



The Effect Of Critical To Quality Factors In Identification Excellence Strategic Dimensions

**Analytical Study of the Opinions of A Sample of Managers
and Clients at the General Company of Drugs and Medical
Appliances in Nineveh , mosul , iraq**

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**International Conference on Business Intelligence and
Knowledge Economy**

**Al Zaytoonah University of Jordan, Faculty of
Economics and Administrative Sciences
23-26 (April 2012)
Amman Jordan**



ABSTRACT:

This study attempts to identify the impact of the CTQ factors in achieving the ESD at General Company of Drugs and Medical Appliances in Nineveh as a case study. The theoretical aspect of the study dealt with the topic of CTQ factors and the ESD as the two variables of the study, by the means of identifying the opinions of researchers in this field. The exploratory study showed the importance of identifying the correlation and effective relationships between these two variables at the studied company, and through responding to a number of questions which specify the general framework of the study problem., They are group as:

1. What is the nature of the relationship between the CTQ factors and the ESD ?
2. What is the importance of the CTQ factors in accomplishing the ESD in the company?

The scope of the study requires formulating a hypothetical model, which shows the correlation and effective relations between the CTQ factors and the ESD . Main and branch hypotheses emerged from the model , which were tested by the suitable statistical program in an attempt to obtain the results lead to the conclusions of the study. The following are the most prominent conclusions:

1. There is a correlation between the CTQ factors and the ESD . Each one of the four factors (supply chain, checking process, operation costs and customer satisfaction) was related with the seven ESD .
2. There is a significant impact of the CTQ factors on the ESD . Each factor influences the ESD .

The results showed that the operation costs has significant effect in comparison to other factors.

Based on conclusions, the research submitted several recommendations to the future study The most important one is the necessity to adopt a radical system of learning, development and training in the company that will help to develop the personal characteristics of the leaders.

Thus, study divided into sections , they are :

1. Methodology
2. Theoretical aspect
3. The experiment
4. Conclusions and recommendations

Keywords : *Critical To Quality (CTQ), Excellence Strategic Dimensions (ESD), Operations costs, Customer , Customer Satisfaction, Factor analysis, Malcolm Baldrige Award of excellence, Results*

1. Methodology:

A. The Research Dilemma

Researchers paid attention to the CTQ^(*) factors to achieve a distinguished performance that contributes to accomplish a high level of customers' satisfaction, in our days the customer continuing to looks for products and services of a good quality that meet his or her requirements (needs, desires and expectations). All these factors make companies search for the best methods to reach to this goal in order to survive and growth .

So, it is important to apply analytical study on company under study (the general company of drugs and medical appliances in nineveh) and to experiment the CTQ factors with the ESD, a number of questions were formulated to express the essence of the problem, Which are :

1. *What are the acknowledgeable factors of CTQ framework?*
2. *What are the possible applicable mechanisms that help the management to identify the CTQ factors? And are they accepted by all employees?*
3. *Does the company management realize the seven ESD ?*
4. *What is the nature of the relationship between CTQ factors and the ESD ?*
5. *To what extent the identification of CTQ factors are important in accomplishing the ESD for the company under study?*
6. *Does the company pay a good attention to the customer as a key factor of CTQ factor ?*

