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USING THE TECHNIQUE OF QUALITY FUNCTION DISSEMINATION (QFD) IN CONTROLLING COSTS AND IMPLEMENTING THE DIFFERENTIATION STRATEGY (AN APPLIED STUDY IN THE UR STATE COMPANY FOR ENGINEERING INDUSTRIES)

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Abstract:

The research aims to apply one of the strategic cost management techniques, which is the technique of Quality Function Dissemination (QFD) in the Ur State Company for Engineering Industries on the electrical outlet product to determine customer requirements, control costs and implement the differentiation strategy. Responding to the customer's voice, taking into account the competition of economic units to achieve cost reduction, maximum customer satisfaction and the highest quality. The research found a weak interest in cost accounting techniques in general and the dissemination of the quality function in particular, which is reflected in the weakness of the economic unit's ability to develop the product and reduce costs as well as the difficulty in responding to the customer's voice and consequently the lack of control over costs well as well as the failure to implement the differentiation strategy as required.

Keywords: Quality Function Dissemination (QFD)

INTRODUCTION:

In light of the many variables accompanying the modern industrial environment, the economic units faced many challenges, the most important of which is the increased intensity of competition and focus on the customer. The technology of publishing the quality function is one of the total quality programs through which the desires and needs of the customer are translated into specific features that can be designed suitable for them, as it represents a challenge and an opportunity for the senior management to focus on how to achieve results by reducing efforts and reducing the time taken to re-design and provide a product that meets the need actual customers and at the appropriate cost.

The first topic: Research methodology:

1.1 Research problem:

The industrial economic units in the Iraqi environment suffer from a lack of interest in cost accounting techniques in general and the dissemination of the quality function in particular, which is reflected in the weak ability of the economic unit to develop the product and reduce costs As well as the difficulty in responding to the customer's voice, and accordingly, the research problem can be formulated by the following question: Does the application of the technique of spreading the quality function help in controlling costs and implementing the differentiation strategy. ?

1.2 Research Importance:

The importance of the research lies in the importance of spreading the quality function, where the technique of spreading the quality function is one of the techniques that work to achieve customer requirements in product design. A means to ensure design quality and reduce costs resulting from unnecessary operations.

1.3 Research Objectives:

The research aims to respond to the customer's voice using the quality function deployment, in addition to reducing the cost of the product because the cost is one of the decisive factors to determine the competitive position of many enterprises in the current era or by adding new values to the product in a way that helps in controlling costs and implementing the differentiation strategy.

1.4 Research hypothesis:

The research is based on the following hypothesis: The application of the quality function diffusion technique will effectively contribute to cost control and the implementation of the differentiation strategy.

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1.5 Research Sample:

The research sample is represented by Ur General Company for Engineering Industries, Nasiriyah branch in Dhi Qar Governorate, for the data for the financial year ending on 12/31/2021.

THE SECOND TOPIC: THE THEORETICAL SIDE OF THE RESEARCH:

2.1 The concept and importance of the Quality Function Deployment (QFD) technique:

The origins of Quality Function Deployment (QFD) technology can be traced back to Mitsubishis Heavy Industries Co., Ltd. in Cuban shipyards in Japan in the late 1960's where QFD was used to facilitate the development of multifunctional products (Liao, et.al.,2019:72).

Since 1970, Yogi has gone with others to work on improving the design process in Japan. It was high quality. When new products were introduced into the factory, the design augmentation process was called Quality Function Deployment (Ginting, et.al., 2020:2).

As for the concept of Quality Function Deployment, there is no single and specific definition of the technique of Quality Function Deployment (QFD), but there are many definitions about the concept of this technique as mentioned by some researchers, which can be clarified through the following:

1. Quality Function Deployment (QFD) is seen as a specific methodological and planning process that helps companies listen to the voices of customers (Chileshe, 2018:51).
2. The Quality Function Deployment (QFD) technique is a planning process that helps the economic unit to effectively implement various technical support tools and complement each other to prioritize each problem (Ginting, et.al., 2020:4).
3. The Quality Function Diffusion (QFD) technique is a method of improving product quality by understanding consumer needs and then relating those needs to the technical characteristics of producing products in each product making process (Liao, et.al., 2019:78).

The importance of Quality Function Deployment (QFD) technology comes from the consensus-based joint work that breaks down barriers between departments, and facilitates team self-management which encourages individual contribution to collective talent instead of people who hold back from giving each other full use of their abilities The design objectives can be modified either to generate a radical new innovation or to produce a conservative gradual improvement in a traditional product that matches the requirements and needs of the customer (Abu Zaid, 2015: 44).

