

THE ROLE OF INFORMATION TECHNOLOGY IN QUALITY MANAGEMENT IMPLEMENTATION. A LEBANESE CASE STUDY

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ABSTRACT: The use of quality management (QM) has become common among organizations during the last decades. Similarly, the effective application of information technology (IT) is becoming critical to the success of an organization. This research is focused on examination of the role of IT in QM implementation in Lebanese organizations using a case study approach.

KEY WORDS: Information technology, quality management, Lebanese organizations

1. INTRODUCTION

Quality management (QM) is an excellent advance to increase efficiency, performance and profit, beside to improved customer and employee satisfaction. This approach has seen successful in various organizations around the world. Yet, no effort has been made to study the effect of QM on organizational performance in Lebanese organizations. Likewise, information technology (IT) has significantly affected most organizations and has been widely researched in recent years. Although, a series of research shows that IT improves performance [3,4,9], some researchers say there is no clear evidence between IT and the increase of organizational performance [11]. Also, there are not sufficient proof to confirm that such a relationship exists in Lebanese organizations. Very few studies have searched the role of IT in QM implementation; mostly the way critical success factors (CFSs) for QM implementation are influenced by IT. Although studies have addressed the link between IT and quality [1,5] empirical proof is absent in Lebanese organizations. The plan of this study is to fill these gaps by making empirical proof to explain the effects of IT and QM on Lebanese organizations.

2. THE ROLE OF INFORMATION TECHNOLOGY IN QUALITY MANAGEMENT IMPLEMENTATION

It is frequently argued that IT is a very important factor in increasing efficiency and reducing costs. Before considering the influence of IT on QM it is necessary to define what is meant by the term IT.

In [7] Hoffman called IT an “all-inclusive term that encompasses computers and telecommunications in all their forms, whatever their use”.

An effective IT system and various IT-related products can provide the infrastructure to facilitate information flow between processes and people in an organization. The IT literature also provides example of how organizations used IT to enable QM. For example, in [6] is reported that bar coding, product recognition system and electronics points of sale are widely used to improve customer service in some organizations. Similarly, several QM organizations are using customer databases to store customer profiles, which includes names, location, addresses, financial information, payment information and complaints for better customer support management [2]. Total quality management organizations have used IT features including computer based modeling and computer aided design (CAD) in process designs. Some

companies have used QM tools including design of experiments, failure mode and effective analysis and quality function deployment using IT for QM analysis [6]. Information technology has also been used to automate processes using computers to handle the process flow effectively in TQM organizations [5]. In [8] the author concluded that "Information technology can provide strong support for QM implementation."

3. CASE STUDY

The research is focused on examination of the role of IT in QM implementation in Lebanese organizations using a case study approach.

3.1 Research methodology

The role of IT in QM implementation was analyzed using the case study research methodology. A survey, in-depth interviews with research participants and a document review were performed in organizations located in North Lebanon.

In [10] Naslund report that "Case study is particularly suitable when the research question are why and how as opposed to the

survey strategies research questions of who what, how many and how much".

The following research question was developed to analyze the role of IT in QM implementation: "How does information technology contribute to quality management implementation in Lebanese organizations?"

3.2 Results of survey

The sample size of 60 consists of IT managers and QM managers. The number of completed surveys returned was 26, resulting in a 43.3% response rate. Data collected form statements on a Likert-type scale ranging from 1 to 5 were analyzed to identify the role of IT in QM implementation.

The following 5-point Likert-type scales representing a range of attitudes from strongly disagree to strongly agree were used to collect data from the research participants: SD-strongly disagree; D-disagree; NR-no response, A-agree and SA-strongly agree.

The codes used in the following section represent the measurement variables used in this study.

A listing of variables and descriptions in the survey are showed in Table 1.

Table 1. Result list of codes used in the qualitative survey analysis

Code	Measurement question
Q1V1	Enable us to train our employees faster
Q1V2	Enable us to measure the performance of our employees faster
Q1V3	Enable us to manage our human resources effectively
Q1V4	Enables us to make needed data and information available to employees for better decision making
Q1V5	Enables us to manage relationship with our external customers more efficiently
Q2V1	Enable us to maintain close relationship with our suppliers
Q2V2	Enables us to involve our suppliers in the design/development process
Q2V3	Enables us to communicate our quality objectives/standards to our suppliers and partners
Q2V4	Enables us to make needed data and information available to suppliers and partners quickly
Q3V1	Enables us to share information very quickly within our organization
Q3V2	Enables us to effectively measure the cost of poor quality
Q3V3	Helps us to assess the needs for quality education and training
Q3V4	Enables us to benchmark the best companies
Q3V5	Has increased quality awareness within our organization
Q3V6	Enables us to identify, share and implement best practices (internal benchmarking) to improve product and services
Q4V1	Increases the organization's direct personal contact with customers
Q4V2	Enables us to measure customer satisfaction quickly
Q4V3	Enables us to communicate our quality objectives to our external customers effectively
Q4V4	Enables us to translate the customer requirements into product and service