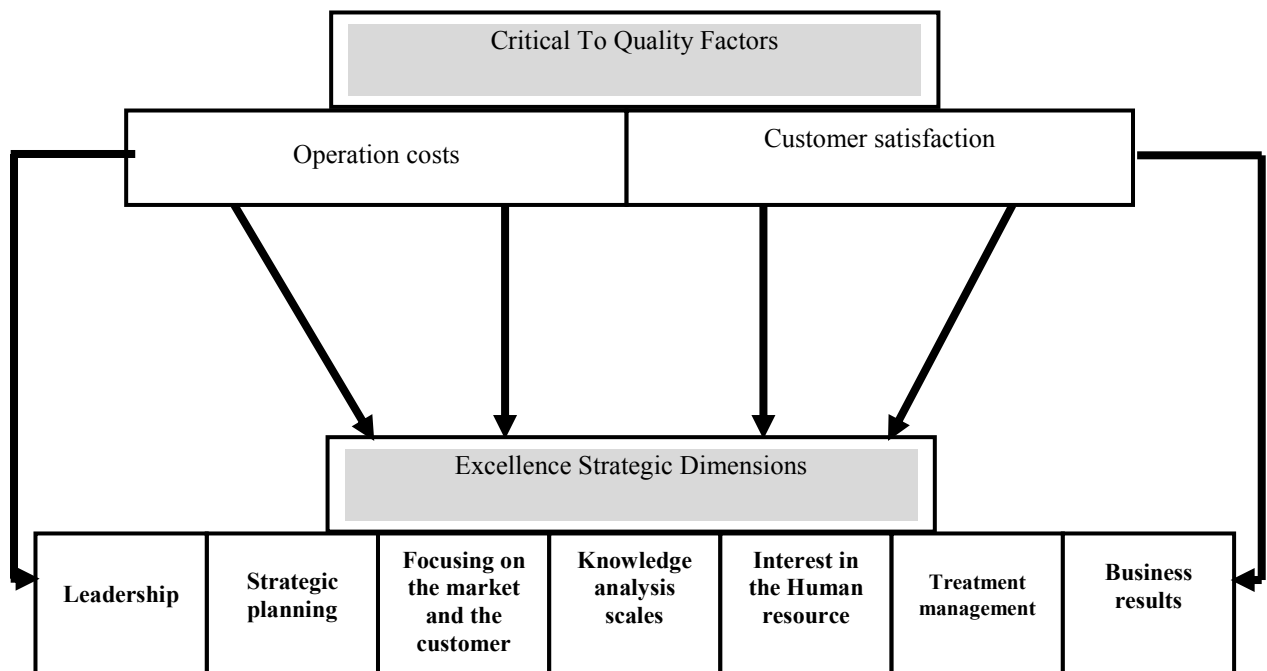
(*) For the purpose of the current research we use the abbreviation CTQs for the (Critical to Quality) factors & ESD for the (Excellence strategic dimensions)

B. The Value of the Study

The main objective of the study is testing the relationship and the effect between the CTQ factors and the ESD in the company studied. Through this objective, the study attempts to achieve the following subsidiary goals:

- 1- Selecting the hypothetical model that includes two variables of the study to reach an image, which reflects the nature of correlative relationships and impact between them.
- 2- Field experiments of the role of CTQ factors adopted by the company studied in accomplishing the ESD.
- 3- Attempting to move beyond the borders of the company by exploring the opinions of the company's customers and tracing the factors that explain the customer satisfaction phenomenon.
- 4- Presenting a group of suggestions depending on the result analyses derived from the accomplishment of excellence dimensions using CTQ factors. This will give a clear identification on the fields of adopting the two concepts within the Iraqi Industrialization environment.

C. The Model and Hypothesis



Exhibit(1) Research model

To test this model, the study put three main hypothesis , they are :

1. There is a significant correlation between the CTQ factors (operation costs, customer satisfaction) and the ESD .
 2. The CTQ factors has a significant influence on the ESD .
 3. The company in question pays a good attention to the satisfaction of their customers.
- D. Survey

Data used in this paper were collected by two questionnaire: (*)

- The first one designed to cover the CTQ factors and seven ESD. They uses a simple random sampling of a company's managers (50 managers), the paper selected a studied society was the General Company for Drugs and Medical Appliances in Ninawa, Iraq.
- The second one designed to cover the 22 factors measure the level of customers satisfaction, also we use a random sample of a company's customers (50 customer).

2. Theoretical Aspect:

A . Critical to Quality Factors (Concept and Definition)

Critical to quality factors (CTQ) includes all the main measurable characteristics of the product or / and the process by using performance criteria or a limits of quality that should be fulfilled in order

(*) The questionnaire were written in Arabic language for relevance with the sample under study.

to satisfy the local and foreign customer, i.e. the critical to quality factors expresses the requirement of the customer in the form of the request submitted by him, which include the maximum and the minimum limits of the qualifications or any other factors related, Thus CTQ can be defined as:

- 1- Measurable characteristics and requirements that are identified by the customer to ensure the improvements in order to guarantee his/her satisfaction (Katanasho, 2005: 2).
- 2- Factors that critical and have influence on production, So, measuring and analyzing CTQ can be used to unify the scales and improve the quality. All this will make the company concentrate on the customer more and more in its work (Shekhar, 2006: 90).
- 3- Tools to apply scales and improve the goals which are considered the main basis to understand the current process requirements and that allow to fulfill the future process requirements (Kim *et al.*, 2007: 45).