Based on the foregoing, the researcher believes that the quality function deployment technique is one of the strategic cost management techniques that works to effectively implement various technical support tools and complement each other to prioritize each problem in order to meet the customer's requirements better than what competitors in the market offer.

2.2 The role of the Quality Function Deployment (QFD) technique in cost control:

Costs are an intertwined process that includes the collection and analysis of costs and knowledge of spending strategies for the economic unit system. Hence, it is necessary to know the meaning of the term cost and to distinguish between a number of accounting terms for cost, expense and loss. Cost is an optional sacrifice of economic resources in the past, present and future in order to obtain assets that have already reached headquarters. The economic unit, so the timing of obtaining benefits is a time boundary in the present and the future, while the expenditure is an optional sacrifice in the past, present and future in order to obtain benefits in the present only, while the loss is the sacrifice of economic resources without obtaining a benefit (Al-Qasrawi, 2015: 23).

Cost reduction can be defined as the process of searching for, finding and removing unjustified expenses from the economic unit to increase profits without negatively affecting the quality of the product, that is, it is the method of performing the work in progress in a new, different and more efficient style in order to reduce the excess cost, and the technique of spreading the quality function works on that As well as controlling the cost and helping to reach its target level (Yadav, et.al., 2013: 2).

The technique of spreading the quality function helps in controlling costs by defining the activities, functions, components and parts of the product with determining the cost of each and finding its relationship to the customer’s desires, as controlling costs through the technique of spreading the quality function can help in the following: (Radwan, 2012: 15), (Al-Jayoushi, 2015: 59)

1. Confronting the problem of lowering prices, as resorting to reducing costs and controlling them in the event of lower prices and the need to keep pace with the changes that result in a decrease in the profits of the economic unit and also testing expectations about products to make productive decisions if there is a significant decrease in prices while monitoring

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the results of economic units in The same industrial sector to determine the extent of price flexibility.
2. The simplicity of the philosophy of cost reduction and control compared to the process of increasing revenues, as it is the easiest way to increase the expected profit in the short term is the process of cost reduction and control.
3. The existence of a fixed cost base for the economic unit, and this type of cost is linked to a period of time such as rents, and the high level of fixed cost requires that the economic unit maintain a high level of revenue to avoid losses, as the increasing costs are reduced over time.

2.3 The role of the Quality Function Deployment (QFD) technique in implementing the differentiation strategy:

The differentiation strategy is one of the three strategies of Porter, and is the secret of the success and distinction of many brands. The differentiation strategy aims to add a competitive advantage to the product or service, to distinguish it from other competing products to create a distinctive customer experience, in terms of product design, brand, quality and customer service. The technique of spreading the quality function implements this strategy through quality improvement (Eishawy, 2008: 4.(

The quality function deployment technique seeks to satisfy the customer through the overall experience of the product and the quality measure is the difference between customer expectations and the actual product performance better than competitors in the competitive market (Blocher, et.al., 2019:719).

This technology works to anticipate the needs of the customer, whether current or future, and to translate these needs into useful and reliable products and to create a system that produces these products at the lowest cost, and this represents a new value for the customer (Chileshe, 2018:49).

The Quality Function Deployment (QFD) technology helps in implementing the differentiation strategy through excellence in a number of matters, as follows: (Radi & Al Arabi, 2016: 23).

1. Low competitive price: The differentiation strategy allows the company to compete in the market with something other than low prices.
2. Unique Products: The benefit of the differentiation strategy is that it builds on the unique characteristics of the product. Your company may create a list of characteristics that your products have that your competitors lack. These characteristics will differentiate your product, and you can communicate this through effective marketing and advertising.
3. Better profit margins: When products are differentiated and converted into high-quality products, they provide a greater opportunity for higher profit margins. For example, if your target market is willing to pay a higher price for higher quality or better value, you may generate more revenue with fewer sales.

The deployment of the quality function is an ideal technique for identifying the needs of customers and translating them into products that meet the customer's need. The basic customer, and thus the differentiation strategy can be implemented efficiently and effectively (Al-Kawaz, 2016: 79).

