

Barriers and Benefits of Total Quality Management Implementation in Libyan Manufacturing Companies

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Abstract: The purpose of the paper is to investigate the barriers that Libyan manufacturing companies face in implementing Total Quality Management philosophy, as well as the benefits gained from such an initiative and to compare findings with similar cases in other nations. To achieve these objectives, an extensive literature review was conducted to understand the barriers and benefits of implementing TQM, followed by a survey questionnaire. Data was collected from companies operating in Libya in the Oil and Gas and manufacturing industries. SPSS was used in performing the analysis. Out of 12 barriers, six barriers showed statistically significant differences from the mean at $p=0.05$ level, showing that companies in Libya have faced some particular difficulties in implementing TQM. Regarding the benefits that could be achieved by implementing TQM philosophy within the surveyed companies, findings were positive in terms of improving product quality for customers, improving the working environment, improving operational performance and improving customer satisfaction. On the other hand, participants indicated that implementing TQM in Libyan manufacturing companies would have no positive impact on teamwork and problem solving procedures, increasing the organization's profits, increasing employee satisfaction or reducing waste and scrap. The findings have been compared with other countries and suggestions were made for the future improvement of Libyan companies.

Key words: TQM • Barriers • Benefits • Manufacturing Companies • Libya

INTRODUCTION

In order to succeed in the global market, all parts of an organization should work together to achieve the same objectives, while taking into consideration that each person in the organization and each activity influences and is influenced by, others. To improve competitiveness, organizations which seek a higher level of efficiency in all functions and processes are adopting TQM as a strategy to stay in business [1]. TQM is a philosophy aimed at enhancing the performance of products, services and processes to meet and go beyond customer outlooks [2]. It can be viewed as a philosophy, method or technique used to direct organizations in a process of continuous upgrading of all aspects of their business [3]. The TQM provides the framework by which continuous improvement is possible in an organization. It is a people-oriented, customer-focused, measurement-driven management philosophy, using

structured and well-organized operating methodology. When considering different evaluations carried out to investigate the status of TQM implementation, a mix of positive and negative experiences was recorded - some companies have experienced success in TQM implementation, others fail [4]. Morris and Haigh [5] found that 20% of organizations have either not encountered any barriers when implementing TQM or have successfully surmounted them, while 80% of organizations have encountered barriers which they have failed to surmount.

A research within Arabic speaking countries concluded that take-up of QM practices has been notably slow in comparison with other regions and there are evidences that TQM practices are not popular among managers [6]. Tarbaghia [7] in his research on private and public sector Libyan companies found that they suffer from lack of research and many difficulties in implementing and maintaining effective managerial and

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management systems. TQM barriers are one of the management obstacles that an organization faces during and after the implementation of quality management system [8]. Hokoma *et al.* [9], found in their study at Libyan Cement Industry, that senior management body should pay more attention through applying a clear strategy towards most of the areas that are considered as being crucial in any successful implementation of the TQM techniques/philosophies. In another research conducted to the Libyan Iron and Steel Industry, a lack of support from the senior managers towards implementing TQM was found [10].

To define the barriers and also the desired benefits from implementing such an initiative, a literature review has been carried out and summarized in two topics, namely TQM barriers and TQM benefits:

TQM Barriers: When aiming to improve operational performance, it is essential to recognize and understand the obstacles that may hinder the success of TQM programs before and during implementation [11]. TQM barriers show up in all sectors (manufacturing, services, government), therefore it is important for all organizations to understand and avoid these barriers both before and during TQM implementation [12]. TQM without certain components will fail, or will not offer many real benefits. Several authors have identified different sets of barriers based on their experience [3, 4, 9, 11-15].

Masters [12] found eight barriers, occurring to varying degrees and with varying frequency, that plague organizations most often: an inability change the organizational culture; lack of permanent training and education; lack of commitment on the part of the management; improper planning for implementation; lack of access to data and results; unsuccessful measurement techniques; isolated individuals and departments and incompatible organizational structure; paying insufficient attention to external and internal customers; and insufficient use of teamwork and empowerment.

A study in Yemen found three major categories of TQM barrier: the first category was related to government decisions in appointing managers in public organizations and lack of governmental programs necessary to support quality activities; the second category was a lack of knowledge of new techniques and a shortage of qualified personnel; the third category was society culture and inappropriate managerial traditions and habits [13].

