects a lower degree of practice compare to Indonesia, Pakistan, and Turkey (4.25), (3.767), and (4.28) respectively in a survey conducted by (Bahri *et al.*, 2012; Hassan *et al.*, 2012; Cetindere *et al.*, 2015)^[3, 16]. This finding also implies that Ethiopian manufacturing still have a long way to go in the journey towards continuous improvement.

4.3 Comparison between Medium and Large Firms

Comparative data on medium and large manufacturing firms are provided in Table 5. From Table 5, it can be clearly seen

that there were no significant difference between medium and large manufacturing companies on the mean of TQM critical success factors at 0.05 significant level. Since all critical success factors have exhibited the p-value more than 0.05, meaning the result is not significant. This tells us that

both of medium and large companies in Ethiopia are at the same level in the extent of implementation on all TQM critical success factors. The results are in agreement with the results reported by (Mallur & Hiregoudar, 2010) [19].

Table 5: Comparison between medium and large Firms: Level of Implementation of TQM

CSF	Medium size (n= 41)		Large size (n=81)		T _{cal}	P _{value}	Result
	Mean	SD	Mean	SD			
TQM Practices	3.15		3.17				.
Top Management leadership & commitment	3.16	.374	3.17	.405	-.364	.716	Not Sig.
Customer Focus	3.01	.375	2.99	.463	.219	.827	Not sig.
People Management	3.32	.431	3.28	.478	.453	.652	Not sig.
Supplier Management	3.00	.49384	2.95	.505	.422	.674	Not Sig.
Process Management	3.28	.495	3.34	.523	-.661	.510	Not Sig.
Continuous Improvement	3.15	.65482	3.25	.563	-1.038	.301	Not Sig.

4.4 Correlation Analysis between variables

The correlation results reveal that the six TQM critical success factors have positive and at 0.01 level statistically significant relationships between them (See Table 6). The correlation coefficients between the six TQM critical success factors were range from .266 to .796. These results are broadly similar to those of Samson and Terziovski

(1999) [30], who established six TQM elements that had correlation coefficients generally above 0.2 between them. It also similar to those of Hassan *et al.* (2012) [16], who established 7 TQM elements that had correlation ranges from 0.3 to 0.9 between them, as well as Zehira *et al.* (2012) [43], who established 8 TQM elements that had correlation coefficient ranges from 0.3 to 0.7 between variables.

Table 6: Results of Correlation Analysis between Variables

		TMCL	CR	PM	SQM	CI	PRM
TMCL	PC	1	.767**	.743**	.383**	.862**	.654**
	Sig.		.000	.000	.003	.000	.000
CF	PC		1	.796**	.469**	.620**	.689**
	Sig.			.000	.000	.000	.000
PM	PC			1	.266**	.639**	.587**
	Sig.				.003	.000	.000
SQM	PC				1	.571**	.310**
	Sig.					.000	.001
CI	PC					1	.383**
	Sig.						.000
PRM	PC						1
	Sig.						

Based on the correlation coefficient, TMCL has the highest correlation with continuous improvement (.862). This shows that TMCL focused company is also to be focused on continuous improvement which is, in turn, highly correlated with customer focus ($r=.767$). On the other hand, the lowest correlation has indicated between supply quality management and people management (.266).

5. Conclusion

This paper has presented the results of a study conducted on Ethiopian manufacturing firms, with the primary objective of investigating the current status of TQM practices in these firms. It has contributed to a better understanding of the field of Total Quality Management. The result has suggested firms in the survey are found to have implemented certain kinds of quality management programs. This means they are generally conscious of the importance of TQM. However, firms were not practiced the complete, and comprehensive components of TQM as their original proponents (American and Japanese TQM gurus) had conceived them. Therefore, this paper indicated and identified areas lacking in implementation in the TQM program. In addition, the status of TQM practices among these Ethiopian manufacturing firms has been far below other developing countries.

6. Suggestion, Limitations and Future Directions

The role of top management is important factor in implementing TQM in organization. Therefore, the success or fail of TQM practices in organization is part of top management responsibility. Managers should determine quality policy, develop specific measurable goals and allocate necessary resources to implement successfully TQM programs. Furthermore, implementation of just a limited portion of the real TQM could miss out on the more important components. Therefore, this research study could provide insights to manufacturing companies in Ethiopia in terms of the need of orientation through seminars and forums on the critical success factors of TQM. Thus, this study focused on different manufacturing industries. So, the next research also could be carried forward with a focus on a particular manufacturing industry such as food & beverage, chemical etc. in order to obtain more specific results. Furthermore, the study is limited to a least developed country where there is strong intervention by the government. Such intervention may have influenced the total quality management practices in the sampled organizations.

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