THE THIRD TOPIC: THE PRACTICAL ASPECT OF THE RESEARCH:

3.1 An introduction to Orr Engineering Industries:

It is one of the companies of the Iraqi Ministry of Industry and Minerals. The company carries out several industrial works that consume many public needs. Ur State Company for Engineering Industries is located on Nasiriyah Road, Al-Shuyoukh market and is about (1) km from the governorate center. This company was formed from the merger of two facilities on 1/ 4/1988: The General Establishment for the Manufacturing of Aluminum Profiles with the General Establishment for the Manufacturing of Cables and Wires, to become the Ur General Establishment for Engineering Industries, with a capital of (107,500) million dinars. Then the name of the facility was changed to Ur State Company for Engineering Industries in 1998, and one of the most important goals of the company is to contribute to supporting the national economy and developing industrial production in the field of midwives and electrical and telephone wires.

3.2 Implementation of the Quality Function Deployment (QFD) technique in Ur Engineering Industries for the purpose of cost control and implementation of differentiation strategy:

The technique of spreading the quality function will be applied in Ur Engineering Industries through building a quality house by following six steps, which are as follows:

The first step: Determine the customer's requirements (voice of the customer):

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The customer's voice about the company's electrically capable product is listened to by distributing the questionnaire to a number of customers. This questionnaire contained two parts. The first section relates to the basic requirements of the customer, which included (quality, aesthetics, price, product safety, maintenance, product resilience to changes climate, product performance), and the second section is related to identifying the company's competitors, which is one of the steps of the Quality House. Return of 30 forms, the following table shows the data related to the electrical plug product:

Table (1): Emptying the data of the questionnaire form for the customer's requirements related to the electrical plug product

No.	customer requirements	Very Available 5	Available 4	somewhat available 3	Not available 2	Not available at all 1	Weighted Sum	Relative importance	Rank Score of importance
1	Product durability	60	36	21	4	0	121	%11.3	4
2	Product performance	25	72	21	0	0	118	%11.0	6
3	Product price	50	44	9	12	0	115	%10.7	7
4	Ease of repairing the product	45	44	30	0	0	119	%11.1	5
5	company's reputation	75	40	15	0	0	130	%12.1	2
6	resistance force	15	60	33	2	0	110	%10.3	8
7	product aesthetics	25	32	39	6	1	103	%9.6	9
8	Product quality	85	40	9	0	0	134	%12.5	1
9	Product safety	45	60	15	2	0	122	%11.4	3

Source: Prepared by the researcher.

The following steps were used to empty the questionnaire data:

1. Carry out the multiplication of the frequencies for each of the customer's requirements with the corresponding relative weight (12 x 5 = 60).
2. Add the result of each multiplication of frequencies to extract the weighted sum for each requirement (60 + 36 + 21 + 4 = 121).
3. The relative importance of each requirement is reached as follows (the degree of relative importance = weighted total ÷ weighted total for each requirement x 100), (121 ÷ 1072 x 100 = 11.3%).

The second step: Competitive evaluation of the customer:

In this step, the competitors in the market are identified, and then a comparison is made between the company's product with similar competitive products. In this evaluation, the competitive position of the product is determined in terms of the level of the company and competitors meeting the requirements of customers, where this evaluation is done by customers to determine the strengths and weaknesses of the product The company and the competing products, and according to the customers' opinions, the Jordanian electrical outlet product was determined based on the second section of the questionnaire. The data of the second section of the questionnaire form can be emptied for the customer's requirements related to the product of the United Cable Factories Company, as shown in the following table:

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Table (2): Emptying the data of the second section of the questionnaire form for the customer's requirements related to the product of the United Cable Factories Company

No.	customer requirements	Very Available 5	Available 4	somewhat available 3	Not available 2	Not available at all 1	Weighted Sum	Relative importance	Rank Score of importance
1	Product durability	35	32	33	8	0	108	%10.3	7
2	Product performance	50	48	15	6	0	119	%11.4	4
3	Product price	60	52	12	2	0	126	%12.0	2
4	Ease of repairing the product	15	56	27	6	1	105	%10.0	8
5	company's reputation	60	40	21	0	0	121	%11.6	3
6	resistance force	35	68	15	2	0	120	%11.5	5
7	product aesthetics	25	36	33	10	0	104	%9.9	9
8	Product quality	50	68	9	0	0	127	%12.7	1
9	Product safety	20	76	21	0	0	117	%11.2	6

Source: Prepared by the researcher.

