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Impact of ISO 9000 Certification on TQM Practices: Empirical Study in Ethiopian Manufacturing Companies

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Abstract: ***ISO 9000 certification is one of the most widely accepted quality assurance systems in world-wide. The primary objective of this study is to examine the relationship between ISO 9000 certification and the levels of total quality management practices of medium and large manufacturing firms in Ethiopia. The design of this research has quantitative approach. Both ISO9000 certified and non-certified firms are included in the survey. From 300 sampled medium and large manufacturing firms a total of 122 valid responses were received. The collected data were analyzed using descriptive analysis such as mean and standard deviation.Inferential statistics was done through T-test.The findings indicate that ISO 9000 certified companies show higher levels of total quality management practices in top management leadership, supply quality management, process management and continuous improvement. Furthermore, the study concludes that when ISO 9000 and TQM are implemented simultaneously, the subsequent benefits to the company are better than those experienced if TQM were implemented in separation.***

Keywords: Total Quality Management, ISO: 9000 Series, Quality management, Organization Performance, Manufacturing Firms

1. Introduction

International organization of standards (ISO), a global federation of 130 national standards bodies, seeks to promote standardization and the development of related activities worldwide in order to facilitate the international exchange of goods and services, and cooperation in the sphere of intellectual, scientific, technological and economic activities [1]. ISO: 9000 Seriesof standards was first published by the International Organization for Standardization (ISO) in 1987 and was subsequently updated in 1994 and 2000 [2].ISO 9000 has gained in popularity as the number of certifications that have been issued increased to more than 1, 609 294in worldwide in 2014[3]. A number of researchers reported that ISO 9000 certified companies had improved quality management practices and quality results more effectively than those companies without ISO 9000 registration and certification.However,rare empirical research has been conducted in this area in Ethiopia. Studies related to the impact of ISO 9000 on the level TQM practices in Ethiopia's manufacturing industry have not been found in the literature review thus far. Therefore, the primary aims of this study is to examine the relationship between ISO 9000 certification and the levels of total quality management practices of medium and large manufacturing firms in Ethiopia.

2. Literature Review

2.1. ISO: 9000 Series and TQM

ISO 9000 is a process that typically shifts an organization's culture to allow successful Total Quality Management (TQM) implementation. Studies reported that companies that implement ISO9000 and TQM at the same time and in an integrated manner might expect to have advantages in product quality, delivery, productivity and customer satisfaction [1]. Bikshapathi[4] reported that in his study there is strong relation between the ISO certification and TQM implementation. The author also found that the total quality management is implemented in organizations with ISO certification were better than those of without ISO certification. Companies that are internally motivated to implement ISO 9000 should a high level of TQM elements [5].According to Kuo et al [6], the development and certification of an ISO 9000 quality assurance system really improves TQM performance. He also found that all certified divisions experience significant results on the level of quality management practices regardless of the nature, size and length of practices.

On the other side, ISO9000 certification is only the beginning of a continuous improvement process rather than the end and could be a useful stepping stone for TQM. ISO 9000 can be an excellent start to TQM, if it is interpreted in a way that encourages the company to start on the process of continual improvement by team work of all people working in the company satisfaction[1]. Furthermore, Quazi et al. [2]suggests that ISO 9000 registration does not have any impact on quality management practices and quality results for firms. Martinez-Lorente et al. [7]also reported that ISO 9000 does not contribute to improve results, especially when the company is also applying a TQM policy, which does contribute to improve them.ISO 9000 certification does not guarantee improved performance due to the high explicit and implicit costs associated with its implementation [8]. Generally, different studies have been conducted in these areas. However, there is no agreement on the relationship between ISO 9000 certification and TQM practices. In this study, ISO 9000 certified companies would, therefore, be expected to have more effective TQM practices than none certified companies as a result of their ISO 9000 effort.

