



## Investigate the Impact of QFD on the Performance of Businesses and Knowledge Corporation (Case Study: Science and Technology Park)

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### Abstract

We concern the world market conditions that have changed. Today, the purchaser is not responsible for the accuracy of the defect in the goods and the seller is responsible. It should be noted the unspoken needs of the customer. Manufacturer should adopt environmental responsibilities. It should be a rapid response to changes (market, technology, economics) are important for production and agile design. At present the global approach gives high cost to education and the right to choose and development of customer. Always we turned our attention to the development of flexible (Against drought) systems thinking (Against local) and yields on long-term (rather short). In all these cases that affect in the state as well as our competitors in search of lower costs and may act faster. Here is that the necessity of QFD is clearer. You have to check that QFD is only applicable in the context of changing customer demands to the technical specifications for the product but also in all other analyzes which are dependent on several factors must be considered simultaneously in the decision is useful. QFD applications wherever they are should be examined a set of problems and solutions. For example we know that the costs (to details of place and time) shall be commensurate with the needs and goals. When we ask created a project or program in organization. Fee must be examined from dimensions of scope budget and other aspects of the program in every part of the organization. For each organization it made up of several parts and each part has its considerations. Here you can help from the QFD.

**Keywords:** Quality, quality development, QFD, corporation

## 1. INTRODUCTION

Complexities of modern organizations, it is somewhat difficult to explain them. Increasing environmental turbulence, environment change, creates change, and uncertainty, and calls organizations to the new capabilities and creates a new project [1]. Now, in order to benefit from the changes in the dynamic environment of the world with all power set foot into the arena of life and to address the challenges of environmental and non-environmental paid search new approaches and new [2] One of the major fundamental changes are formed in the management of change in the attitude of the organization [3]. Until a few decades ago it was thought that organizations are rational tools for the coordination and control of in the goals which is a vertical divisions, sections and units which are based on relationships of power but today our managers are expressed relative to the human issues and progress in the light of the staff members and clients all of which represents a major move in line with to establish culture of in the organization [4] A culture of quality starts from conscious choice of a management philosophy appropriate to the circumstances. Only the right choice and with that it can release energy required for the new orientation [5]. QFD, is one of these methods to improve quality of products and services manufacturing and service organizations. QFD is an improvement on traditional methods of work and proven technology to ensure product quality and service and reduce costs of waste [6]. This approach has a philosophical elements and principles of simple and understandable and provides a natural context is probably from best option in facing

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managers [5] Three pillars of the philosophy of QFD which is customer oriented, tendency to Process and continuous improvement of processes both at the top and at the base of the organization it is easy to understand and implement. In order to keep pace with developments in the fast growing world of today organization managers had to equip to the new management theories [7]. QFD from theories that in the '80s and '90s has been raised by scholars of management and most successful industrial and service organizations around the world have benefited from it and achieved a huge success [8] In Iran, from 1988 Iranian companies on the one hand because significant savings in this system as well as the competitiveness of the domestic market due to the entry of foreign goods and the elimination of subsidies and a single rate of exchange tried following the implementation of the system and the like. Many of these companies have not succeeded in implementing this system and gave up from pursuit of it but some of them still covered to keep track of the system and achieved great progress and even some action; they formed group's quality and productivity and implementation of a comprehensive quality system. Tendency that has already been made in Iranian companies for certification quality assurance system "ISO" implies the knowledge and management efforts to change in previous trends [9]

## 2. LITERATURE RESEARCH

### 2.1 Quality

Which consists of a set of properties and characteristics of a product or service includes the ability based on the requirements and implications of a particular market, customers and clients and to be followed satisfaction and customer satisfaction [10] Dr. Edward Deming (Haji Sharif, 2000), the founder of total quality management, quality is defined as: Quality is a broad concept which should all parts of the organization committed to it and the purpose of it is the perfect match for the product or service with the required specifications with minimal cost to the organization which leads to an increase of the total efficiency and increase competitiveness. Quality has nine different dimensions, which are:

1. Performance 2. Characteristics 3. Match 4. Reliability 5. Durability 6. Services 7. Accountability 8. Aesthetics 9. Reputation and good name [10].

### 2.2 Customer

Regardless of how the exchange of money those who entered into an organization and are requesting services or products which organization is working on it is called a client [11]. In addition customers will be divided into two categories: internal customers and external customers. External customers, and outside the organization, and are buyers of products or services. Against this customer as well as any organization there are a number of domestic customers who are employees of the relevant departments in the organization. At all stages of production or services any person who shares in the process the customer has the previous operation and purpose of the previous staff is sure to meet the needs of service quality, in the next section [10].

