

The role of specification-based cost and reverse engineering in supporting the target cost and its reflection in reducing costs

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ABSTRACT:The research aims to implement the integration approach between the target cost and cost techniques based on specifications and relying on reverse engineering in the heater laboratory of the General Company for Electrical and Electronic Industries in order to reach the required reduction in costs. Because of their effective effect in reducing the cost of the electric heater product 120 liters. To achieve the goal of the research, the researchers relied on the company's data through field living and interview with officials in the company research community as well as interviews with retailers, the research has reached a number of conclusions, perhaps the most prominent of which is that the laboratory of the research sample needs to apply the cost technique on the basis of specifications and depending on the One of the target cost tools represented by reverse engineering, which will achieve excellence and excellence for the products of the laboratory research sample in terms of reducing cost, raising the level of quality, reducing response time, and achieving optimal use of resources compared to what competitors produce, and thus the DGM of the target cost technology will be successfully achieved. The most important proposals contained in the research emphasize the application of the above techniques in order to achieve support for the target cost technique to reach the required reduction of cost.

KEYWORDS:specification-based cost technology, reverse engineering, target cost technology, cost reduction.

I. INTRODUCTION

The rapid developments and changes witnessed by the modern business environment, especially at the level of manufacturing, as a result of technological progress in the field of industry, information and communication technology, and the emergence of the globalization of modern markets, which made global markets characterized by wide openness with the increasing intensity of competition between economic units, has led to the emergence of modern technologies aimed at achieving The competitive advantage of the economic unit by producing products at the lowest cost while providing a high degree of flexibility and the ability to respond to the requirements and needs of the customer in the shortest time.It was natural, in the face of all these developments, for economic units to think about reconsidering the traditional accounting systems because of the criticisms leveled at them for neglecting market considerations and developments that occurred in it, and to search for strategic techniques in the field of cost management in response to these developments through the ability of these techniques to Providing information that helps achieve the objectives of the economic unit represented by low cost, high quality and optimal use of resources. The two techniques of costing based on specifications, reverse engineering and target costing are among the most prominent techniques for strategic cost management that provide appropriate information in order to take appropriate decisions and that help the economic unit enhance competitive advantage.

First: The problem of research

The rapid transformations and changes witnessed by the contemporary business environment as a result of openness to global markets and the increase in the volume of competition and the entry of products similar to the local product at competitive prices have made most of the Iraqi economic units suffer from the problem of high costs of their products compared to what is produced by competing economic units due to their lack of use of modern strategic cost management techniques and their limitation to traditional systems that have become unable to provide information that suits these transformations. This made the competitive position of these units decline significantly compared to competing products and this is what will represent the problem of the study, so the current study has adopted the use of modern methods of measuring cost, which is the entrance to cost based on specifications and reverse engineering, and the problem of research can be formulated through the following two questions:

1. Does the application of cost technology based on specifications and reverse engineering contribute to supporting the target cost?
2. Is the target cost support by applying cost technology based on specifications and reverse engineering reflected in the reduction of product costs?

Second: The importance of research

The importance of research stems from the importance of the role played by strategic cost management techniques, represented by cost techniques based on specifications and target cost and relying on one of its tools, which is reverse engineering in avoiding shortcomings and weaknesses in traditional cost measurement systems, because of their effective impact in achieving the objectives of the economic unit, which is represented by providing products of high quality and low cost, which contributes to enhancing the competitiveness of the economic unit and increasing its market share.

Third: Research objectives

The objectives of the research are as follows:

1. Provide a theoretical and philosophical framework for both cost techniques based on specifications, target cost and reverse engineering.
2. Demonstrate the role of both specification-based cost technology and reverse engineering in providing support to target cost technology
3. Implement the approach of integration between the target cost and cost techniques based on

specifications and relying on reverse engineering in order to reach the required reduction in costs.

Fourth: Research Hypothesis

The research is based on the basic premise that "the application of cost technology based on specifications and reverse engineering would contribute to the strengthening of the target cost, which is reflected in the reduction of costs."

Fifth: Limits of Research

1. **Temporal Limits:** In order to accomplish what the research aims at, the data of the year (2021) has been relied upon.
2. **Spatial boundaries:** Because the research relates to one of the laboratories of the General Company for Electrical and Electronic Industries / Waziriyah branch, namely the heater factory, which specializes in the production of electric heaters of various types, so the company returned as a research community and the laboratory sampled it in order to test the research hypothesis of the effectiveness and role of the company in general in the production of products that directly affect the needs of customers, as well as the intense competition faced by the company as a result of the country's openness to the world and the entry of various products at low prices.

II. RESEARCH METHODOLOGY

In the theoretical aspect of the research, the researchers have relied on the deductive approach by relying on the references and various sources, both Arab and foreign, while in the applied aspect of the research it has relied on the inductive approach (case study) through the study of accounting records and statements used in the different departments and divisions of the research sample laboratory, as well as field experience and personal interviews conducted with officials in the laboratory of the research sample.

Conceptual Framework of Cost Technology Based on Specifications

First: Cost technique based on specifications

The idea of specifications appeared in many of the writings of marketing science in the late sixties of the last century, where many researchers in marketing science directed to the need to form a marketing strategy by relying on market studies that determine according to the requirements and desires of customers and adopt their preferences for specifications and characteristics in which products are distinguished, and the cost technique based on

specifications is one of the techniques of the entrance to modern cost management that did not receive much attention by researchers in the field of cost accounting (Abdul Rahman, 2003: 108).