2.2. TQM and Organization Performances

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 [9].Many firms have arrived at the conclusion that effective TQM implementation can improve their customer satisfaction and organization performance[10]. The critical success factors of TQM can be described as best practices or ways in which firms & their employees undertake business activities in all key processes. According to Dean & Bowen [11], TQM as a philosophy or an approach to management can be characterized by its Critical Success Factors. They continue and indicate that TQM implementation can only be accomplished through a set of Critical Success Factors that supports the TQM philosophy.Based on literature review, six critical success factors are adopted as a TQM construct for this study. These CSFs are also used by Abusa [12] and empirically proved 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	[13,14,6,15,16,17,9]
Customer Focus	[13,2,18,19,20,15,9]
Supplier Quality Management	[6,15,16,9]
People Management	[18,21,19,22,16,23]
Process Management	[24,25,26,20,16]
Continuous Improvement	[27,28,29,30,31]

Organizational performance is possibly the most widely used dependent variable in organizational research today. However, at the same time it remains one of the most vague and loosely defined constructs [32]. A review of past empirical studies on organizational performance also indicatesthat there are variations in measuring performance in organizations[33,34]. To date, no uniform measures have existed. To investigate the relationship between TQM practices and organization performance improvement, this study incorporates different indictors of overall performance such as customer result, employee result, product quality results and key business result as supported by different researchers and quality award models (see Table 2).

Table 2: Organization performance indicators supported by different studies

Overall OP indicators	Supported studies
Employee Result	[35,36,37,38,39]
Product Quality Result	[40,41,42,43,44]
Customer Result	[36,45,12,46,47]
Key business Result	[48,49,34,46]

3. Research methodology

3.1. Questionnaire

To investigate the relationship between ISO 9000 certification, TQM implementation status and organization performance, 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 and 4 performance indicators were adopted from several related studies; these are Abusa [12], Zhang [48], Claver et al. [50], Chileshe & Watson [51], Santos-Vijande & Alvarez-Gonzalez [52], Das et al. [53], and Anil & Satish [54]. 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 [55], Mallur and Hiregoudar [56], Bahri et al. [57] and Ullah [58], a five-point Likert scale was employed for scoring responses (1 = strongly disagree and 5 = strongly agree).The questionnaires have 3 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 with a total of 61 statements.Finally, Section 3 describes the degree of agreement achieved on the impact of implementing TQM in organization performances with a total of 23 statements.

3.2. Population and Sample

According to the 2010-2011 annual Large and Medium Scale Manufacturing industries survey of Ethiopian Central Statistical Agency [59], 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. Both ISO 9000 certified and non-certified firms are included in the sample. 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, certification status, 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 6 critical factors of TQM and 4 performance indicators were calculated by Crobach's alpha (see Table 3). Nunnally[60]advocates that reliability coefficients of 0.70 or more are considered good, although it may be reduced to 0.6 in exploratory research [61]or even to 0.55 [62]. 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 and organization performance improvement. T-test of Hypothesis for the Mean Difference also used to see the significance difference between ISO 9000 certified

and non-certified company. Correlation analyses were conducted to observe the degree of relationship between TQM critical success factors and performance indicators.

Table 3: Reliability analysis of critical success factors of TQM and OP indicators

No. Variables/Indicators	No. of items	Cronbach's α	Description
1. TQM Practices (X)			
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
2. overall performance (Y1)			
Employee Result	6	0.860	Reliable
Quality Result	7	0.786	Reliable
Customer Result	6	0.826	Reliable
Key Business Result	4	0.769	Reliable

4. Results and Discussions

4.1. General Profile of Respondent Companies

The response rate of the survey was 40.67%. 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%)(seeTable 4). 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.

As it was the purpose of this study to find out where the Ethiopian companies are in the quality race, the companies were asked whether they have been certified with ISO 9000. Only 32.8% of the respondent companies already have an ISO certification. Most (67.2%) of the respondents do not have an ISO 9000 certification. This clearly shows that the involvement in ISO 900 certification is very low, where they were not realized the importance of ISO certification at their company. Table 4, also shows that 56.1% of non-certified firms have a plan to get certification in short period. Perhaps, the remaining (43.9) are still in their infancy stage of getting to the idea of to have ISO 9000 certification for their company.

