

# TQM in E-Commerce: Issues, Implementation and Challenges

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**Abstract:** Nowadays, e-commerce changes the marketing field. It is considered as an effective means to run business over the internet in order to reach more customers as well as satisfy their needs through offering high quality products and services. This paper presents the common quality issues in e-commerce, implementation of TQM in e-commerce and challenges.

**Keywords:** E-commerce, Total Quality Management, Quality issues, Implementation, Deming Cycle, Six Sigma, Challenges.

## I. INTRODUCTION

Electronic commerce (E-Commerce) is a new approach of running business processes and transactions that include exchanging, purchasing, and selling of information, goods and services. These activities are done through different networks communication [10].

Nowadays, e-commerce changes the marketing field. It becomes the main purpose of the internet and the web sites to run business. E-commerce deal with the different types of business concern. The major goal of e-commerce is to focus on business alternatives that are related to products and services among the different companies and consumers as well. There are a lot of advantages of e-commerce. It is considered as an ideal means to develop business transactions over the other different networks. This development leads to efficient performance, customer's satisfaction, and quick exchange. To accomplish these goals, e-commerce should satisfy the customer's needs, support corporate decision making, implement high speed transactions, and impose lower cost [9].

To run on online business, it does not ensure competitive advantages. The e-shoppers have the choice to buy from any specific e-shop when they think that their needs will be satisfied. It is obvious that e-commerce firms are based on people who visit their web sites, buying their goods and become their frequent customers. To achieve that, there should be a secure and quality environment. The most important element to business achievement is the quality. The "Quality Management Approach" is required for insuring quality from its systems, staff, and supplier. Without this quality, a business cannot convey the suitable level of service quality to achieve customers' satisfaction [11]. In e-commerce community, quality is an important issue that is meant to accomplish the following quality objectives [10]:

- To attract more customers through good quality of website design contents.
- To make transactions available at any time through high quality technology.
- To make online processes and transactions easy and available through high quality supplemental services.
- To secure e-commerce processes and transactions through high quality security methods.
- To make e-commerce field effective through high quality environment.

There are various advantages of e-commerce, but it is having many quality issues. To overcome these issues Total Quality Management (TQM) is the best solution. TQM refers to a philosophy and a group of principles that present the base of a continuous improving organization [9].

This paper presents the concepts of Total Quality Management. Then, e-commerce quality issues are discussed. After that, the implementation of TQM in e-commerce and some challenges are discussed.

## II. THE CONCEPT OF TOTAL QUALITY MANAGEMENT

There are many definitions of the Total Quality Management (TQM) since the researchers differ in their definitions.

Total Quality Management is defined as "A system of continuous improvement that involves all workers in a business from upper management to production line workers" [14]. The improvement program focus on improving customer services and reduce waste and costs in the organization. The team of this program using problem solving techniques to define and reduce

weaknesses in the organization [14]. Another definition of TQM is the full integration effort of continuous improving the whole organization culture in order to gain the competitive advantage [21]. Additionally, TQM is the approach that helps to meet customer satisfaction through applying different techniques and tools that lead to provide a high quality of products and services [13].

All these definitions carry a single concept that focus on continuous improvement in each part in the organization in order to provide a high quality of products and services which lead to increase their customer satisfaction. These TQM concepts has been shown in the following figure [19]:

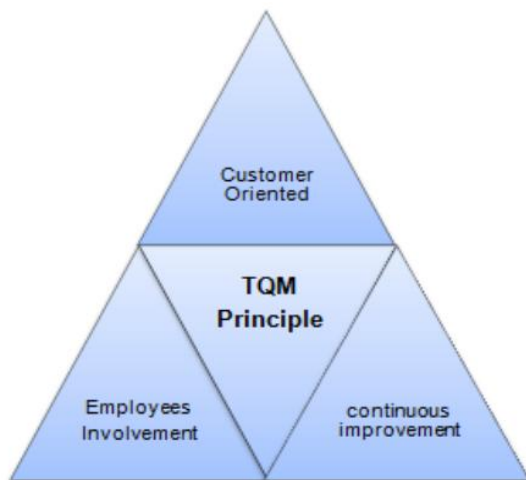


Fig. 1. Basic concepts of TQM

Total quality management can be applied in e-commerce because this will increase the company's revenue, improve communication with the outside world, and win customers' satisfaction. Moreover, the monitoring of e-commerce activities help simplify project operations and achieve goals away from mistakes. In addition, Total quality management serves many purposes to improve the quality of the processes, reduce waste, focus on how to avoid problems before they occur, reduce costs, and determine the organization's vision [10].

### III.E-COMMERCE QUALITY ISSUES

This section presents different quality issues in e-commerce which include: website content and design, technology infrastructure, supplemental services, security, and environment.

#### A. Website content and design

To begin with, modern business requires mainly information. In e-commerce, there is a need of content that includes information, data, experience or knowledge in order to reach a high standard of importance. Additionally, the content is considered as a means to produce value. Since the content is needed for all various types of e-commerce. Not only this, but also, a content is the main source of the knowledge about the products, services, and transactions [15].

