

# The Role of Structural Control in Total Quality Management among Manufacturing Companies in Bahrain

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**Abstract:** The research was conducted to measure the implementation of Total Quality Management by selected companies in the Bahrain manufacturing industry; and, determine the structural and processes changes the same firms underwent towards successful implementation of the TQM concept. A total of 25 executive respondents (from supervisor to Quality Manager Level) of manufacturing firms participated in the study from September to November 2015. The results reveal that respondent Bahraini manufacturing firms have significantly higher levels of Total Quality Management implementation in the areas of “Use of TQM Methods” followed closely by “Top Management Involvement”. Furthermore, the processes and structural changes the organizations underwent in implementing TQM include the identification of TQM champions (those who spearhead the promotion of TQM in the company); identifying and partnering with sources of TQM expertise; selecting the best department where TQM can best be practiced; having the Quality Manager as Head of their Quality programs; and, having Total Quality Management System as their main focus in the formal training of employees. Moreover, in terms of the level of implementation of structural exploration and structure for TQM implementation, companies lean towards more conservative exploration and rigid structure. The implementation of Total Quality Management in terms of the goals set for the effort and as perceived by quality management is perceived to be highly effective and backed by much better financial performance. Finally, it was concluded that the main competitive advantage of TQM implementation is less product and workmanship defects and more efficient operations.

**Keywords:** Structural control; Total Quality Management; TQM Implementation; Quality Managers; Competitive Advantage; Quality Managers; Structural changes.

## I. INTRODUCTION

Total Quality Management (TQM) has evolved in such a manner that top managers view the practice as a competitive advantage and an integral part of their strategic planning process. This study reviewed the competitive advantages gained from the implementation of TQM techniques by manufacturing firms in the Kingdom of Bahrain. More importantly, it also reviewed the level of TQM implementation among these firms and determined whether structural control and exploration play an important part as a moderating influence on the organizational performance of firms practicing TQM.

In the Kingdom of Bahrain, there were very few studies on the link between the level of TQM implementation and structural control; and, how the relationship affects the firm's overall performance.

This is unfortunate due to the fact that the manufacturing sector in Bahrain contributes billions of dollars to the country's economy and is major part of a trillion-dollar industry among Gulf Cooperation Council (GCC) countries. It is therefore considered a major source of employment, investments and output for the Kingdom's economy. Therefore, the industry plays an important role in the Kingdom's rise as a prominent economic player in the GCC and the Middle East.

The primary objective of the research is to determine the level of implementation of Total Quality Management (TQM) among manufacturing firms in Bahrain. However, the study also focused on three specific objectives. First, it tried to find out the process the companies went through in implementing TQM. Second, it determined the effectiveness of TQM in these organizations; and third, the corresponding competitive advantages gained by these companies in adopting TQM practices.

## II. RESEARCH METHODOLOGY

The study employed a descriptive design using a survey of the sample population of manufacturing firms in the Kingdom. Such design is also appropriate to attain the research objective of establishing a sort of preliminary picture of



the state of TQM implementation by these manufacturing firms. A survey methodology using a standardized assessment instrument adapted to the firms concerned is expected to give a consistent view across respondent firms.

The standardized assessment inventory allow for quantitative results comparable across respondent firms. Another standardized assessment was used to establish perceived financial performance using scale rating directly obtained from respondents.

In this study, five manufacturing industries namely: Electrical/Electronics; Metal and Aluminium; Oil and Gas; Manufacturing/Building Materials; and Agribusiness/Agricultural were considered as clusters from where samples in the study were drawn. Five representative companies from each of the five clusters represented the samples in the study, which brought a total of 25 manufacturing firms considered as the final sample.

Within each manufacturing firm considered as a member of the final sample, the quality control manager or officer or his equivalent were targeted as the respondent for the structured interview and assessment questionnaire for the seven TQM practices. The assessments on structural exploration and control and on perceived financial performance were answered by the chief operating officer (COO) of the organization.

The research instrument used in this study is the survey questionnaire. The standardized questionnaire is composed of three main parts. The respondent's profile comprised the first part which includes their names and data on their gender, age, civil status and the title of their position in the company.

The second part of the research instrument is on data concerning the company profile of each of the company respondents. This includes data on company name, and number of employees. It also included data regarding the company's number of years in operation.

The third part of the instrument is the main body of the questionnaire, which is divided into two sections. The first section is the **TQM** assessment inventory. The determination of the level of practices in each manufacturing firm respondent was done through specific scales and 36 items which have been identified in previous researches (Powell, as cited by Douglas and Judge, 2001).