In Qatar, nine barriers were found: the existence of a strict hierarchical and authoritative structure; a lack of commitment and support from top directors; resistance from both employees and middle management; a negative

work climate; lack of resources to implement changes; lack of knowledge and skills in senior management; wrong people in the wrong positions; promotion for employees on the basis of race rather than on achievement and experience; and complications linked with empowerment at lower employee levels [14].

A survey in USA, conducted for the American Society for Quality (ASQ), found that five barriers exist: insufficient human resources management and development; lack of quality leadership; lack of planning for quality; lack of customer focus; inadequate TQM resources [15]. Other research in USA studied the barriers facing TQM and non-TQM organizations and showed that three barriers faced TQM organizations; insufficient time, poor communication and lack of employee authorization. For non-TQM organizations, barriers were insufficient time, lack of strategic planning for change and lack of motivation [16].

A study in Indonesia has revealed eleven factors considered to hinder the successful implementation of TQM. These factors are linked to human resources; organizational culture; management; inter-departmental relations; attitude towards quality; materials, machines and equipment; information; method and training [17].

A study in Singapore found that the main difficulties encountered during the implementation of TQM are managers' unwillingness to take responsibility, initial managerial difficulties, a short-term view of TQM and employees' resistance to change [18].

In India, three barriers were found in industrial companies, namely no benchmarking of other companies' practices, employees' resistance to change and lack of resources [19].

The different and similar findings obtained by the above researchers are summarized as follows: lack of various resources occurred in Yemen, USA, Indonesia, India and Qatar, whereas a lack of involvement of management and employees appeared in USA, Qatar, Singapore and Indonesia and lack of management commitment was encountered in Indonesia, India, USA and Yemen.

TQM Benefits: TQM programs, if effectively implemented, will lead to substantial benefits [14]. Those benefits do not happen overnight and will only be realized in the long term [20-23]. Organisations that implement TQM effectively have to be patient and will see improvement in financial performance after a year or two [24]. Juran [25] stated that the expected benefits of TQM deployment are lower costs, higher revenues, satisfied customers and empowered employees.

A study by Bhanugopan [26] in Papua New Guinea found that customer satisfaction and efficiency are the most valuable benefits of initiating quality management. TQM helps organisations by allowing them to benefit from greater customer satisfaction and better quality through the introduction of permanent improvements [27].

Goh and Yeo [18] found that the main benefits of TQM implementation are sustaining a competitive advantage, improving customer satisfaction, increasing awareness of quality and improving operating procedures.

Al-Asiri [28], in his study on Saudi Arabian business organizations, found that when TQM is successfully implemented, an organization will gain the benefits of continuous improvements in products, processes and services, a reduction in costs, enhanced productivity and increased overall customer satisfaction.

TQM offers many benefits when properly implemented, such as reduced scrap and rework, the elimination of defects, reduced levels of cost, increased levels of productivity and efficiency and better employee morale [29]. There is evidence that proper TQM implementation improves organizational performance and adds valuable benefits such as fewer defects, less rework and scrap, lower inventory levels, reduced lead times, higher flexibility and improved employee satisfaction [16].

Chin and Pun [30] stated that successful TQM implementation will result in improved products and services, more satisfied employees and customers, reduced costs and an improvement in the organization's financial performance.

The benefits of TQM revealed by the above researchers can be summarized as: a reduction in overall costs; higher revenues and improved financial performance; better quality of products and services; elimination of defects; reduced scrap and rework; reduced lead-times; lower inventory levels; increased customer satisfaction; increased employee satisfaction and morale; increased productivity; improved organizational performance.

In Libya, empirical research is required to identify and highlight the barriers and benefits of TQM in the context of a country that has just opened its economy to foreign investment after enduring international sanctions over an extended period of time (1986-2004). Knowledge and results obtained from this study would help the Libyan government, particularly the National Oil Corporation (NOC) and the General People's Committee for Industry-Economy and Trade, in the process of related decision making. Furthermore, results will help to guide those organizations which are planning TQM