Second: The concept of cost based on specifications

Opinions and concepts about the concept of specifications have exceeded in the literature, it has defined it (Abdul Sadiq, 2005: 213) as a cost technique based on specifications as a modern accounting technique that determines costs on the basis of the specifications in which the product will be designed and also on the basis of the level of achievement reached by each of the basic specifications of the product, as Jabbar points to the cost on the basis of specifications that it is considered as an advanced technology of cost on the basis of activity and it depends directly on the fragmentation of the product into a group Specifications based on the vision of the market and the requirements of customers with the calculation of the cost of each specification and for all production levels related to the product down to the total cost of this product and the characteristics that distinguish it and its quality that distinguishes it from competing products and that aims to develop the product and satisfy the desires of customers in terms of providing the best products at a lower cost and an appropriate price (Jabbar,2021:0 27).

Third: Requirements for the application of cost technology based on specifications

The cost technique based on specifications is based on basic requirements for its application by my agencies (Al-Sagheer,2011: 79):

1. **Process analysis:** This requires the rehabilitation of process maps that contribute to the diagnosis of the expected areas of process improvement, and this leads to the reduction and elimination of waste of productive resources within these processes.
2. **Activity analysis:** Activities are analyzed by listing all resource-depleting activities that occur in order to achieve product specifications and this step aims to determine the following (required activities, resources required to perform the activity, measuring the value of activities from the consumer's point of view and dividing them into activities that add value and others that do not add value).
3. **Ensure the completion of each specification:** This is because the cost of the product is determined in the light of the cost of each level of completion of each of the specifications of the product.

Fourth: Steps to apply the cost based on specifications

There are a set of steps to calculate the final cost of the product and each of the specifications are as follows:

1- Determine the specifications related to the product

Determining the specifications related to the product is one of the important and basic steps in cost technology based on specifications, as in this step the specifications of the product are determined based on the requirements and desires of customers, (Al-Mahmoud, 2007: 179).

2- Classification of specifications

The classification of specifications is one of the most important steps for the economic unit, as the specifications can be classified into the following (AL Saqir,2011:79)):

a- **Basic specifications:** are the specifications that are the basis in the composition of the product and that are determined at the stage of product design, as the product can not perform its functions unless those specifications are available, as the economic unit seeks through the development of those specifications to provide a product that exceeds similar products in terms of high quality and competitive price, and who represents you these specifications are size and performance (defensive, 2019: 3)

b- **Secondary specifications:** After determining the basic specifications during the design phase of the product, there are secondary specifications, these specifications are complementary to the basic specifications or usually the economic unit adds other specifications that give aesthetics to the product, which makes the attention of customers directed towards a group of alternatives to choose the best alternative among the alternatives in terms of shape, color, perfume and other specifications that relate to the shape when designing and what the customer prefers, An example of such a specification is suitability Nowlis& Simonson, 1997: 205-218).

c- Identification of activities:

Activities are determined with the aim of knowing how important these activities are and how much they contribute to adding value to products so that a distinction can be made between activities that add value and activities that do not add value with the ability to get rid of activities that do not add value (Al-Sagheer, 2011: 81).

Determine the cost of the level of completion of each specification

In this step, the cost of each of the product specifications is calculated according to the level of completion of each specification (Jasim, 2019 :9), and in this regard the cost is divided into

A- Cost associated with the volume of production: It is the cost that is directly related to the volume of production such as direct materials that are directly proportional to the level of change in the volume of production.

B- Cost related to activities: It is the cost that has a direct link to activities such as indirect industrial costs, where attention should be paid to conducting an in-depth study to identify basic activities and exclude unnecessary activities.

C. Energy-related cost: It is the cost that is directly related to the acquisition of machinery and equipment that go into the production process.

d- Cost associated with non-industrial elements: It is the cost that has a direct link with the policy of the economic unit and the decisions it makes and is associated with the marketing of the product and after-sales services and is represented by marketing and administrative costs.

5- Determine the total cost of the product

In this step, the final cost of the product is determined by adding the cost of each level of production and each of the specifications, since each level of the product is a basic product, that is, the cost of the product at any level consists of the cost of activities that add value at a certain level of achievement and the cost of necessary activities that do not add value to the product (Mahmoud, 2018 :11).

III. TARGET COST TECHNOLOGY

First: The concept of the target cost

Al-Rubaie defines the target cost as a strategy that works to plan costs at the beginning of the product development phase based on market brands to meet the expectations and desires of the customer in order to obtain a profit margin that maintains the continuity of the product and its survival in competition (Al-Rubaie, 2015, 36). Hilton defines the target cost as a technique widely used by companies during the stages of new product development, as the target cost of a new product is the expected long-term cost that It will allow the products of the economic unit to enter and stay in the market and compete successfully with its competitors (Hilton & Platt,2019:682).

The researchers believe that the target cost is a management technique with a strategic dimension that enhances the ability of economic

units in terms of conducting improvement during the planning, design and production process in order to maintain the position of the product in the markets for as long as possible.

Second: Characteristics of the target cost

The target cost is characterized by a set of characteristics and agencies (kwah,2004,38):

They are used in the development and design phases, unlike the production phase where the traditional method of cost control is used.