So (Kim *et al.*, 2007) presents the concept of CTQ to assert that they include seven axes, which are:

1. *Facilitating or simplifying the design of the products.*
2. *The relatedness of designs with the customer requirements.*
3. *Corresponding to the market concerning the quality levels.*
4. *Going beyond the requirement of reliability.*
5. *Going beyond the emergence of product expectations.*
6. *Corresponding with the technical requirements.*
7. *Supplying of perfect products.*

We see that the axes approaches necessary conditions to accomplish a clear identification of CTQ starting with working on designing a simplified design and ending with supplying perfect products.

B. The Critical to Quality Factors Classification

Every company has a certain nature and characteristics to outline the domain and the number of the critical factors to their products and services. This may be related to :

1. The nature of company's customers.
2. The marketing activity of the company concerned with market share or the markets of local customer or foreign.

In general, researcher viewed the CTQ that are different. As far as the researcher is concerned, the study attempted to adopt the classification that suits with the practical field of the study.

An exploratory study indicated that selecting the model (Koning and Mast,2007) which includes the customers satisfaction and the operation costs, does express the real situation of the company under study.

1- Operations Costs: the classification of these costs needs to have a double or a triple classification. Some asserts that the operation costs comprises two types of costs which are *production costs* such as (direct wages, indirect wages, inventory cost, devices exhaustion costs and the cost of materials and the supply used within the product) , *the direct and indirect managerial costs* (Chase *et al.*, 2003: 758), (Maher *et al.* 2006: 34) agree with that (Direct Manufacturing costs & indirect Manufacturing costs), others state that there are two classifications, one of them is binary and the other is triple. The binary classification includes (direct material costs and manufacturing indirect costs) (Horugren, 2005: 46).

(Schroeder, 2007:24) clarify that the best way to achieve lower costs is to focus on customer requirements in both product design and operations, as a way of eliminating rework, scrap, inspection and other forms of non-value-added steps in operations.

2- Customer Satisfaction: nowadays, companies still face failures in reaching to the defined budget, delivery on schedule and accomplishing the requirements of quality. Managing the customer requirements in a wrong way may be the most important reason. Most managers are characterized by weakness in this respect, especially in estimating the costs, schedules and risk management. Therefore, the international efforts are directed into achieve production plans with quality according to the international specifications. So, quality has become the most prominent competitive advantage over the past twenty years and became the unique goal to every company in the whole world (Mahesh, 2010).

So, defining CTQ will help to gain the competitive superiority through product and service quality, the low costs and consequently the customer will be satisfied more and more.

Many researchers defined the concept of customer satisfaction. Some of these definitions ranged between customer awareness cases or customer reactions and as an interaction process of the customer expectations and awareness, it is a relative concept that varies from one customer to another, it is a direct measure of quality (Schroeder, 2007:137).

C. Excellence Strategic dimensions (ESD)

1. *The Concept of Excellence*: the basic goal of management in modern companies is defining the main characteristic that they should have (excellence) , which emerges from two basic facts in the modern management, which are : (AlSulami, 2002: 7)

- The goal of the successful management is attempting to accomplish the excellence, i.e. achieving unprecedented results that make the management superior to its competitors through the logic of learning.
- The decisions of management , the activities and systems it adopts should be characterized with excellence, The excellent quality that leaves no place for errors or deviation and prepare true opportunities to accomplish the work perfectly and precisely at the first time.

It is noticed that these truths are the same because one of them can't be accomplished without the other . They are totally dependent on investing the accumulated and renewed knowledge continuously and facilitate the methods of organizational learning in order to activate that knowledge in the real world.