## 3. QUALITY FUNCTION DEPLOYMENT (QFD)

Yoji Akao is the original creator of QFD, and someone who has worked in the academic, public and spread this way. Invented the first QFD occurred when in the minds Akao, make inquiries on this theme: "We are in discussions quality much attention we give some details of the product or process and wants to see that we were in compliance with is the quality of them or not. Why in these parts and quality are important points which are called "guarantee of quality" as the monitor not included in the original design of the product and its process? In this case, since beginning of product design have taken a step in the direction of their priorities" [12]

simply put, the purpose of QFD is converted by customer demands assessment to technical specifications of in product. That's what the customer wants and it is through discipline and integrity that QFD which gives to the product design process us will develop the product. In various industries for QFD I have mentioned many benefits. It has written many articles in the fields of product development according to market needs with the help of QFD. The application of this method has been mechanical and electronic industries and even in the aerospace industry it is used. Currently, its use has expanded to such an extent that 5.68% of US companies and 5.31% of Japanese companies, but in 1997, they used this technique [13].

The first book on the subject was written by "Akao" and "Mizono". This Japanese scientist when they attempted to do this Japan was fresh industrial and economic independence against America. At the time statistical quality control introduced in Japan and also understands the importance of design quality was found is defective, process quality control chart because of it after the production of goods [14]

QFD, at the beginning of its development was presented with the name of "point of view" [3] Later in its development public areas is the tables "Kobe" Mitsubishi Heavy Industries shipyard. This tables were not only balance the needs of the client with the tasks that must be done but helped determine the relationships between these tasks. It should be noted that this has been the mistake of those who origin of the QFD Mitsubishi know. However two years before his Akao wrote an article with the same title [4]

Associated with the development of ideas with QFD and their integrity established named Quality Deployment on them. [14] the purpose of the QD was conversion of customer demands to quality indicators. Hence, the definition of QFD is the "establishment and deployment of a job step and practical the quality is, in detail in order to ends and means. " Of QFD can be defined as machine translation "the needs of customers" to "technical specification" in other words become customer demands quality characteristics and the preparation of a quality plan for the final product through the development of a systematic relationship between customer demand and product quality characteristics. This process is begun with the quality yield components and then spread to all parts of and process [15]

Techniques QFD, and is introduced by methods such as thirty matrix eighteen matrix and four matrix, etc., in the world. In the meantime four matrix methods that Institute for US suppliers it has adopted and used the following reasons has been more attention:

1. More common than to other existing views among experts and users of QFD.
2. Easy to Learn and a summary of the comparison to other approaches.
3. Coherent and simple stages with each other.
4. Cover the important stages of production using four matrices.

### **3-1 QFD Elements**

QFD consists of two components which will lead to expansion during the design process is one of quality, and other is functions. Improving the quality (Quality Deployment), voice of customer (Voice of Customer) to convert and the design process (Riahi, 2002).

Hence, with identification of objectives characteristics and product segment, this is associated with client needs leads to ensure design and production quality. Improving the function (Function Deployment) in connection with the various functional departments is associated with the production designer to do the job with the formation of the design team. Functional specialists reduce defects related to communication between the design and functionality [6]

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To achieve the quality objectives, and in fact what is called the goals of QFD use of tools and different methods in QFD. The main tool for implementing QFD is a quality home or in fact the same elements in turn for the implementation of each element there are different methods [12]

### 3-2 work Methods with quality homes in QFD:

The first matrix of this method known as the home of quality (HoQ) (Figure 1) Experts QFD recognizing that if this matrix to be completed in full the project is terminated in the first step according to the importance of these matrices seven of which are as follows:

- (A) Customer needs
- (B) The characteristics of the product
- (C) The importance of customer needs
- (D) Planning matrix
- (E) The relationship between customer requirements and product characteristics
- (F) The correlation matrix between the characteristics of engineering
- (G) Priorities and objectives of each of the characteristics of engineering

QFD used properly can provide an effective method for taking the voice of customer in new product and process design [16]

### 3-3 QFD Objectives

Objectives QFD usually includes two categories of tangible and intangible as described will be the following: [17]

Concrete objectives: concrete objectives including the use of QFD can be found at:

- Designing a low cost
- Remove the frequent changes of technical
- Preliminary identification of areas of production which are critical.
- identify the processes in the upcoming production.
- Significant reduction of time for product development and a more efficient allocation of resources.