Target cost is not a standard strategy for managing and controlling costs, but a strategy aimed at reducing costs..

Conduct product development and design processes using many management science methodologies in the target cost estimation process.

Directing cost targets and related resources and activities from the stage of product planning and design to the stage of after-sales services.

Third: Principles of Target Cost

(Slater,2010:26), (Massoudi, 2010: 164-165), (Hilton & Platt, 2019: 683) indicate that there are seven basic principles of target cost:

1. Estimating the cost based on the price:

The target cost is reached by subtracting the target profit margin from the target selling price and according to the following formula:

Target Cost = Target Price - Target Profit

2. **Focus on customer:** Taking into account the tastes of the customer in all aspects of production is a necessity as knowing what customers want and knowing what competitors are doing will lead the economic unit to meet those basic needs of customers.

3. **Focus on the product design stage:** The target cost indicates that most of the costs and time are spent at the design stage where economic units can make the necessary engineering changes to the product in order to exclude unnecessary costs and time and bring the product to market at a time when the reduction is effective.

4. **Cross-functional interoperability:** The application of target costs entails coordination between the multiple functions in production performed by economic units from the beginning of the production process to its completion, represented by marketing, finance, design engineering, industrial engineering, procurement, production, sales and accounting. Costs, and from outside the economic unit are processors, customers, dealers, distributors and other service providers.

5. **Participation in the value-chain involvement:** In some cases, it is expected that the cost of the

new product will exceed the target cost, so efforts should be focused to exclude costs that may not add value to the new product in order to reduce the expected cost of it (Massoudi, 2010: 165).

6. Life-cycle Cost Determination: The application of the target cost must take into account the costs along the life cycle of the product from the point of view of the producer and the consumer, which begins with the research and development phase and continues to the after-sales service stage.

7. Focus on process design: The economic unit must continuously inspect all levels that the production processes go through in order to ensure the production of the product with the highest level of quality and efficiency, as the use of labor, technology and all aspects of the production process should be within the target cost range (Hilton, 2019: 683)).

Fourth: Steps to implement the target cost

The steps to implement the target cost are summarized as follows (Horngren, 2018:530-533).):

1. Target Price Determination

Drury believes that the first step in the target cost technique requires conducting market research to estimate the perceived value of the product among customers, based on its functionality and qualities, the value of differentiation relative to competing goods, and competitive product pricing. As a result of this procedure, the target selling price is determined (Drury2018:594).

2. Target Profit Determination

The target profit is determined by the total return on investment and profits as a percentage of sales. The target profit for each product is then calculated by subtracting the target cost from the target price (Drury,2018:236)).

3. Target Cost

The target cost of the product is determined by subtracting the target profit from the expected selling price of the product and my agencies (Garrison,2018: 624):

Target Cost = Target Selling Price - Target Profit

4. Determine the current cost of the product Current Cost

After determining the target cost of the product, its current cost is determined that includes all the cost elements related to the life cycle of the product, and Burns states that the use of modern strategic cost management techniques such as activity-based cost technology will contribute to

the appropriate determination of the current cost (Burns, etal.2013:494).).

The researchers believe that the cost technique is applied on the basis of specifications in calculating the current cost and this represents the essence of the integration between this technique and the target cost technique.

5. Target Reduction

The cost gap is determined by comparing the current cost of the product with the target cost with the aim of achieving the cost savings required for the economic unit at the competitive level (Bierer&Gotze, 2013:437), if the current cost exceeds the target cost, then the design team must address this difference in such a way that the current cost is equal to or less than the target cost, 2018:532).

6. Achieve of target reducing

(Burns, et.al.,2013:494) points out that the process of reaching the goal of achieving the target reduction in cost requires the use of a number of tools or methods, the most important of which are value engineering, benchmarking, and reverse engineering.

IV. REVERSE ENGINEERING

First: The concept of reverse engineering

It is also called dismantled analysis, where it is one of the tools of the target cost as the main goal of it is to achieve the target cost, and both (Kaplan&Atkinson, 2016:287) believe that reaching the target cost under the application of reverse engineering is done by identifying the specifications of the design of products that compete with the product of the economic unit in order to prepare for its analysis and know the mechanism of work of designing these products and make appropriate adjustments to the product of the economic unit in order to be better than competing products. Reverse engineering (Drury, 2018:618) is defined as the study and logical examination of competing products and the statement of their mechanism of action with the aim of identifying opportunities to reduce or improve the cost of a product in order to outperform competing economic units. Datar & Rajan, 2018:488) adds in this regard that under the application of reverse engineering, the product of the competing units is studied and analyzed with the aim of determining its functionality and design while providing sufficient information on the processes that contribute to its production in addition to its cost.

Second: Advantages of applying reverse engineering technology

According to Jacob, reverse engineering is a design tool that adopts reciprocal relationships aimed at achieving the target cost through several advantages, perhaps the most prominent of which in this regard are (Jacob and Saleh, 2013: 259):

1. The behavior taken by design engineers (reverse) contributes to reducing the cost of the product as well as reducing the product development cycle.
2. Contributes to the identification of parts and components of great importance and the most complex from the point of view of design, performance and function.
3. Knowledge of the processes for the manufacture of parts and components by competitors and the continuous search for alternatives and appropriate solutions that contribute to improving the value of the product.
4. It is an important method in product cost planning because it expresses a common analysis between the dismantling of competing products and market analysis as well as the determination of product specifications.
5. It is one of the most important tools of targeted cost technology appropriate to the requirements of diversity through its ability to collect financial and non-financial information (design, operational processes).