Excellence as a concept refers to a simple planning, owning the emergent meaning, having powerful and clear values, clarity of the assignment, sharing the vision of excellence, that excellence aspects should be at everything, the necessity of having standard criteria in accomplishment and finally enjoying work more than enjoying the results (Wiggenhorn, 2004 : 181), Excellence equals Managing Change at an accelerated Rate (Mark , 2011: *XV*).

Achieving excellence needs to have permanent efforts in the company and also needs enough time and an unlimited cost. In this respect (Johnson, 2007: 27) outlined ten steps to achieve excellence presented in a logical sequence as follows:

- 1- *Using the approach of systems through Malcolm Baldrige framework.*
- 2- *Identifying the vision and creating the strategy of achievement.*
- 3- *Arrangement of culture, strategy, goals, scales and plans.*
- 4- *Applying the process of organizational learning.*
- 5- *Measuring the results and leading them.*
- 6- *Identifying and evaluating the degree of maturity.*
- 7- *Identifying the products , the services and needs to be achieved.*
- 8- *Understanding the correlations between sub- systems.*
- 9- *Focusing on the correlations in the chain of results.*
- 10- *Starting immediately without any cessions or going back.*

2. *Excellence Model*: Malcolm Baldrige Award of excellence was established throughout the law of national improvement of quality No. 100-107 in 1987. The American Department of Trade is responsible for Baldrige National Program for quality. This model is run by the National Institute of Standards and Technology (NIST) and the American Society of quality (ASQ) helps to run the model program according to the contract with NIST. The model is granted in the sector of industry, services, small businesses, health care and education.

This model assists the companies in defining what the quality means (Krajewski & Ritzman, 2005: 226), the model of Excellence consists of seven main dimensions and eighteen sub dimensions. The summation of these dimensions is (1000) points. It represents high value of the prize, the following is a representation of the main and sub dimensions of Malcolm Baldrige model : (US Department of Commerce,2005)(Mark, 2011: 84)

1. *Leadership (120) points.*
 - 1-1. *Organizational leadership (70) points.*
 - 1-2. *Social and legal liability (50) points.*
2. *Strategic planning (85) points.*
 - 2-1. *Strategy development (40) points.*
 - 2-2. *Strategy spread (45) points.*
3. *Concentrating on the customer (85) points.*
 - 3-1. *Customer relatedness (40) points.*
 - 3-2. *Customer vote (45) points.*
4. *Scales, analysis and knowledge management (90) points.*
 - 4-1. *Scales, analysis and improving the organizational performance (45) points.*
 - 4-2. *Information management, Information technology and knowledge (45) points.*
5. *Concentrating on labor power (85) points.*
 - 5-1. *Labor power incorporation (45) points.*
 - 5-2. *Labor power environment (40) points.*
6. *Treatment managements (85) points.*
 - 6-1. *Labor system (35) points.*
 - 6-2. *Labor treatments (50) points.*

7. results (450) points.
- 7-1. Product and service results (100) points.
 - 7-2. Customer-oriented results (70) points.
 - 7-3. Financial results (70) points.
 - 7-4. Labor power results (70) points.
 - 7-5. Process effect results (70) points.
 - 7-6. Leadership results (70) points.

3. The Experiment:

A. The Relationship between the Factors Forming CTQ & the Factors Forming ESD.

In order to identify the nature of the relationship between the CTQs and factors forming ESD resulting from the statistical analysis concerning the factor analysis of the company data about the two variables, table (1) indicates that there is a significant relationship between CTQs which are two factors and ESD and the factors of each of them.

So, the First main hypothesis was fulfilled on the level of the company, There is a significant correlation between the CTQ factors (operation costs, customer satisfaction) and the ESD .

B. The Effect of the Critical to Quality Factors on the ESD

Table (2) shows the effect of the CTQs, as an independent variable, on the ESD , as a dependant variable. The results of regression analysis performed on the company under study, indicates that there is a significant influence of the CTQs on the ESD . F value was (3554.8) which is higher than its table value (4.0848) on the two degrees of freedom (1.48), and R^2 was (0.876). Through tracing B coefficients and testing (t) for it, it was shown that the calculated value of (t) was (49.622), which is a significant value and higher than its table value (1.784), with a significant level and degrees of freedom of (1.48).