Table 4: 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
Q2	**Highest Education Level**		
	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
Q4	**Industry type**		
	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
Q5	**Firm classification based on ISO 9000 certification**		
	Certified	40	32.8
	None Certified	82	67.2
Q6	planning to get certification		
	Yes	**46**	**56.1**
	No	36	43.9

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 [63,57,64].

Table 5: Results for Mean Value & Std. deviation of TQM Practices

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

According to table 5, it can be reveals that average value (mean) of TQM practices variable was in moderate category (3.17). The values of the six critical success factor range from 2.97 to 3.32, which corresponds to a `moderate' level of practice. People Management (3.30) and Continuous Improvement (3.32) were the two highest practices in this study; while Supplier Management (2.97) and Customer Focus (3.00) was the bottom two (see Table 5). From this result, it can be observed that all the respondents rated at `moderate' for degree of TQM practices in their companies, indicating that companies are struggling to practice TQM successfully.

4.3. Levels of organization performance (OP) Improvement

To analyze the organization performance improvement level over the last three years the researcher uses four indicators and 23 items questionnaire. Mean for individual question and over all mean for each 4 indicators were calculated. The overall mean values of each indicators range from 3.15 to 3.50 shown in Table 6.

Table 6: Mean values & Std. Deviations of organizational performance improvement

No.	Indicators	Mean	SD	Description
	Organization Performance	3.39		
	Employee Result	3.50	.502	High
	Product Quality Result	3.44	.495	High
	Customer Result	3.15	.585	Enough
	Key Business Result	3.45	.566	High

Table 6 indicates that average value (mean) of performance improvement variable was a little between the `moderate' and `high' improvement category (3.39). The values of the 4 performance indicators range from 3.15 to 3.50, which corresponds to between `moderate' and 'high' level of performance improvement. Employee result (3.50) and key business result (3.45) were the two highest performance improvement in this study; Customer result (3.15) was the bottom one (see Table 6). From this result, it can be observed that all the respondents rated at between `moderate' and 'high' for degree of performance improvement in their companies, indicating that companies are struggling to improve organization performance from different angle.

4.4. Comparison between ISO 9000 certified and non-certified Firms on Level of TQM Implementation

Comparative data on ISO 9000 certified and non-certified manufacturing firms are provided in Table 7. From Table 7, mean measures on the four categories defining the TQM practices were significantly greater for the ISO 9000 certified group than none certified group.

Table 7: Comparison between ISO 9000 certified and non-certified Firms on Level of TQM Implementation

CSF	ISO 9000 (n= 40)		Non ISO 9000 (n=82)		T_{cal}	P_{value}
	Mean	SD	Mean	SD		
TQM Practices	3.42		3.04			
TMlC	3.24	.229	3.13	.293	1.99	.049
CF	3.10	.403	2.95	.442	1.831	.070
PPM	3.37	.421	3.26	.478	1.317	.190
SM	3.13	.450	2.89	.506	2.566	.012
PRM	3.66	.364	3.15	.494	5.770	.000
CI	3.53	.334	3.06	.448	5.858	.000

As it was already anticipated that TQM practices among the ISO 9000 certified companies are supposed to be higher than ISO 9000 non-certified companies was proven to be true at all critical success factors. On four of the six TQM critical success factors, there are significant differences between the mean responses of the ISO 9000 certified and non-certified respondent companies.

In particular, the p-value of the t-test shows that the participants perceived that the ISO 9000 certified companies had greatest significance difference in Process Management (.000) and Continuous improvement (.000), followed by Supplier Management (.012). Interestingly, the least significance difference between the mean measures of the ISO 9000 certified and non-certified firms were measures for Top Management leadership & commitment (.049). The results are in agreement with the results reported by Kuo et al. [6]ISO certifications significantly improve the effectiveness of quality management practices, and providing a good first step towards TQM. The results are also in agreement with the result reported by Bikshapathi [4]that total quality management is implemented in organizations with ISO certification were better than those of without ISO certification.