V. REFLECTION OF TARGET COST SUPPORT BY APPLYING COST TECHNOLOGY BASED ON SPECIFICATIONS AND REVERSE ENGINEERING ON COST REDUCTION

First: The Role of Specification-Based Cost Technology in Supporting Target Cost Technology

The cost technology based on specifications (ABCII) is one of the strategic cost management techniques that link the internal environment of the economic unit with its external environment, by determining the basic and motivating specifications of the customer who wants to be present in the product, and thus this technique may contribute to improving the competitive position of the economic unit because it may be greatly affected by the wishes and expectations of customers (Al-Attali, 2019 : 100), Drury (2008: 574) believes that by adopting the economic unit of the cost technology on the basis of specifications, this would contribute to the achievement of support for the target cost technology, because the ABCII technology is one

of the strategic cost management techniques that are compatible with the changes and developments in the contemporary business environment, as its application will achieve two fundamental objectives of the first economic unit: It is the provision of appropriate costly information, which is considered an input to the technology (TC) while the second: is to determine the cost of the product on the basis of the specifications it holds, which are considered as a meeting of the requirements of the customer. The researchers believe that the cost technique is applied on the basis of specifications in calculating the current cost and this represents the essence of the integration between this technique and the target cost technique.

Second: The reflection of the target cost support by applying reverse engineering on cost reduction

The reverse engineering method has a fundamental role that contributes to supporting the target cost, as it is one of the basic tools that are used to reach the target cost by working on the dismantling and analysis of the competitor product into its basic parts and components in order to obtain information on the design and manufacturing process of competing products for the purpose of identifying possible opportunities to reduce the costs of the product (Yacoub and Saleh, 2013: 257), Rains adds that reverse engineering is a comparative process used to determine the value of product components and understand the design model and technology used in product production in order to develop a product that meets the customer's desires in terms of cost, quality and design and this would contribute to achieving support for the target cost (Rains,2009:8).).

Third: The Role of the ABCII and TC Integration Approach in Reducing Costs

Modern strategic cost management focuses on the external environment (markets, customers) unlike traditional cost systems that are more focused on the internal processes of the economic unit, where the goal of cost management can be achieved by the ability of the economic unit to provide products to markets with diverse and superior specifications, high quality, low cost and competitive selling prices. Where the method of pricing based on cost plus profit margin has become inappropriate, as pricing has become mainly dependent on the market and the competitive environment, and from this point of view it requires the economic unit to adopt the two cost techniques on the basis of specifications and

target cost within an integrated methodology especially in order to reduce the costs of products and relying on one of the target cost tools represented by reverse engineering (Muharram, 1995: 652). The basic steps to implement the integration of ABCII and TC technologies can be summarized as follows:

First: Study the reality of the market

It requires a thorough study of the market according to a strategic perspective in order to obtain the necessary information to contribute to the achievement of proactive knowledge of needs and desires where this knowledge achieves the realization and determination of the basic specifications of the product and the extent to which these specifications contribute to the satisfaction of those needs and desires, and also facilitates the process of determining the specifications that add value to the product and those that do not add value from the customer's point of view (Mahmoud, 2007: 179):

Second: Determining the specifications of the product

When the economic unit determines the specifications of the product, it should take into account that the customer may request the greatest amount of specifications and also may want to obtain them at low prices, while the economic unit may not be able to provide those required specifications based on these low prices, as the one who determines the provision of specifications and is the main controller of the synthesis of specifications and their costs in addition to the prices of their sale is the capabilities and owned by the economic unit, In this case, the economic unit determines the specifications from its own perspective and not from the customer's perspective, provided that these specifications are compatible with the wishes of the customers as much as possible (Al-Shami, 1999: 465).

Determining the relative importance of each specification Al-Rubaie (2015: 59) believes that the main objective of determining the relative importance of each specification is the following:

- a) Realize the value that the standard adds to the product.
- b) Analysis of the product according to its core specifications.

It should be noted that determining the relative importance of each specification is done through the design of a special questionnaire in which the basic specifications of the product are determined and based on the opinions of customers for these specifications with the determination of the value

of those specifications and the importance they may constitute to them, which may be formal specifications or fundamental specifications.

Fourth: Analysis and determination of the cost of each specification

The costs of each specification are analyzed into four types (costs related to the volume of production, costs related to activities, costs related to energy, and costs related to decision).

Fifth: Determining the target price

Drury believes that the first step in the target cost technique requires conducting market research to estimate the perceived value of the product among customers, based on its functionality and qualities, the value of differentiation relative to competing goods, and competitive product pricing. As a result of this procedure, the target selling price is set (Drury2018:594).

Sixth: Determining the target profit

The target profit margin is determined by the total return on investment and profits as a percentage of sales. The target profit for each product is then calculated by subtracting the target cost from the target price (Drury,2018:236).