The TQM practices, according to Douglas and Judge (2001) "are grouped into the seven practices with the corresponding extent to which the items represent practices in the organization, as well as their corresponding degree of importance as perceived by the respondent." The TQM assessment inventory shall be content validated in the research locale.

To ensure the clarity of the instruments, the researcher personally administered the TQM assessment inventory.

The steps taken to collect the data were as follows:

1. Initial visits to the identified respondent firms with the purpose of getting their commitment to be involved in the study, preceded by a request letter asking for their inclusion in the study of their quality management practices.
2. After securing approval from the key officers of the respondent firms, and the key informants have been identified in each respondent firm, the administration of the assessment questionnaire was conducted at the offices of these key officers/informants.
3. The responses to the TQM assessment inventory were tabulated. The answers were pre-coded and tabulated for data analysis.

### Statistical Treatment of Data

1. Descriptive statistics describing the TQM assessment inventory scores. Mainly descriptive statistical tools were used following the nature of the study in terms of frequencies, ranges, maximums, minimums, and medians. Where applicable, matrices showing the patterns of assessment inventory scores across respondent organizations were prepared.

2. Factor analysis of TQM assessment inventory scores for identification of implementation patterns and degree of importance. Factor analysis of the inventory scores using SPSS was utilized.

The use of factor analysis in research is based on the guidelines given by Hair, Anderson, Tatham, and Black (1995). They explained the nature of factor analysis as follows:

"Factor analysis is a generic name given to a class of multivariate statistical methods whose primary purpose is to define the underlying structure in a data matrix. Broadly speaking, it addresses the problem of analyzing the structure of the interrelationships (correlations) among a large number of variables by defining a set of common underlying dimensions, known as factors...the two primary uses for factor analysis are summarization and data reduction (page 90)." As with any statistical analysis, there are certain methodological limitations. The number of manufacturing firms practicing TQM is not 100% of even the sample population. The findings of the study applied only to manufacturing firms of the designated cluster industries, and are not indicative of a trend elsewhere in the kingdom.

### III.RESULTS AND DISCUSSION

This study aimed to determine the level of implementation of TQM practices of Bahraini manufacturing firms. It also aimed to compare the level of implementation and perceived importance of TQM practices in the firm.



#### Level of Implementation of Total Quality Management Practices

It can be surmised from the first part of the results that the respondent firms rate high on the level of implementation of Total Quality Management practices in three areas in the following order: Use of TQM Methods (Mean: 4.26), Top Management Involvement (Mean: 4.23), and Focus on the Customer (Mean: 4.19).

#### Processes and Structural Changes towards TQM Implementation

Inasmuch as the respondent manufacturing firms have implemented Total Quality Management in their respective organizations and departments, the same firms have undergone at least several structural changes in the implementation of TQM.

From the results, it can be observed that of the 25 respondent companies, the average number of employees is 205, with 10 years as the average numbers of years that TQM was implemented. Majority of the responses show that TQM champions, or those who promote TQM inside the company are the Quality Managers; and the majority of the companies' sources of TQM expertise are the In-House experts. It also shows that the common department where TQM is best practiced is the Operations Department.

#### Structural adjustments towards successful implementation of Total Quality Management

With regards to the structural adjustments that the respondent companies underwent towards successful implementation of Total Quality Management in various areas of their organizations, the findings show that majority of the respondent firms have the Quality Manager as Head of their Quality programs (80%); and, Total Quality Management System as their formal training of employees (68%). The responses also showed that the most common quality program name in their respective organizations is Quality Management Systems (60%).

#### Perceived level of implementation structural exploration and control in TQM implementation

The study also revealed the perceived level of implementation of the structural exploration and control in TQM implementation by the firms. The respondent companies lean towards more exploration and structure rather than control. The table also shows that perceived financial performance is perceived to be much better.

#### Effectiveness of Total Quality Management

In this study, the researcher asked the respondents on the effectiveness of Total Quality Management in terms of the goals set for the effort and as perceived by quality management. Majority of the respondents, 20 out of 25, answered that Total Quality Management implementation is highly effective.

#### Competitive Advantage

The respondents were also asked on the competitive advantage brought about by TQM implementation. The main competitive advantage of TQM implementation is less product and workmanship defects (32%), followed by more efficient operations (24%) and third highest advantage is quality becomes a culture (20%).

## IV. CONCLUSION

In terms of the level of implementation of TQM practices of Bahraini manufacturing companies, the respondent firms rate highest on the "Use of TQM Methods" followed closely by "Top Management Involvement". This shows the interrelatedness of top management commitment and the implementation of TQM methods.