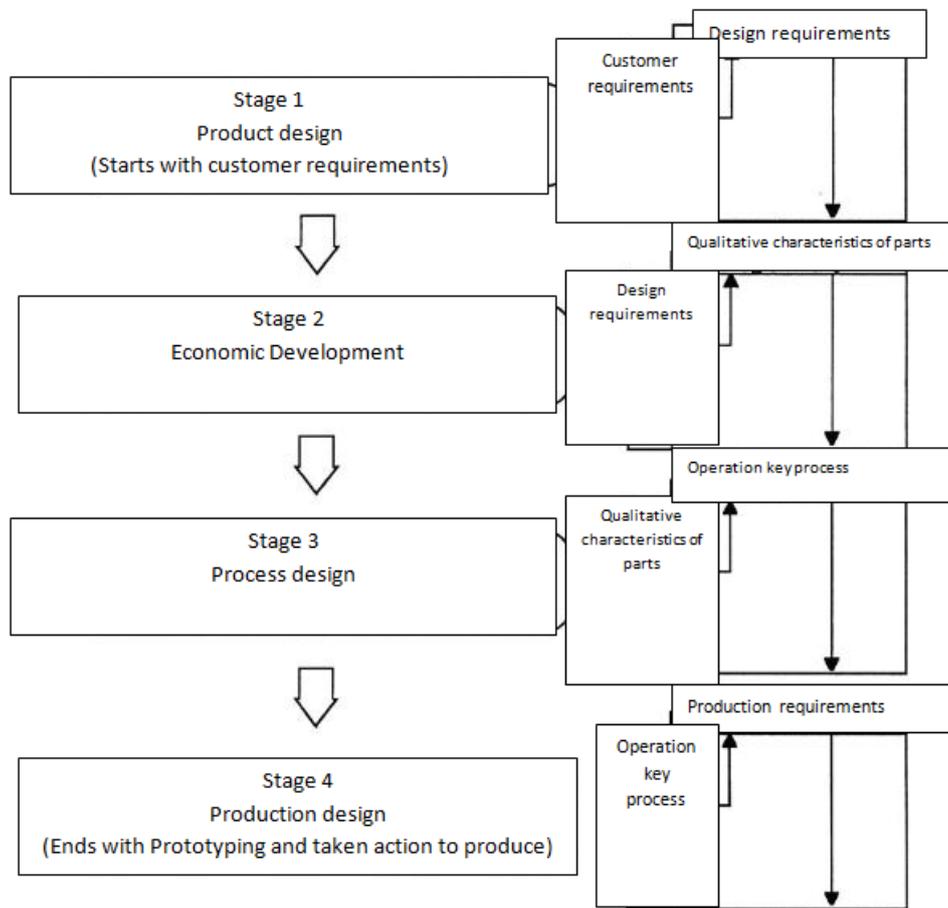
Intangible Objectives: In addition to Objectives tangible, intangible Objectives identified in the application of QFD, which include:

- Increase customer satisfaction
- Facilitating collaborative work with several different systems.
- Establishing a foundation for planning and product improvement.
- creating and maintaining documentation
- Establishment of a convertible source for technical knowledge.
- Encourage members of QFD to transfer their knowledge to other projects
- Accurate and simultaneous implementation of all elements in QFD in coordination with full integration of all components with each other.
- To understand customers' changing demands a technique that could be converted into understandable demands (of the system).
- To enable the influence of in theater of operations.
- For more on this topic the voice of customer (customer) accurately what they are.

## 4. TYPES OF CUSTOMER DEMANDS

Customer demands which should lead to the product sorted and in 8 main areas are analyzed according to them. This is important to note that the accuracy of in 8 domains of mentioned the

above; we can see that the use of QFD is not limited solely to the product surface and can also be included within the organization [11]



**Figure 1.** Conceptual process QFD.

The most important expected benefits of the appropriate use of QFD in organization include:

- Shorten product development time.
- Reduce the number of changes in engineering design.
- Costs of introducing a product to market.
- Customers to supply their wants and needs.
- Improved capability of manufacturing.
- Creating a common language between different units of the organization.
- Create a database suitable for future applications.

#### 4.1 Questions Objectives and research hypotheses

The purpose of this study is the identification of the performance of QFD on Business Corporation. This research question is quality performance development impact on corporation performance? According to the Objectives and research questions the hypotheses it states that QFD has a positive and significant relationship with corporation performance.