Seventh: Determining the target cost

The target cost of the product is the difference between the target price and the target profit (allowed) after being determined by the economic unit, so that the economic unit harnesses its efforts and possibilities to reach it, and determines the target cost according to the following equation (Al-Rubaie, 2015: 61):

$$\text{Target Cost} = \text{Target Price} - \text{Target Profit}$$

Eighth: Determine the target cost of each specification

The target cost of each product specification is determined after the total target cost is determined by the previous step by the relative importance of each specification in the third step, and is found by the following equation (Al-Rubaie, 2015: 61).

$$\text{Target cost of specification (A)} = \text{target cost of the product} * \text{Relative importance of specification (A)}$$

Ninth: Identify the gap between the current cost of the standard and the target cost of the standard

The gap between the current cost of the standard and the target cost is determined by finding the

difference between the two costs through the following equation:

Cost gap = current cost of the standard – target cost of the standard

If the current cost of the standard is greater than the target cost, this means that the benefit of the economic unit is less than the cost, and it must take the necessary measures to reduce the cost of the standard because it exceeded the permissible level of cost, while if the target cost of the standard is greater than the current cost of it, this is a positive effect of the economic unit, through which it can support its products by selling them at competitive prices that achieve success and continuity in the markets.

Tenth: Achieving the target cost

After the implementation of all the previous steps, the basic tools of the target cost technique are applied which contribute to reducing the gap between the current and target cost, and it is stated (Berk, 2010: 121-124) that achieving the target reduction requires an in-depth study of all the cost elements related to the product in order to find opportunities to reduce the cost as much as possible without affecting the quality of the product, and there are many tools that will contribute to reaching the cost reduction such as reverse engineering, benchmarking and value chain, which have been Previously taken up.

The researchers believe that all of the above is just a theoretical clarification whose results are difficult to predict correctly unless it is delved into in practice, which will form the focus of the next chapter.

The Applied Aspect of Research

Sixth Section: Application of Target Cost and Cost Techniques Based on Specifications through an Integrated Approach to Cost Reduction in the General Company for Electrical and Electronic Industries

First: Overview of the General Company for Electrical and Electronic Industries

The General Company for Electrical and Electronic Industries is one of the subsidiaries of the Ministry of Industry and Minerals, which was established in 1965 following the joint cooperation agreement between the Soviet Union and Iraq, where it began its experimental work in 1967 as one of the economic institutions of the Iraqi Ministry of Industry and Minerals.

Second: Selection of the laboratory research sample. This laboratory represents one of the important laboratories of the General Company for Electrical and Electronic Industries, and its

establishment was in (1969). For the purpose of achieving the research requirements and in order to improve the demand for the company's products and the research community, the electric heater laboratory was selected as a sample for research for the following reasons:

1. The efficiency and quality of this product compared to the competing products offered in the market.
2. Most of its components are manufactured in the laboratory.
3. Its high cost compared to the products offered in the markets, in addition to the importance of this product in the local markets because it is used in daily life during the winter season.
4. This product can be divided into a group of specifications.

Third: product pricing

The pricing process of the 120-liter electric heater product is carried out through several stages, where the first stage begins when the Costs Division receives the work order, through which the production path of the 120-liter electric heater product is indicated according to the quantities and types of materials involved in production and the times necessary to complete the work and then the total cost of the product is calculated based on the cost elements that relate to the product as follows:

1. The Inventory Accounts Division determines the cost of direct materials by using the weighted rate method.
2. The direct labor share of the cost is determined by dividing the workers' salaries by the number of heaters produced.
3. Bearing the indirect industrial costs on the electric heater product based on the number of workers in the laboratory, the research sample.
4. Marketing and administrative costs shall be distributed on the basis of the ratio of each to the manufacturing cost of the product.

As for the second stage, through which an initial sale price for the electric heater product is determined with the addition of a profit margin to the total cost of one heater, which ranges from 10% to 25%, and then the proposed sale price that has been determined is sent to the marketing department for study and determination in accordance with the markets, and finally the process of approving the final sale price is carried out by the board of directors or modifying it based on the opinions provided by the marketing department and then approving it.

VI. APPLICATION OF COST TECHNOLOGY BASED ON SPECIFICATIONS ON THE PRODUCT OF ELECTRIC HEATER 120 LITERS

1. Study the reality of the market

In order for a particular product to be produced according to the wishes of the customer, an in-depth study of the reality of the market should be carried out, in order to obtain the necessary information that contributes to the identification of the wishes and requirements of the customer, which may enable the laboratory research sample to produce a product that achieves response to the wishes and requirements of customers and continuously.

2. Determine the basic specifications

Market research surveys conducted by the marketing department of the laboratory indicate that the specifications that the customer wants to provide in the product and that correspond to his requirements are as follows:

- a) A - Size: which means providing the heater product to the customer with a size of different areas to accommodate the amount of water.
- b) B. Performance: It represents the extent of the operational capacity of the electric heater, which is represented in the process of receiving, heating and transferring water to the user.
- c) C. Safety: which is represented by the rigidity and durability of the outer cover of the electric heater and the degree of protection included in the use of electrical insulators.