The quality of content means the features of the information that exist in the e-commerce websites. The features of the content involve the characteristics of the content which is shown on the sites. Another quality that is required is the information quality. The quality of information is "one of determinants of user satisfaction and their intention to use a particular system and identified a number of attributes such as accuracy, up to date, comprehensiveness, understandability, completeness, timeliness, reliability, relevancy, currency, preciseness" [15].

The websites provide the users the required information and knowledge. The best website is the one which provides more accurate and useful information. The most efficient e-commerce website is that extend customers the sufficient information for the products, services, sales, and technical support, and the other related information of the company. Additionally, the web contents include and identifies all supplementary services that are connected to online transactions [10].

In the same respect, the content presentation means the presenting and organizing of the content and information to reach a customer controls or make the content customized according to the customers' preferences[15]. The content presentation includes the information that is shown on only appropriate page which allows customers to scroll down to recognize whole related information in that page, logical representation of information in the site, and different navigation tools which facilitate the browsing process. The good website has to present its information right away to the users who determine to stay or not according to what they find when they visit the website. Therefore, the quality of the content which the customers expect may influence the success of the organization and the customers' choice[15].

For the design, it should include different search function to facilitate the user research process which involves the help buttons, hyperlinks, index page and a feedback section. Another requirement for the website is the updating. Updating the website is needed to avoid the mislead, wrong, or incomplete information [10].

#### B. Technology Infrastructure

It is a fact that there is no certain web technology which is able to satisfy all customers' needs. The design of the web infrastructure should meet the organization's requirement for cost, accuracy, ability, benefits, and efficiency, such technological requirements decide the design of the website and the bandwidth of networks, reliability, accuracy, prospective traffic, software and hardware [10].

A network connection is a part of web technology which is required for development of the web. The organization have to choose the most effective network connection for operating their online processes [10].

It is not easy to merge internet and e-commerce software with various databases and applications [22]. To support the application of the internet, programming language can be used in designing software. A high-quality technology

is able to integrate different web languages in e-commerce applications and software [10].

### C. Supplemental services

Supplemental services, provided by electronic businesses of high quality, are required since they help customers to complete their purchasing process when they visit the website. These supplemental services include every step before, during and after purchasing process such as: online payment services, securing purchasing processes and customers' sensitive information, contracting service, and conflict and legal management service [10] [8].

### D. Security

A high-quality e-commerce businesses must provide secure processes. Since security is always a major concern of all customers [16]. Security is the main reason that the customer decides to buy from one website and not from another [8]. The vendor's responsibility is to confirm the reliability and security of its technology as well as to provide security means for its customer [16].

A clear privacy and security policy are required essentially for developing trust between the customers and the organization. The information related to how and what types of consumers' personal and transaction information are lay out by a privacy and security policy and all of them will be collected altogether. Also, a privacy and security policy determines the way by which this information will be used as well as the protection from illegal access [16]. The websites will be distinguished by well-designed policy statements which are accompanied by efficient enforcement reports. Through using such information, the users become able to take decisions relating to the advantages and risks of engaging in online business transactions with the organization [16]. The virtual world of e-commerce effects the customer decision making process especially through the continues improvement of privacy and security issues [8].

### E. Environment

Environmental quality is the responsible for deciding the level of inside and outside control and the effect of this control on the e-commerce [10] [8]. This internal and external environment include: company goals and objectives, management rules, taxation policy, government rules and regulations, and legal services [8]. "Many legal and public policy issues including taxation, have not yet been resolved or are not clear. National and international government regulations sometimes get in the way"[22, p. 68]. For maintaining the development of e-commerce, the supportive environmental quality is required. There are characteristics of a supportive environment. The following are some of these characteristics[10]:

- It has few government control on e-commerce.
- The process of shopping over the internet is Tax-free.
- There are fewer customers' restrictions.
- It allows differences in culture, language, technology in e-commerce among nation.

## IV. IMPLEMENTATION OF TQM IN E-COMMERCE

Implementation of total quality management in e-commerce provides an opportunity for expansion and success. Globalization in establishing the concepts of total quality management in e-commerce companies helps provide information and speed the transition in order to facilitate the exchange between the countries. Moreover, e-commerce companies get benefits from the integration of total quality management in different segments [8]. This integration contributes to the organization's activities through [10] [8]:

- Increasing competition in an open electronic market which lead to lower prices and costs and improve quality.
- Distributing services among a large number of customers with the lowest costs for easy access of information.
- Dealing directly with customers and without complicated procedures which contribute to raise the quality of services provided.
- Help to satisfy customers' demands by providing them the products and services they prefer.
- Obtaining feedback from customers directly for the development and improvement of goods and services.