Table 1: List of TQM barriers

	Barriers
QA1	Lack of tangible improvement from previous efforts
QA2	Lack of recognition for employee involvement
QA3	Lack of commitment from staff
QA4	Increased complex paperwork
QA5	Lack of government support, incentives and resources
QA6	Not part of our organisation vision / mission
QA7	Difficulties in change of culture and management
QA8	Inadequate knowledge and understanding of quality
QA9	Lack of leadership, business experience and expertise
QA10	Lack of financial resources
QA11	High turnover / changes in key executives
QA12	Lack of technological facilities

Table 2: List of TQM Benefits

	Benefits
QB1	Improving product quality for customers
QB2	Improving the working environment
QB3	Improving operational performance
QB4	Improving teamwork and problem solving procedures
QB5	Increasing the organization's profits
QB6	Increasing employee satisfaction
QB7	Reducing waste and scrap
QB8	Improving customer satisfaction

implementation. It will also help to guide Libyan manufacturing managers and businessmen in conducting self-audits of their implementation of TQM initiatives and in developing effective strategic plans and related measures designed to overcome obstacles.

Research Method and Survey Instrument: An extensive literature review was carried out to understand the expected benefits from TQM and the different TQM implementation barriers. This was followed by a survey questionnaire conducted in Libyan manufacturing companies. The questionnaire was designed in two main parts:

Part A: Designed to define the TQM possible barriers. Respondents were asked to what extent any of 12 quality conditions are currently barriers to implementing quality activity in the organisation. The 12 quality conditions are listed in Table 1. All questions were in a five-point Likert scale format (1 = not applicable; 2 = very low extent; 3 = low extent; 4 = moderate; 5 = high extent).

Part B: Designed to define the possible benefits of TQM. The respondents were asked to express their opinions to the best of their knowledge about the benefits that could be achieved by implementing the TQM philosophy within their organization. The eight quality

benefits are listed in Table 2. All questions were in five-point Likert scale format (1 = not sure; 2 = negative; 3 = moderate; 4 = positive; 5 = very positive).

A total of 311 copies were distributed to participants selected at random and holding different levels of management positions at selected organizations. Out of the 311 copies, 238 copies were returned, of which 226 copies were suitable for data analysis, giving a response rate of 76.5%.

The survey was carried out in July-September 2009. Each copy of the questionnaire was accompanied by a formal letter providing explanations about the research being conducted and providing some contact details in case of any inquiries or clarifications. There was no attempt to identify names or job titles, so all information was confidential and anonymous.

RESULTS AND DISCUSSION

Data gathered from the selected industrial sectors were collected, carefully checked for any unanswered questions, sorted, screened and analyzed using Statistical Package for Social Science (SPSS) software. Table 3 shows the size of companies involved in the study. Large companies were considered to have more than 500 employees whereas medium companies had 100 to 500 employees.

In order to evaluate the correlations between the barriers, factor analysis was performed on part A of the questionnaire. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was found to be 0.87. The KMO statistic varies between 0 and 1. A value close to 1 indicates that factor analysis should yield distinct and reliable factors [19]. Table 4 summarizes the varimax-rotated factor matrix, which extracts three factors that accounted for about 61% of the total variation. Items with loadings < 0.5 were dropped and items with higher loadings were considered to be important and to have influence on the label selected to present a factor [31]. Questions QA1-4 belong to factor 2, named by the author as lack of total involvement, whereas questions QA5-6, QA10 and QA12 belong to factor 3 and are identified as lack of resources. Questions QA7-9 and QA11 belong to factor 1 and are described as lack of effective management.

A reliability test was conducted for questionnaire parts A and B and Cronbach's Alpha value was found to be 0.87. A Cronbach Alpha value $\alpha \geq 0.7$ is considered to be acceptable [32], thus providing evidence that the questionnaire was judged to be reliable.

Table 3: Organisation size

	Business area	Medium 100-500 employees	Large \geq 501 employees
F1	Oil and gas		✓
F2	Cement		✓
F3	Steel		✓
F4	Agro-food	✓	
F5	Electrical and power		✓
F6	Textile	✓	
F7	Plastic and wood	✓	

Table 4: Varimax-rotated factor matrix and significance

Item no.	Factor 1	Factor 2	Factor 3	Sig.
QA1		0.680		0.008
QA2		0.765		0.091
QA3		0.728		0.010
QA4		0.657		0.095
QA5			0.636	0.050
QA6			0.580	0.000
QA7	0.786			0.501
QA8	0.784			0.456
QA9	0.699			0.144
QA10			0.787	0.000
QA11	0.591			0.938
QA12			0.528	0.005