- d) d- Shape (aesthetic): which reflects the external appearance of the product as it is one of the motivating reasons that drive the customer

3. Determine the relative importance of each specification

In this step, the relative importance of each of the product specifications is determined by knowing the benefit, value and importance of these specifications to the customer in order for the laboratory to produce products of importance that suit the wishes and requirements of the customer, and therefore the customer must have a role in determining the relative importance of each of the specifications for the electric heater product 120 liters, and can also benefit from determining the relative importance of each specification in determining the cost of each of the specifications of each of the specifications of the electric heater 120 liters, and can also benefit from determining the relative importance of each specification in determining the cost of each of the specifications of each of the specifications of The product is especially related to the costs related to the decision. The researchers prepared a questionnaire that would contribute to achieving the above purpose, which was distributed to a sample of (60) individuals, where it included a group of customers, retailers and a number of engineers and technicians working in the laboratory of the research sample in order to survey their views on the importance of each of the specifications of the product for them as shown in the following table:

Table (1): The sample to which the questionnaire was distributed

Details	Number
Company's Engineering Staff	10
Retailers	20
Customers	30
Total	60

Table (1) shows the description of the sample selected by the researchers to which the questionnaire form has been distributed.

Where (56) questionnaires were retrieved from among the distributed forms.

Table 2 shows the results of the questionnaire reached by the researchers:

Specification	Relative Importance of Specification %
Size	34.7
Performance	28.7
Safety	28
Shape (Aesthetic)	8.6
Total	100%

Table 2: Relative Importance of Specifications

Source: Preparation of researchers (survey results)

The results of the resolution in table (2) indicate that the volume specification has obtained the highest percentage in terms of relative importance among the other three specifications of the electric heater product 120 liters, as it achieved a degree of relative importance of (34.7%), while the performance specifications came in the second degree of customer interest, while the standard of the form (aesthetic) obtained the lowest percentage where the percentage of importance reached (8.6%), which indicates that the customer may not focus on the form (aesthetic).

4- Analyze and determine the cost of each specification

In this step, the costs of each specification are analyzed and determined, and these costs are divided into four main types of agencies:

1- Costs related to the volume of production for each specification: The costs related to this element include everything related to the cost of the raw materials used in the production of each component part of the product and according to the relationship of the part or component to each specification of the product that was identified in the second step of (size, performance, safety, and appearance). The following table summarizes the costs related to the volume of production and the four specifications of the electric heater product 120 liters:

Table (3): Summary of costs related to the volume of production for each specification

Specification	Cost related to volume of production
Size	37559.694
Performance	17060.3713
Safety	44184.174
shape (aesthetic)	4044.775
Total	102849.0143

Source: Prepared by researchers

Table (3) indicates that the total cost related to the volume of production for 2021 is (102849.0143) dinars and that the highest cost was for the safety standard, which amounted to (44184.174) dinars, while the lowest cost was for the shape (aesthetic) specification, where it amounted to (4044.775) dinars.

2- The costs related to the activities for each specification: the costs related to the activities include two parts of the first costs, which is the direct labor costs. The second is the indirect

industrial costs (except for depreciation). Then the cost of this time is calculated. The following tables show the time required to complete each of the four specifications (size, performance, safety, and shape) of the electric heater product, noting that this time was determined based on the technological path of the electric heater 120 liters. Table (5) shows a summary of the time required to complete each specification **of the electric heater 120 product.**

Table (4): Summary of the total time required to complete each specification

Specification	Total Time/Minute	% Time Percentage
Size	104	51.4
Performance	20	10
Safety	56	27.7
Shape (Aesthetic)	22	10.9
Total	202	100%

Source: Prepared by researchers

Direct work costs for each specification: The laboratory of the research sample adopts a wage rate per hour of direct work of 3000 dinars, as the rate of pay per minute is equal to 50 dinars (3000 / 60) dinars / minute, so the process of

determining the share of each specification of the cost of work will be based on the time necessary to complete each of the specifications shown in Table (5).

Table (5): Labor Costs for Each Standard

Specification	Total Time Required for Each Specification/Minute	Pay Rate Per Minute	Labor Costs for Each Specification / In Dinars
Size	104	50	5200
Performance	20	50	1000
Safety	56	50	2800
Shape (Aesthetic)	22	50	1100
Total	202	-	10100

Source: Preparation of researchers based on Table(4)

It is noted from Table (5) that the Specification-Based Cost Technology (ABCII) has contributed to the achievement of a fair distribution of working times for the completion of each of the specifications, which has led to a reduction in the cost of direct work by (1500) dinars.

B- Indirect industrial costs (except extinction) for each specification: Indirect industrial costs (with the cost of extinction) for 2021 amounted to (1770.5) dinars, as the cost of the product will be excluded from extinction and the reason behind the exclusion of the cost of extinction is to be calculated within the paragraph of energy-related costs, while the process of determining the cost of extinction in the laboratory of the research sample is conducted based on the

available production capacity in accordance with the policy followed in the laboratory and through the following equation:

Share of one heater in the cost of extinction = annual cost of extinction of the heater department

Available production capacity

The cost of one heater product from extinction = 346799 = 578 dinars 600

So indirect industrial costs (excluding extinction) = 1770.5-578 = 1192.5 dinars.

Therefore, indirect industrial costs (except extinction) will be distributed among the specifications of the product and based on the time ratio previously specified in Table 5, as shown in Table 6:

Table (6): Indirect Industrial Costs (Except Extinction) Related to Electric Heater Specifications

Specification	F.O.H. (Except Dep.)	% Time Percentage	F.O.H. (Except Dep.) Specification
Size	1192.5	51.4	612.95
Performance	1192.5	10	119.25
Safety	1192.5	27.7	330.32
Shape (Aesthetic)	1192.5	10.9	129.98
Total	-	100	1192.5

Source: Preparation of researchers based on Table(4)

Table (6) shows the total indirect industrial costs (except extinction), as they were distributed to the specifications of the product through the process of multiplying indirect industrial costs by the percentage of time consumed, while table (7) shows the total costs of each of the specifications of the heater in relation to the activities.