So, the second main hypothesis was fulfilled on the level of the company, The CTQ factors has a significant influence on the ESD.

In partial mode (table 3, 4) declare the Significant Influence of both the Operational Costs and Customer Satisfaction on ESD.,

Table (1): Correlation Between the Factors Forming Critical to Quality Factors and the Factors Forming ESD .

Responding Variable Explanatory variable	Explanatory variable	CTQ factors	
		First factor	Second factor
Leadership	First factor: organizational leadership and product inverse impact on the local society.	0.752	0.131
	Second factor: Social, moral and legal responsibility.	N.S 0.033	0.527
Strategic planning	First factor: Strategy development and diffusion.	0.901	0.299
	Second factor: Strategic planning operations.	N.S 0.016	0.723
Focusing on the market and customers	First factor: Identifying customer groups and using customer votes to establish relationships with customers.	0.298	0.700
	Second factor: Collecting complaints, solving and identifying measurements to go beyond customers' expectations.	0.811	NS 0.012
Standards, analysis and knowledge management	First factor: Management of information technologies	0.872	0.775
	Second factor: Knowledge management.	NS 0.199	NS -0.155
Taking care of the human resource	First factor: Integration of work force and developing their capacities and abilities.	0.868	0.960
	Second factor: Adopting high organizational culture and developing leaders' traits.	0.288	0.096
Treatment management	First factor: Identifying major work treatments and operation implementation.	0.609	NS 0.264
	Second factor: Identifying substantial abilities and reducing test costs.	0.703	0.553

Responding Variable Explanatory variable	Explanatory variable	CTQ factors	
		First factor	Second factor
Business results	First factor: Workforce ability, treatment effectiveness and social responsibility to satisfy the customer.	0.415	0.352
	Second factor: Workforce climate and major work treatments and indices to fulfill the company strategy and financial return standards.	NS -0.053	0.806
	Third factor: Financial performance and organizational citizenship.	0.514	NS 0.001
	Fourth factor: Customer important products and their indices for marketing performance.	0.485	NS 0.194

This table was prepared by the researcher depending on the results of the calculator.

*P≤0.05 N.S.: Not significant.

Table (2) : The Effect of the Critical to Quality Factors on the ESD , at overall level

Responding Variable Explanatory variable	CTQ factors		R ²	F		N	d f
	B0	B1		Calculated	Table		
ESD	2.589	0.885 *(49.622)	0.876	3554.83	4.0848	50	49 (1, 48)

The table was prepared by the researcher depending on the calculator values, () indicates the calculated value of (t), *P≤0.05, N.S.: Not significant.

Table (3) : The Significant Influence of the Operational Costs on the ESD.

Responding Variable Explanatory variable	CTQ factors		R ²	F		N	D f
	B0	B1		Calculated	Table		
ESD	-4.371	0.985 *(39.630)	0.889	1570.5 42	4.0848	50	49 (1, 48)

The table was prepared by the researcher depending on the calculator values, () indicates the calculated value of (t). *P≤0.05 N.S.: Not significant

Table (4) : The Significant Influence of Customer Satisfaction on the ESD.

Responding Variable Explanatory variable	CTQ factors		R ²	F		N	D f
	B0	B1		Calculated	Table		
ESD	2.247	0.971 *(28.032)	0.861	785.775	4.0848	50	49 (1, 48)

The table was prepared by the researcher depending on the calculator values, () indicates the calculated value of (t). *P≤0.05 N.S.: Not significant

C. The Statistical Analysis of Customer Satisfaction Phenomenon

By using the program SPSS, the part related to the factor analysis, the total results of the subjective values of the correlation reduced matrix or the matrix of the round factors were obtained using the (Varimax) technique. It was shown that the measuring tool of the factors of the phenomenon (customer satisfaction) included four factors arranged in a descending depending on their extent of

participation in explaining the variance. These were chosen essentially on the (eigen value) whose value is higher than one (integer). These factors comprised (22) variables.