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## 5. RESEARCH METHOD, POPULATION SIZE, AND SAMPLE AND FINDINGS

### 5.1 Research Methodology

This research can be taken into account in those studies in which to obtain basic data in order to explain and evaluate the theoretical model is applied from the research. In addition, the present study based on the nature of the research is the investigation of causal as well as in terms method of data collection the research can be seen as a kind of survey research in which the required data gathered through questionnaires.

### 5.2 Reliability and validity of the questionnaire

The population of the present study constitutes the firm foundation of knowledge, science and Technology Park in Tehran which is a total of 50 companies each company on average and 2.5 employees. To estimate the sample size used in the tables Morgan and the sample size required is 44 companies.

In this study, we used a standard questionnaire that the validity of the questionnaire was confirmed by several masters of business administration and experts. In order to accurately measure the validity of the questionnaire as well as the use of factor analysis. Often, in analysis of several variables related to a topic simultaneously there are variables that must be removed due to less variability. Factor analysis enables us that the hidden dimensions review based on related questions. Cronbach's alpha coefficient was used to evaluate the reliability. This coefficient for the variables of the study is equal to 0.814 which is indicative of reliability suitable for a question.

To investigate validity of the questionnaire was used factor analysis principal component method. In this way if you have any questions variance is less than 0.5 can be removed from the questionnaire. This questionnaire survey included 32 questions all questions that the coefficient of variance was greater than 0.5, which proves the validity of it. Also was used to test KMO which is called the index of sampling adequacy that this index compares the observed values of solidarity with partial correlation. When the value of KMO is greater than 0.6 one can easily is factor analysis. Whatever is more this value the greater the relevance and adequacy of sampling [18] According to what was said the number of test KMO must be greater than 0.6 and the Bartlett test significance level should be less than 0.05. In this study, the number of test KMO is equal to 0.819 then there the adequacy of sampling to conduct exploratory analysis as well as the level of statistical significance Bartlett is equal to zero and less than 0.05 so data structure is appropriate for exploratory factor analysis.

### 5.3 Data analysis method and Findings

In the following software P. L. S. to review the conceptual model of research should be considered the situation fit of the two models the first model and the structural model. To evaluate the fit of the measurement model should be considered as coefficients Cronbach's alpha composite reliability coefficient and average variance extracted. If you do amount of Cronbach's alpha is greater than 0.7 composite reliability coefficient is greater than 0.8 and average variance extracted is greater than 0.5 the measurement model is a good fit. In addition in order to assess the fit of the structural model it should be noted to amount of variance. If the amount of explained variance the larger than the number 0.3 the structural model study would be a good fit. Table 1, we briefly show that the model fit indices.

**Table 1.** Model fitting.

| Structural model fitting | Measurement model fitting |                       |                            | Variable                |
|--------------------------|---------------------------|-----------------------|----------------------------|-------------------------|
| Explained variance       | Cronbach alpha            | Composite reliability | Average variance extracted |                         |
| 0. 400317                | 0. 876253                 | 0. 923710             | 0. 801519                  | QFD                     |
| 0. 342098                | 0. 919610                 | 0. 943182             | 0. 805893                  | corporation performance |

According to Table 1 it can be said that the measurement model and the structural study is a good fit which means that we can pay path analysis and significant numbers causal pathways depicted in model. Therefore, in Table 2 are the coefficients of the path and significant numbers which are indicated to confirm or refute the research hypotheses.

**Table 2.** Path coefficients and significant numbers.

| Result                 | Significant number | Path coefficient | Hypothesis                    |
|------------------------|--------------------|------------------|-------------------------------|
| Confirmation           | 3. 885485          | 0. 578455        | QFD ← corporation performance |
| Confirmed in 95% level |                    |                  |                               |

According to Table 2 for data analysis, and hypothesis, we analyzed a significant number and path coefficient. As you can see the entire research hypothesis was confirmed at 95%. I.e. have positive correlation with each other.

## 6. CONCLUSION

QFD is a useful tool to convert customer needs to the characteristics of the product and the decision of when it should be considered a range of issues with their requirements simultaneously in decision-making. QFD is a regular batch process for planning and design of new products or improved products / services are as follows: Focus on customer requirements using the competitive environment and market's needs aims to improve the design and build teamwork and to benefit from it and preparing documents to facilitate uniformity and convert customer requirements for quality and measurable goals so that appropriate products and services as appropriate and at the first opportunity to be introduced to the market. In this study we evaluated the effect of QFD on the performance corporation according to the statistical output; it became apparent that there is a positive correlation between these two factors that are causing their influence on each other. I.e. With the increasing use of QFD in organizations and businesses will enhance and improve the performance of corporation in the long run.

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