Table (7): Costs related to each of the specifications of the heater in relation to activities for 2021

Specification	Labor Costs	F.O.H. (Except Dep.)	Activity Cost Per Specification
The Size	5200	612.95	5812.95
The Performance	1000	119.25	1119.25
Safety	2800	330.32	3130.32
Shape (Aesthetic)	1100	129.98	1229.98
The Total	10100	1192.5	11292.5

Source: Preparation of researchers based on both tables(5,6)

Table (7) shows the total costs related to the activities associated with each product specification where they were calculated by combining the cost of direct work with indirect industrial costs after excluding the cost of extinction from indirect industrial costs to be calculated later in the paragraph of energy-related costs.

3- Energy related costs: Energy related costs include the depreciation costs that were identified for the product unit in the previous paragraph, which amount to (578) dinars, and therefore the process of distributing it will take place on the basis of the percentage of time required to complete each product specification, which is shown in Table (8).

Table (8): Energy Associated Costs for each 2021 Standard

Specification	Heater deterioration costs	% Time percentage	Energy related costs per specification
Size	578	51.4	297.09
Performance	578	10	57.8
Safety	578	27.7	160.11
Shape (Aesthetic)	578	10.9	63
Total		100%	578

Source: Preparation of researchers based on Table (4)

Decision-related costs: The costs related to the decision include both marketing and administrative costs, which will be distributed on the basis of the relative importance of each product

specification. From this topic, Table No. (9) will show the costs related to the decision for each specification and for the year 2021, as follows:

Table (9): Costs related to the Resolution for 2021

Specification	Administrative And Marketing Costs of The Heater	Relative Importance %	Decision-Related Costs Per Specification
Size	8135.435	34.7	2822.995
Performance	8135.435	28.7	2334.87
Safety	8135.435	28	2277.92
Shape (Aesthetic)	8135.435	8.6	699.65
Total		100%	8135.435

Source: Preparation of researchers based on table (3)

Table (9) shows the process of calculating the costs related to the decision for each specification and for the year 2021 through the process of multiplying the marketing and

administrative costs by the degree of relative importance of each of the specifications of the product.

Table (10) summarizes the results extracted in each of the previous tables, which represent the amount of cost of each of the specifications of the electric heater product 120 liters, where the sum of the rows represents the total cost for each of the cost corrections related to (volume, activities, energy, and decision) and for all

product specifications (size, performance, safety, and shape), while the column representing the total cost of the specification represents the total cost of the electric heater product 120 liters, which represents the result of the application of the cost technology based on the specifications.

Table (10): Specification-based cost of electric heater 120 liters for 2021

Specification	COSTS RELATED TO VOLUME OF PRODUCTION	ACTIVITIES RELATED COSTS	COSTS RELATED TO ENERGY	COSTS RELATED TO DECISION	TOTAL COST OF THE SPECIFICATION
the size	37559.694	5812.95	297.09	2822.995	46492.73
the performance	17060.3713	1119.25	57.8	2334.87	20572.3
Safety	44184.174	3130.32	160.11	2277.92	49752.52
shape (aesthetic)	4044.775	1229.98	63	699.65	6037.40
Total	102849.0143	11292.5	578	8135.435	122854.95

Source: Preparation of researchers based on tables (9,8,7,3).

Fifth: Application of the target cost technology to the electric heater product 120 liters

Therefore, this paragraph will address the application of the steps of this technique, which are described below, and which have already been exposed to in the theoretical aspect, in order to complement the procedures for the integration approach between the ABCII and TC technologies and in a way that achieves the goal of the research through the following steps:

A. Determination of target profit

This step entails the process of determining the target price of the product by conducting an in-depth study of the local markets in order to investigate the sale prices of competing products offered in the market and similar to the 120-liter electric heater product of the laboratory research sample, and the researchers were able through conducting a field survey of the market to determine some of the sale prices of competing products similar to the product of the laboratory research sample and have reached the results shown in the following table:

Table (11): Sale prices of electric heaters 120 liters for competing products of the factory product Research sample

Product name	Manufacturer country	Price
Al-Amin heater	Iraq	25000
Heater of faith	Iraq	110000
mill heater	Iraq	125000
food heater	Iraq	95000
Prince heater	Iraq	120000
Ryan	Iran	90000