4.5. Comparison between ISO 9000 Certified and Non-Certified Firms on Level of OP

Table 8: Comparison between ISO 9000 certified and non-certified Firms on Level of OP

OP indicators	ISO 9000 certified (n= 41)		ISO 9000 non-Certified (n=81)		T_{cal}	P_{value}
	Mean	SD	Mean	SD		
Overall Op	**3.59**		**3.29**			
People Result	3.77	.382	3.37	.503	4.43	.000
Quality result	3.72	.362	3.31	.495	4.75	.000
Customer result	3.28	.515	3.09	.610	1.69	.093
Key B. Result	3.59	.414	3.38	.618	1.91	.059

From Table 8, the result reveals that the influence of TQM practices on organizational performance is higher for those ISO 9000 certified companies. On two of four OP indicators, there are significant differences between the mean responses of the ISO 9000 certified and non-certified respondent companies. In particular, the p-value of the t-test shows that the influences of TQM practices had greatest significance difference in People Result (.000) and Product quality Results (.000) between ISO 9000 certified and non-certified companies.

This result was consistent with the results reported by Kuo et al. [6]. ISO certification does bring significant benefits to improve the level of quality performance. Starke et al. [65]also believed that certification contributes to increase in sales revenues, decrease in cost of goods sold/sales revenue and increase in the asset turnover ratios.Hasan et al. [1] also found that companies that implement ISO9000 and TQM at the same time and in an integrated manner have better performance in product quality, delivery, productivity and customer satisfaction. Muturi et al. [66]also reported that certified companies have better return on net assets of the organizations thereby influencing their performance.

4.6. Correlation Analysis between variables

Table 9: Pearson Correlation coefficient matrix

		CR	PQR	ER	KBR
TM CL	PC	.600	.655**	.638**	.419**
	Sig.	.000	.003	.000	.000
CF	PC	.529**	.549**	.545**	.406**
	Sig.	.000	.000	.000	.000
PP M	PC	.447**	.469**	.504**	.356**
	Sig.	.000	.000	.000	.000
SQ M	PC	.083	.264**	.255**	.171
	Sig.	.361	.003	.005	.060
CI	PC	.610**	.585**	.666**	.384**
	Sig.	.000	.000	.000	.000
PR M	PC	.570**	.575**	.396**	.312**
	Sig.	.000	.000	.000	.000

As shown in the above Table 9,the result also revealed that entire six TQM critical success factor is significantly correlated with all performance improvements except supply quality management. Supply quality management is significantly correlated only with two performance indicators: product quality result (.264) and employee result (.255). TMLC has highest and significant correlation with entire performance improvements; it is significantly correlated with customer Result (.600), product quality performance (.655), employee performance (.638) and key business results (.419). This result is consistent with the study conducted byCetinderea et al. (2015) that leadership criteria have a higher correlation with performance.

TQM critical success factor vary in terms of their importance to influence the four performance improvements. It was observed firstly that TMLC, as a TQM critical success factor could be rated as the most important TQM critical success factor in relation to organizational performance improvements. The second most important TQM critical success factor was continuous improvement with higher correlation coefficient. This was a significant predictive factor that explained variations in the entire organizational performance improvements. The influence supply quality managementwas very low and it was influence only two performance improvements i.e., product quality performance and employee performance.

5. Conclusion, Limitations and Future Directions

This paper has presented the results of a study conducted on Ethiopian manufacturing firms, with the primary objective of investigating the relationship between ISO 9000 certification, TQM practice and Organization performance improvement in these firms. Classification has been done by ISO 9000 certification status. The results vary to a certain degree between groups, and significant difference was found on four TQM critical success factors & two performance indicators. Manufacturing companies in Ethiopia that certified ISO 9000 standards is necessarily obtain better TQMpractices and performance improvement than those that had not yet certified. The implication is that ISO 9000 standards & TQM must be completely and systematically implemented and integrated which in turn should lead to improve organization performance.The study should be better if it is done by balanced number of certified and non-certified firms. But this could not be done in this study owing to small number of firms which are ISO 9000 certified in the country. As ISO 9000 is becoming well accepted and more firms are going in for certification, the next study can address this issue.

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