Table 5: Benefits of survey results

No.	F1	F2	F3	F4	F5	F6	F7	Overall
QB1	3.84	3.96	3.45	3.27	3.80	4.25	3.31	3.75
QB2	3.90	3.56	3.54	3.73	3.53	3.13	3.38	3.73
QB3	3.65	3.68	3.64	3.64	3.40	3.38	3.46	3.61
QB4	3.41	3.52	3.18	3.50	3.07	3.13	3.31	3.38
QB5	3.48	3.48	3.82	3.50	3.33	3.13	3.53	3.48
QB6	3.33	3.56	3.27	3.09	3.46	3.13	3.15	3.32
QB7	3.32	3.28	2.55	2.50	3.20	3.50	3.62	3.20
QB8	3.76	3.88	2.82	2.77	3.93	3.38	3.46	3.59

Note: $(1.51 \leq \text{Negative} \leq 2.50, 2.51 \leq \text{Moderate} \leq 3.50, 3.51 \leq \text{Positive} \leq 4.50)$

The ANOVA test (Table 4) shows that out of 12 barriers, 6 were statistically significantly different from the mean of $p=0.05$ level. Those barriers are: QA1, lack of tangible improvements from previous efforts; QA3, lack of commitment from staff; QA5, lack of government support, incentives and resources; QA6, not part of our organisation vision / mission; QA10, lack of financial resources; QA12, lack of technological facilities. A post hoc Least Significance Difference (LSD) test was carried out for these six barriers. The test found that one large size industry (F5 Electric and Power Supply industry) and two medium size industries (F6 Textile industry and F7 Plastic and Wood industry) faced some particular

difficulties when compared to other industrial companies in Libya. The Electric and Power Supply industry has two barriers: lack of total involvement (factor 2) and lack of resources (factor 3), while the Plastics, Wood and Textile industries experience a lack of resources (factor 3).

Part B of the questionnaire was used for the analysis of the means of the TQM benefits within the surveyed companies; a summary of the tabulation is summarized in Table 5. Three categories of outcomes (negative, moderate and positive impacts) were noticed ($1.51 \leq \text{Negative} \leq 2.50$, $2.51 \leq \text{Moderate} \leq 3.50$, $3.51 \leq \text{Positive} \leq 4.50$). Overall results indicate that implementing TQM would have a positive impact on improving product quality for customers, improving the working environment, improving operational performance and improving customer satisfaction. On the other hand, the respondents indicated that implementing TQM would have no impact on improving teamwork and problem solving procedures, increasing the organization's profits, increasing employee satisfaction and reducing waste and scrap. Findings showed that TQM implementation in the Agro-food industry would produce a negative impact on reducing waste and scrap.

CONCLUSION

This study is the most recent to investigate the barriers and benefits of TQM within Libyan manufacturing companies. It contributes by providing an insight into what causes TQM to fail and identifying the benefits that can be expected from implementing TQM. Findings will be used for a TQM framework design to be implemented in Libyan manufacturing companies.

Three factors of TQM barrier were identified from this study, namely: a lack of total involvement (lack of tangible improvement from previous efforts, lack of recognition for employee involvement, lack of commitment from staff and increased complex paperwork); lack of resources (financial, technological and government support); and lack of effective management (difficulties in change of culture and management, inadequate knowledge and understanding of quality, lack of leadership, business experience and expertise and high turnover / changes in key executives). The findings show that in general, Libyan manufacturing companies suffer two factor barriers: a lack of total involvement and lack of resources. Both factors appeared in Yemen, Indonesia, USA, India, Qatar and Singapore, except that Singapore

had no lack of resources barrier. In Libya the Electrical and Power, Textile and Plastics industries suffer the most, facing some particular difficulties compared with the other industries. The Electric and Power Supply industry has two barriers: a lack of total involvement and lack of resources, while the Plastics, Wood and Textile industries experience a lack of resources.

TQM for Libyan manufacturing companies was found to have either a positive or moderate impact. A positive impact was found in improving product quality for customers, improving the working environment, improving operational performance and improving customer satisfaction. The moderate impact of TQM was in improving teamwork and problem solving procedures, increasing the organization's profits, increasing employee satisfaction and reducing waste and scrap.

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