Source: Preparation of researchers based on the field survey of the market

Therefore, the target selling price of the electric heater product 120 liters represents the average sale price of competing products shown in the previous

table, which is 120,000 dinars, calculated as follows:

$$\text{Target Price} = 125000 + 125000 + 110000 + 120000$$

= 480000 IQD

B. Determine the target profit

The laboratory of the research sample wants to achieve a profit margin ranging from 10% to 25%, and as a result of the market conditions and the intense competition imposed on the 120-liter electric heater product by the competing products offered in the market, the researchers believe that choosing the minimum profit margin of 10% of the target selling price is one of the necessities of competition. Therefore, the target profit is calculated as follows:

$$\begin{aligned} \text{Target Profit} &= \text{Target Selling Price} \times \text{Target Profit Margin Ratio} \\ &= 120000 \times 10\% \\ &= 12000 \text{ IQD} \end{aligned}$$

c. Determine the target cost

After determining the target profit, the target cost of the electric heater product will be calculated in this step 120 liter by subtracting the target profit from the target sale price of the product and my agencies:

$$\begin{aligned} \text{Target Cost of Electric Heater Product} &= \text{Target Selling Price} - \text{Target Profit} \\ &= 120000 - 12000 \\ \text{Target cost} &= 108,000 \text{ IQD} \end{aligned}$$

c. Determine the target cost of each specification

After determining the target cost of the 120-liter electric heater product, the process of determining the target cost of each of the specifications of the above product, which was previously determined in the second step of the previous section, is carried out as shown in the following table: Table (12): Target cost per specification of the electric heater product is 120 liters

Specific ation	TARGET COST OF THE PRODUCT	THE RELATIVE IMPORTANCE OF THE SPECIFICATION %	SPECIFICATION TARGET COST
the size	108000	34.7	37476
the performance	108000	28.7	30996
Safety	108000	28	30240
shape (aesthetic)	108000	8.6	9288
the total	-	% 100	108000

Source: Preparation of researchers based on Table (2)

Table (12) shows the target cost of each of the specifications for the electric heater product 120 liters by multiplying the target cost by the ratio of relative importance of each of the product specifications shown in Table(2).

After determining the target cost of each of the product specifications, in this step the target reduction in the electric heater product of the laboratory is determined by the research sample and for each of its specifications as shown in the following table:

h. Setting the target reduction

Table (13): Target reduction in the electric heater product of the laboratory research sample and for each specification

Specification	THE CURRENT COST OF THE SPECIFICATION	SPECIFICATION TARGET COST	DIFFERENCE (GAP)
the size	46492.73	37476	(9016.7)
the performance	20572.3	30996	10423.7

Safety	49752.52	30240	(19512.52)
shape (aesthetic)	6037.40	9288	3250.6
the total	122854.95	108000	14854.95

Source: Prepared by researchers

Table (13) shows the difference between both the target cost and the current cost, which is a fundamental reason for the high price of the 120-liter electric heater product of the research sample, which led to a decline in demand for it in front of the competing products offered in the market, so appropriate solutions should be found to achieve the target reduction in the cost of the product of the laboratory heater research sample in order to reach the target cost and seek to sell the product at the target price, and the researchers believe that the target cost technology has a great impact in achieving the desired goal.

Sixth: Achieving the target reduction During this step, the purpose of achieving the target reduction of the current cost of the electric heater product is sought 120 liters in order to reach the target cost, as in this step one of the tools for the target cost is used, perhaps the most prominent of which in this regard is reverse engineering in order to reach the target reduction, which was exposed to in the theoretical aspect of the research.

reduction in the cost of electric heater 120 liters and according to the steps of this tool that, noting that the main reason behind choosing this tool over other target cost tools is because it clearly focuses on the component parts of the product, This may support the approach of integration between the two cost technologies based on specifications and target cost in a way that contributes to reducing costs in terms of working to meet the requirements of the customer, as the procedures for applying reverse engineering (dismantled analysis) directly depend on the analysis and dismantling of the competing product into its original components in order to facilitate the process of comparison between the constituent parts of a product of the research sample laboratory and between the component parts of the competing product, It should be noted in this regard that the researchers have chosen the competing product (Prince heater) to apply reverse engineering to it, because of the ease of obtaining the necessary information about this product,

VII. CONCLUSIONS

The inability of traditional cost systems to meet the requirements and objectives of the economic unit, as these systems do not have the

ability to provide accurate data that may help management in making decisions in light of the developments and changes that have occurred in the current business environment represented by modern globalization and intense competition, and this has led to the emergence of The so-called modern strategic cost management techniques.

1. The General Company for Electrical and Electronic Industries does not adopt any of the modern cost and administrative systems to calculate and manage costs for its products, as it relies on traditional cost systems in the process of recording and controlling costs, and this is what made the above company unable to keep pace with developments in the modern business environment and the low share market and its competitive position.
2. The cost is not classified under the cost system applied in the laboratory, the research sample in a way that supports administrative decision-making and the difficult competition conditions imposed on the laboratory during the current time.
3. The laboratory's adoption of the research sample in pricing its products on the traditional method (cost + profit margin), ignoring market considerations as well as selling prices of competing goods, which are low in relation to the prices of the research sample laboratory products.
4. The research sample lab needs to apply the two cost techniques based on specifications and depending on one of the target cost tools represented by reverse engineering, which will achieve excellence and superiority for the research sample lab products in terms of reducing cost, raising the level of quality, reducing response time, and achieving optimal use of resources in comparison With what the competitors produce, and thus the fusion of the target cost technology will be achieved successfully.
5. The (ABCII) technique analyzes and classifies the product into a set of basic specifications (size, performance, safety, and shape). And then you determine the cost of each specification of the specifications of the product.
6. The application of the reverse engineering tool is sure to support the integration approach

between the two cost technologies on the basis of specifications and target cost in a way that contributes to achieving the reduction in the cost of the product, fulfilling the requirements of the customer with the possibility of achieving high flexibility in the manufacture of products.

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