According to the customers' assessment of the availability of the necessary and basic requirements for the company's product and the competing product, the priorities can be arranged according to the degree of relative importance as in the following table:

Table (3): Ranking of priorities according to the degree of relative importance of the product of the Ur State Company for Engineering Industries and the product of the United Cable Factories Company

Customers' Requirements	The product of Ur State Company			the product of the United Cable Factories Company		
	Weighted Sum	Relative importance	Rank Score of importance	Weighted Sum	Relative importance	Rank Score of importance
Product durability	%11.3	4	6	%10.3	7	3
Product performance	%11.0	6	4	%11.4	4	6
Product price	%10.7	7	3	%12.0	2	8
Ease of repairing the product	%11.1	5	5	%10.0	8	2
company's reputation	%12.1	2	8	%11.6	3	7
resistance force	%10.3	8	2	%11.5	5	5
product aesthetics	%9.6	9	1	%9.6	9	1
Product quality	%12.5	1	9	%12.1	1	9
Product safety	%11.4	3	7	%11.2	6	4

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Total	%100	-	-	%100	-	-

Source: Prepared by the researcher.

It is clear from the above table the difference in the degree of relative importance between the local product and the appropriate product, and after searching for the reason for this difference, it was found that the requirements of customers were different in the products, which generated competition between them.

The third step: Determine the technical specifications or characteristics of the product design (the engineer's voice):

This matrix includes defining the technical specifications of the electrical plug-in product that meet the customer's requirements and according to the opinion of the engineers and technicians working only have been determined (machines, the importance of workers' efficiency, PVC packaging, the type of reinforcement used, the type of copper used, the type of conductor used for the plug, the type of insulator used, the amount of voltage of the acceptor).

The fourth step: Define the correlation matrix (relationships):

The relations matrix is determined after consulting the relevant specialists. The relations matrix for the electrical plug product can be clarified through the following table:

Table (4): Matrix of relationships for the electrical conductor product

details	machines	Efficiency of workers	Armament type	copper type	connector type	Insulator type	Packaging type	High voltage tolerance	Ranking of importance
Product durability	-	%2.26	-	-	%2.59	%2.59	%2.59	%18.75	%11.3
Product performance	%2.53	%18.26	%2.53	%2.53	%18.26	%2.53	%2.53	%18.26	%11.0
Product price	%17.7	%17.7	%2.14	%2.14	%2.14	%17.7	%17.7	%17,7	%10.7
Ease of repair	-	%18.42	-	-	%2.55	-	%2.55	-	%11.1
company's reputation	%20.8	%20.8	-	-	%2.3	%20.8	%20.8	%20.8	%12.1
resistance force	-	%17.9	-	-	-	-	%17.9	-	%10.3
product aesthetics	%15.9	%15.9	-	-	-	-	%2.20	-	%9.6
Product quality	%20.75	%20.75	%20.75	20.75 %	%20.75	%20.75	%20.75	%20.75	%12.5
Product safety	-	%18.92	-	%2.28	%2.62	%18.92	%18.92	-	%11.4
Product durability	%7.768	%15.91	%2.542	2.770 %	%5.121	%8.329	%10.59	%9.626	%100
ranking	5	1	8	7	6	4	2	3	

Source: Prepared by the researcher.

It is evident from the above table that there is a relationship between many components, parts and specifications of the product in question, which confirms the interest in the quality of these parts in order to affect the quality of the product in a positive way.

The fifth step: the exchange matrix:

This matrix is located at the top of the Quality House. This matrix is drawn after defining the technical specifications of the product to show the effects that occur between those requirements and the technical specifications, as well as after determining the relationship between the technical requirements and