Table (5) : The Final Distribution of the Factor of (customer satisfaction)Phenomenon

Variables	The Factor or its main component (Pci)	Eigen value	% of factor influence in total variance pct of Var.
X2 Response as soon as possible X3Market survey to identify the requirements	Responding to our requirements and establishing good relationship through possessing information system and communication means.	4.898	17.621
X4 Establishing relationships with customers.			
X5 Quick communication means			
X8 Information system to develop products.			
X9 Offering a suitable collection of products.			
X10 Offering high quality products.			
X22 Conducting a periodic evaluation of our degree of satisfaction.			
X1 Meeting needs continuously. X6 Solve the complaints seriously.	Having the necessary flexibility in the case of demand change and pursuing innovations to offer products superior than the competitors' products.	4.804	18.697
X12 Flexibility when changing the order.			
X13 Availability of the desired specifications.			
X19 Abiding by the quality when designing.			
X16 Pursuing new innovations and products,			
X18 Services superior to competitors' services.	Employees enjoy flexibility and necessary experience of dealing	3.642	12.803
X14 Employees have flexibility in dealing.			
X15 Employees enjoy experienced performance.			
X17 High loyalty due to problem solving.	Offering products in time, replacing and getting back products out of quality as well as offering financial facilities.	3.821	12.493
X7 Means and mechanisms to obtain information.			
X11 Offering products in time.			
X20 Replacing and getting back products out of quality.			
X21 Offering financial facilities			
Total			58.852%

The table was prepared by the researcher depending on the calculator values

So, the second main hypothesis was fulfilled on the level of the company, The company in question pays a good attention to the satisfaction of their customers.

4. Conclusions and Recommendations:

A. Conclusions

1. There are different points of view between authors about the concept of CTQ that seemingly explains the different care and concern of each one of them as well as their focus on this term, but in spite of this disagreement, they agree on the term content.
2. Doing the right things from the first trial, without committing errors could offer an opportunity to the company to gain competitive advantages among other companies in the market.

3. ESD are considered an instrument to reinforcement local and international realization of quality and represent a recognition of the strategic contribution of the company's managers to improve efficiency and effectiveness.
4. A significant correlation has been found between CTQs and the ESD, both (Operation Costs and Customer's Satisfaction) have correlated with the seven dimensions of excellence upon the company level at the company under study.
5. There has been a significant effect of CTQ on the ESD as each one of CTQs affects the ESD . Findings showed that operation costs have the greatest effect than Customer's Satisfaction .
6. Replies of a sample of the company's customers showed that owning rapid communications help the company to recognizing the needs and responding to them which lead to increasing their satisfaction. they have supported the idea that recognizing the extent of customer's satisfaction is achieved through performing a periodical assessment of their degree of satisfaction about the company outputs.
7. The customers questioned confirmed that the company is nearing with their desired specifications, besides its ability to offer services superior to those of competitor's, that why its have increasing marketing share in the local market.
8. Replies of the company's customers showed that the company employees have flexibility in dealing with the customers regarding the availability of various drugs and medical requisites which help to increase the customer's loyalty to the company.

B. Recommendations : The company should

1. Be more interested in training its employees on the contemporary methods used in checking process and secondhand materials in order to increase their skills and experiences which in turn reduces checking time and speeds up achievement.
2. Perform a fair and real assessment system for suppliers such as Suppliers Rating System (SRS), so that it can obtain proper supply sources which is most important means in gaining excellence performance .
3. Establish efficient standards to assess leaders and employees performance in order to identify drawbacks (defect) and make suitable rectification in the future.
4. Take care on the products' passive effect on the society, its necessary to adopt the concepts of green manufacturing in order to avoid production waste and losses.
5. Rely on employees participating and involvement in drawing up strategic plans, that insure achieving them in a better way, which needs to establishing measurements and indicators that are based on their views and upon their agreement.
6. Carried out marketing studies by R&D department within the company in order to recognize the segmentation of customers, as well as there present and future needs.
7. Activating the role of information systems within the company in collecting, arranging and making use of the data, besides realizing the best methods of operation and keeping up necessary information for stockholders which in turn be useful in taking decisions in advance.
8. Measure the workforce satisfaction, and their integration in the company which in turn affect the level of their skills and achievements.
9. Focus on founding indicators and measurements for abiding by ethical behavior and the confidence of stockholder's in general at the higher leadership of the company.

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