	design requirements quickly
Q4V5	Enable us to identify and transfer of relevant knowledge from and to customers
Q5V1	Helps organization leaders to develop long term plans and strategy to satisfy the customer needs
Q5V2	Provide accurate and reliable information for management decision making
Q5V3	Help our organization leaders to assess the performance
Q5V4	Major tool to scan the business environment in our organization
Q5V5	Enables us to keep data and information availability mechanisms, including software and hardware systems, current with business needs and directions

The following sections summarize the role of IT in QM implementation for each analyzed factor.

People and customer management factor was analyzed using five measurement questions (code Q1V1÷Q1V5). 46.1 percent of the respondents agreed that IT contributes to the faster training of the employees. In addition, 50% percent of the respondents felt that IT enabled them to measure the performance of their employees effectively. Similarly, the highest number of respondents, 50% felt that IT enables them to develop necessary data and information to employees for better decision making. 80.7% of the respondents agreed or strongly agreed that IT enables them to manage relationships with external customers.

Supplier partnership factor was analyzed using four measurement questions (Q2V1÷Q2V4). In response to this factor most of the respondents, 50% noted that IT enables us to maintain close relationship with the suppliers. 42.3% agreed or strongly agreed that IT enables them to involve suppliers in the design and development process. 53.8 percent of the respondents agreed or strongly agreed that IT enables them to communicate them quality objectives to the suppliers and partners. 57.6 percent of the participants agreed or strongly agreed that

IT enables them to make needed data and information available to suppliers partner quickly.

Communication of quality improvement information factor was analyzed using six questions (Q3V1÷Q3V6). 61.5% agreed or strongly agreed that IT enabled them to share

information very quickly within the organization. 53.8% of the respondents agreed or strongly agreed that IT enables the organization to measure the cost of poor quality. 61.5% of the respondents agreed or strongly felt that IT helps to assess the needs for quality education and training. Nearly 70% of the respondents indicated that IT helps to benchmark the best companies. 57.6 percent of the respondents agreed or strongly agreed that IT has helped to increase quality awareness within the organization and helped in the internal benchmarking process.

Customer satisfaction orientation factor was analyzed using five questions (Q4V1÷Q4V5). Nearly 50% of the research survey respondents felt that IT increases the organization’s direct personal contact with customers. The highest number of respondents, 92% felt that IT enables them to measure customer satisfaction quickly. 62% of the research participants agreed or strongly agreed that IT enabled them to communicate the quality objectives to their external customers and helped to translate the customer requirements into product and service design requirements quickly. 34.6% of the research participants agreed or strongly agreed that IT enabled them to identify and transfer the relevant knowledge from and to customers.

Strategic quality management factor was measured using five questions (Q5V1÷Q5V5). 61.5% of the respondents agreed or strongly agreed that IT helps organization leaders to develop long-term plans and strategies to satisfy the customer needs. 53.8% of the research participants agreed or strongly agreed that IT provides accurate and reliable information for

management decision making. Nearly 76.9 of research participants agreed or strongly agreed that IT helps organization leaders to assess organizational performance. 53% of the respondents felt IT is a major tool used to scan the business environment. 41.6% of research participants agreed or strongly agreed that IT enables them to keep data and information availability mechanisms, including software and hardware systems, current with business needs and directions.

4. CONCLUSION

The result of the case study indicated that IT plays a supportive role in QM implementation. The QM factors people and customer management, communication of quality improvement information, team work structure for process improvement and quality improvement measurement exhibited high levels of IT usage. Furthermore, the factors operational quality planning and strategic quality management exhibited moderate IT usage, and IT plays some role in the factors corporate culture, empowerment and quality citizenship.

By comparing our results with recent studies, we observed that the case study results supported the view of Dewhurst et al. [6]. They investigated the IT influence on TQM through a qualitative approach in Spain.

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