E-commerce can carry out these activities through implementing the Deming Cycle for continuous improvement in the work, and it is called the PDCA cycle. A conceptual framework has been shown in the following figure 2 [1]:

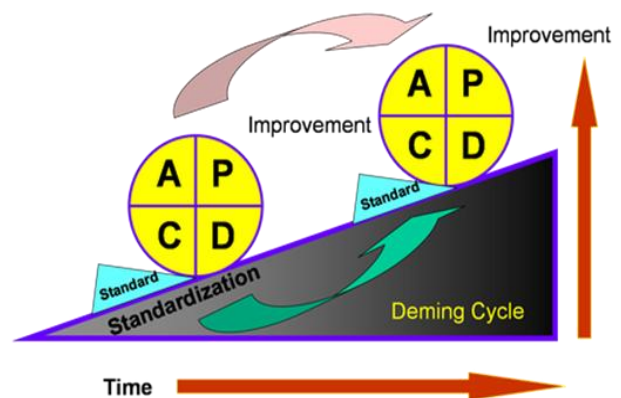


Fig. 2. Deming Cycle

The implementation of Deming Cycle includes four steps as follows [20]:

- Plan: define the quality issues which measures the extent of customers' requirements and then uses them in the planning for the design of website contents and provides services that meet the customers' need.
- Do: develop and test possible solutions with high quality which is determined in the planning stage.
- Check: measure the effectiveness of the solutions through customers' responses acts to ensure perfect implementation of the possible solutions.

- Act: analyse the customers' satisfaction and then send the results to the planning phase for review. Therefore, it is applied Deming Cycle.

Beside the Deming Cycle, six sigma can be applied as well in e-commerce businesses. A lot of successful online businesses in e-commerce have integrated the six sigma elements in their day to day activities and operations in order to ensure the high quality in all transactions. Six sigma defined as "A data-driven method for achieving near perfect quality. Six sigma analysis can focus on any elements of production or service, and has a strong emphasis on statistical analysis in design, manufacturing and customer-oriented activities" [2].

The six sigma approach consists of five steps as shown in figure 3 [3]:



Fig. 3. Six Sigma

- Define: identify the processes that need improving in internal or external company processes or in its website to ensure the quality in each product or service provided to the customers [4].
- Measure: understand and measure the defects in the current processes [4]. The defects in the current processes can be measured by applying different statistical techniques such as Pareto charts, histograms, Cause and Effect diagrams. These tools are used to analyse the root factors that lead the current processes to be different in quality [13].
- Analyse: determine the original causes of the defects through analysing and testing these potential causes [4].
- Improve: modify the current processes by establishing new ways to reduce the defects level and ensure consistent outputs in the future [13].
- Control: manage the improved processes and setup rules to control them in order to keep the performance effective and ensure that the effective results which are achieved will be continued and the problem will not occur again [5].

These processes of continuous improvement can eliminate unproductive activities, focus on establishing new effective measurements, and apply different and

innovative technologies in e-commerce businesses for improvement and ensure integrating high quality across all processes and systems [6].

Leaders in business thought that six sigma is a new and an effective way to gain revenue through improving the current business processes [13].

## V. CHALLENGES OF TQM IN E-COMMERCE

The integrating of total quality management in e-commerce companies grows increasingly. It is found that some companies that tried to implement total quality management did not achieve the desired benefits [12]. When it comes to the application of quality standards in one of the fields of information technology, the managers face many pressures and challenges to provide technologies that achieve the organization's goals and meet the customers' need [18]. Maintaining customers' satisfaction is one of the major tasks for the quality of Website design. However, the poor quality of the data or information adversely affects the decision-making process. In addition, the incorrect information associated with the provision of services contributes in reducing the customers' satisfaction. Thus, this negative impact will lead, definitely, to lower revenues [7].

It is possible that the company has a large number of web visitors who may withdraw from the site. This happen because of the complexity and the rapidly change of technology. Quality has to be measured by collecting customers' feedback. Additionally, improvement is required to attract more customers [10].

On the other hand, there is difficulty in measuring the environment, security, privacy and quality of service. Security issues are threats that should be avoided by increasing technological awareness because the attackers are become more sophisticated through exploiting weaknesses to prepare for new attacks. E-commerce companies must be aware of the threats and follow the security and privacy policies, the application of digital signature, and encryption procedures [17].

The e-commerce models differ from each other since they have certain characteristics in terms of competition, customers' needs and quality of services provided. This difference causes the variation in the total quality management processes among electronic markets. The presence of different models of e-commerce makes the implementation of total quality management a difficult process [10].

## VI. CONCLUSION

This research paper presents some TQM aspects in e-commerce. When the quality of the e-commerce systems standards is examined, it is realized that it is based on competition and customers' satisfaction. Therefore, the quality assurance in e-commerce leads to enhance customer confidence. However, it is difficult to obtain customers' loyalty in e-commerce. So, it is required for e-commerce companies to distinguish themselves from the

other competitors through achieving customers' satisfaction.

This paper discusses e-commerce quality issues which include website content and design, technology infrastructure, supplemental services, security, and environment. Moreover, it highlights the implementations of TQM in e-commerce and challenges of TQM that may face e-commerce.

With regard to total quality management, the majority of researches focus on products and services operation as well as the product itself. So, it is recommended that the future research should be focus on the quality of information in e-commerce systems.

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