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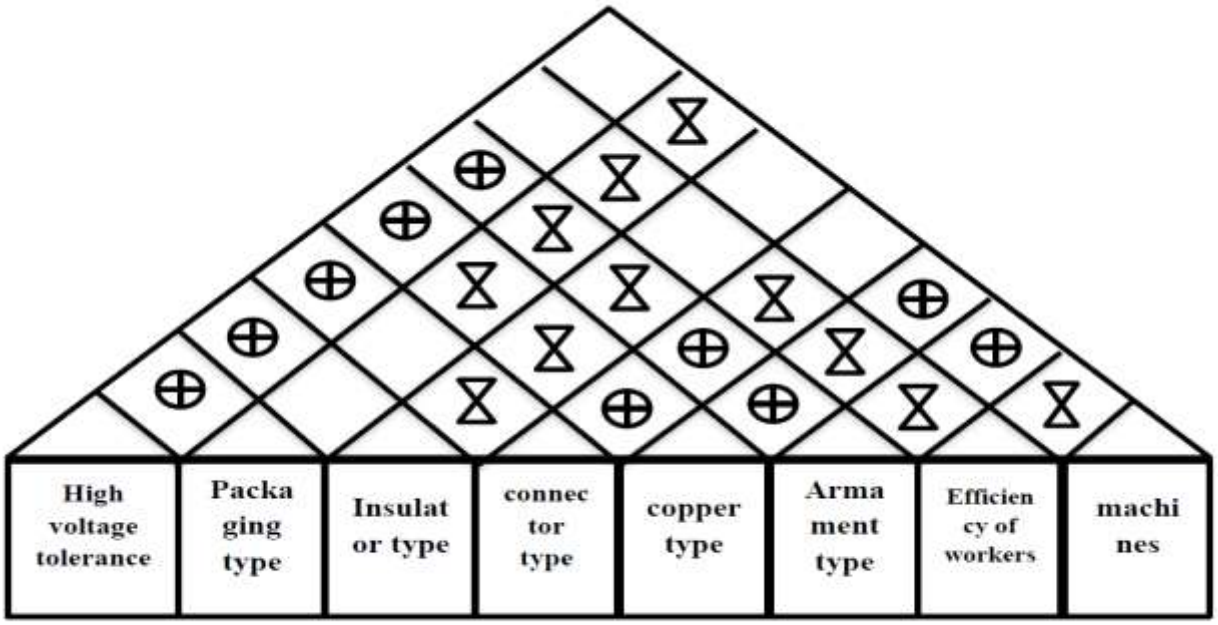
the requirements of customers. These exchanges were represented by the following symbols:

Table (5): Exchange Matrix Symbols

Relations	Code
strong positive relationship	⊕
positive relationship	⧖
There is no relationship	

Source: Prepared by the researcher.

Figure (1): Exchange Matrix



Source: Prepared by the researcher.

The sixth step: the matrix of technical evaluation and target values:

This matrix is the final part of the construction of (House of Quality) to include a technical evaluation of the product of the Ur State Company for Engineering Industries, as well as the competing product of the Jordanian United Cable Factories Company to indicate the location of the company and the competing company in the Iraqi market and then work to improve the reality of the company. The research sample is as follows- :

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Table (6): Matrix of technical evaluation and target values for the electrical plug product

details	machines	Efficiency of workers	Armament type	copper type	connector type	Insulator type	Packaging type	High voltage tolerance
Technical evaluation of the UR company	117	191	60	85	146	165	185	147
Technical evaluation of the competing company	143	209	71	84	131	167	196	165
target values	143	209	71	85	146	167	196	165

Source: Prepared by the researcher.

The target values were calculated by multiplying the weight of the relationship in each column of the correlation matrix with the corresponding matrix of competitive values, and then calculating the total of the paragraphs, as the engineering requirement for the efficiency of machines reached 117, as follows:
[(7 x 0) + (9 x 5) + (1 x 5) + (2 x 0) + (8 x 5) + (3 x 5) + (5 x 0) + (4 x 3) +(6×0])
It is noted from the above that the quality function deployment technique can help control costs by reducing unjustified expenditure resources, in addition to helping to improve product quality based on the customer's voice as well as comparison with the competing product, which can help in implementing the differentiation strategy efficiently. and efficacy.

FOURTH TOPIC: CONCLUSIONS AND RECOMMENDATIONS:

4.1 Conclusions:

1. The company does not apply the accounting techniques that help to develop the product and increase the quality, especially the technique of spreading the quality function.
2. The company's lack of interest in competitors or the competing product, which resulted in the company losing many opportunities to improve the quality of its products.
3. Low levels of employees' performance and management's lack of interest in improving performance and quality, raising the level of employees' efficiency and following modern methods of development, including spreading the quality function.
4. The quality function deployment technique can help control costs by reducing unjustified expenditure resources.
5. The quality function deployment technique helps in improving the quality of the product based on the customer's voice as well as the comparison with the competing product, which can help in implementing the differentiation strategy efficiently and effectively.

4.2 Recommendations:

1. Implementing the deployment of the quality function for the purpose of retaining the customer and attracting the largest possible number of them due to the ability of this technology to develop products, increase quality and achieve customer requirements.
2. The necessity of involving the customer in the product design process because of its impact on achieving product quality and gaining customer satisfaction.
3. Directing the company's interest in comparing its products with competing products to find out weaknesses and strengthening them, increasing support for strengths and reducing competitive gaps.
4. Choosing the appropriate competitive strategy for the company's resources and capabilities in a way that can achieve the best returns for it.
5. Accurate identification of the customer's requirements by listening to his voice by following a variety of methods, including questionnaire and interviews, which are an important link between the producing company and the customer to meet his requirements.

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