The processes or structural changes the organizations underwent in implementing TQM include the identification of TQM champions (those who spearhead the promotion of TQM in the company); identifying and partnering with sources of TQM expertise; selecting the best department where TQM can best be practiced; having the Quality Manager as Head of their Quality programs; and, having Total Quality Management System as their main focus in the formal training of employees.

Moreover, in terms of the level of implementation of structural exploration and structure for TQM implementation, companies lean towards more conservative exploration and rigid structure.

The implementation of Total Quality Management in terms of the goals set for the effort and as perceived by quality management is perceived to be highly effective and backed by much better financial performance.

Lastly, it was concluded that the main competitive advantage of TQM implementation is less product and workmanship defects and more efficient operations.

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Table 1. Diagnostic results of each of the twenty-five respondent firms in terms of their Implementation of TQM Practices

FIRM	Top Management Involvement	Adoption of Quality Policy	TQM Trainings	Focus on the Customer	Continuous Improvement	Management by Fact	Use of TQM Methods
1	4.00	4.40	4.83	4.80	4.33	4.83	4.80
2	4.00	3.80	2.67	4.20	3.67	3.33	3.60
3	4.67	3.60	4.33	3.60	3.33	4.17	4.40
4	4.83	4.60	3.50	3.80	4.33	4.50	4.60
5	4.67	4.20	4.17	4.20	4.67	4.50	4.20
6	3.83	4.40	3.83	5.00	3.67	4.00	4.60
7	4.67	4.00	4.00	4.20	5.00	3.50	4.60
8	4.83	4.40	4.00	4.00	4.00	4.33	4.40
9	3.33	4.40	4.33	3.80	5.00	4.33	3.40
10	4.83	3.80	4.33	3.40	4.33	3.67	3.40
11	3.33	3.20	4.50	4.40	4.00	3.50	4.20
12	3.83	4.20	3.50	4.00	3.33	3.50	4.60
13	4.67	4.20	3.83	3.80	4.67	4.17	4.20
14	3.50	3.40	4.00	3.80	3.33	4.67	4.60
15	3.50	3.20	4.00	4.60	4.67	3.67	4.60
16	4.67	3.20	4.00	4.60	4.00	3.17	3.80
17	4.00	4.40	4.50	4.40	3.33	4.17	3.80
18	4.67	4.60	4.33	3.60	4.33	3.33	4.80
19	4.83	3.60	4.33	4.40	4.00	3.33	3.60
20	4.67	4.00	4.67	5.00	4.67	4.00	5.00
21	3.17	4.60	4.67	3.80	4.00	4.00	3.60
22	4.17	4.20	4.50	4.40	4.67	4.33	4.80
23	4.83	3.00	3.67	4.60	2.33	4.17	3.20
24	3.50	2.60	3.67	4.40	5.00	3.17	4.60
25	4.67	4.00	4.33	4.00	4.00	4.50	5.00
<b>MEAN</b>	<b>4.23</b>	<b>3.92</b>	<b>4.10</b>	<b>4.19</b>	<b>4.11</b>	<b>3.95</b>	<b>4.26</b>

Table 2. Perceived level of implementation structural exploration and control in TQM implementation

FIRM	Structural Exploration	Structural Control	Perceived Financial Performance
1	1.50	2.00	3.00
2	3.50	3.67	3.40
3	3.50	2.33	3.40
4	5.50	5.67	3.80
5	3.50	4.33	4.20
6	3.00	3.67	3.80
7	3.00	3.67	4.20
8	3.00	3.67	4.00
9	3.00	3.67	4.20
10	3.00	2.67	3.40
11	3.00	3.33	3.80
12	3.00	4.00	3.60
13	3.00	4.33	3.60
14	3.00	4.33	3.40
15	3.00	3.67	4.40
16	3.00	4.00	4.00
17	3.50	3.33	4.00
18	3.50	3.33	4.20
19	3.00	3.00	4.60
20	3.50	3.00	4.00
21	3.00	3.00	4.00
22	5.00	5.00	3.60
23	4.00	3.33	3.80
24	5.00	3.67	3.20
25	3.00	2.67	4.40
<b>MEAN</b>	<b>3.58</b>	<b>3.42</b>	<b>3.82</b>

**Note:**

1. For a scale of 1 to 7\*, each statement in the pair has a corresponding scale. A (1) represents a more rigid structure, and a (7) represents the least rigid structure, with 4 as the midpoint standing for a combination of the two.
2. Using a scale of 1 to 5 to represent the firm's performance relative to the rest of the other firms' performance over the last three years, with 1= "much worse" to 5= "much better".