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THE ROLE OF ATTRIBUTE BASED COSTING SYSTEM (ABCII) IN IMPROVING PERFORMANCE: A CASE STUDY IN AL-AL-NARJES COMPANY FOR PIPE PRODUCTION

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Abstract:

Traditional cost and administrative accounting systems have become unable to cope with the changes of the modern business environment. This ultimately led to the weakening of the competitive and financial performance of economic units, which in turn led to the search for alternative techniques and methods to those accounting systems that are no longer able to develop and improve the performance of economic units. Therefore, this research aims to highlight the role of Attribute Based Costing System (ABCII) as a modern strategic approach to improve performance through the appropriate and comprehensive information provided by this technology. This is in order to help economic units to optimize the use of resources, choose the appropriate combination of production and calculate the most accurate cost of the product, which contributes to improving the operational, competitive and financial performance of Al-Al-Narjes Company for Pipe Production. This is done by using its cost and financial data and relying on field visits and interviews with the engineering and administrative staff of the company to apply Attribute Based Costing System. The results of the research showed that the application of ABCII technology leads to improving the competitive and financial performance of the company, and it is clear that the performance improvement by reducing the cost of the product by (21) dollars was when using traditional systems. The researchers recommended the need for the company to, in the production of pipes, rely on modern management and cost methods and techniques, including ABCII technology because of its great impact on improving performance

Keywords: Attribute-based cost, performance improvement

1. INTRODUCTION

The many criticisms of the traditional systems and methods of costs contributed to their inability to meet the needs and requirements of managing economic units administratively and costly. This has had negative effects on their operational performance and their competitive and financial performance as a result of transformations and changes in the modern economic and industrial environment. As a result, the search for systems, methods and technologies that are consistent and compatible with those transformations and changes in the economic and industrial environment has begun to ensure the improvement of operational performance with a high degree of efficiency and effectiveness to achieve financial and competitive stability for economic units. Therefore, many of these systems, methods and techniques have emerged. Including cost technology on the basis of specifications that analyze and measure the cost of products according to the specifications required by customers. Economic units seek to apply these specifications for the purpose of achieving optimal

World Economics & Finance Bulletin (WEFB)
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utilization of resources and choosing the appropriate combination of production and calculating the most accurate cost of the product to enable economic units. This is to improve their performance at the operational, competitive and financial levels. Thus, the research aims to apply attribute-based costing technology.

2. RESEARCH METHODOLOGY

Research problem: The research problem revolves around the suffering of economic units, including (research sample) of weakness in operational performance. This results from the failure to choose the appropriate combination of production, the lack of optimal use of resources and failure to calculate the most accurate cost of the product. Thus, it negatively affects the efficiency and effectiveness of its financial and competitive performance in terms of cost, quality, time, creativity and flexibility. Accordingly, the research problem can be formulated by indicating the role of attribute-based costing system ((ABCII) in improving the performance of the following questions:

1- Is there a role for ABCII costing technology in the optimal utilization of resources, the selection of the appropriate combination of production and the more accurate calculation of the cost of the product?
2- Is there a role for Attribute Based Costing System (ABCII) in improving the competitive and financial performance of the economic unit?

2.2 The Research Importance

This research derives its importance from the importance of identifying and allocating costs in a way that helps to improve operational performance by choosing the appropriate combination of production and optimal use of resources and accurate calculation of the cost of the product and thus its impact on the results of the company's business financially and competitively in a positive way.

2.3 Research objectives:

The research aims to identify the Attribute Based Costing System ((ABCII) and identify its role in choosing the appropriate combination of production, optimal use of resources, and more accurate calculation of the cost of the product, as well as a statement of the extent of the Attribute Based Costing System (ABCII) in improving the financial and competitive performance of the economic unit.

2.4 Research hypothesis:

In light of the problem and objectives of the research, the hypothesis on which the research is based has been formulated as follows:

The use of cost technology on the Attribute Based Costing System contributes to the selection of the appropriate combination of production, optimal utilization of resources and accurate calculation of the cost of the product, in order to ensure improved competitive and financial performance.

2.5 Research community and sample:

The research community is represented in the industrial sector in Iraq, and the research

Application sample is Al-Narjes Company for the production of plastic pipes UPVC pipe producer laboratory (25 mm \ 1.5 MM \ 10 BAR).

3. LITERATURE REVIEW

When reviewing the previous literature by the researchers, little, if any, has been done as regards the role of Attribute Based Costing System ((ABCII) in improving performance directly. However, there are studies that indirectly dealt with this topic including the following:

- (Al-Hajj, 2016) A study entitled (Modern methods of management accounting and their role in evaluating the efficiency of financial performance). This study concluded that the use of modern management accounting techniques contributes to the trade-off between the offered options leads to the rationalization of administrative decisions, through the adoption of the management of the facility on data and cost analysis. This is done by linking cost to performance as an input for measurement and evaluation in order to allow the provision of information necessary for proper evaluation, and the need to pay attention to technological developments in production and information systems to raise the efficiency of the financial performance of industrial establishments.

(AL-Mashkor et.al, 2020) A study entitled (The Importance of Using Attribute-Based Costing in Facility Management). This study concluded the importance of using Attribute-based costing in facilities management. This is achieved by highlighting methods for calculating costs, and determining the facilities

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Vol. 18, January 2023
ISSN: 2749-3628,

management's need for resources and how to utilize it optimally. This in turn contributes to a more accurate cost calculation based on specifications that meet the needs and desires of customers in a product that achieves their satisfaction, which is reflected in improving the competitive and financial performance of the economic unit.

The most important feature that distinguishes the current research from previous studies can be summarized as its focus on improving performance through the use of the ABCII technique through the optimal exploitation of resources, choosing the appropriate combination of production and more accurate calculation of the cost of the product. This is in order to ensure the achievement of sustainability and continuity of the dimensions of competitive advantage and thus reflects positively on improving the competitive and financial performance of the economic unit.

4. ATTRIBUTE BASED COSTING SYSTEM ((ABCII)

The first appearance of ABCII technology in thought accounting dates back to the beginning of the 1990s through Bromwich in 1990 by developing strategic management accounting, which may constitute a mechanism for determining the benefits that products provide to customers. Bromwich believes that the main reason for achieving competitive advantage is those benefits. Therefore, the product can be described as a set of specifications produced by economic units in a way that is stimulating and attractive to customers, which increases the demand for economic units products market (Al-Baldawi & Khamis, 2019, p. 251). Moreover, Walker stated that ABCII is an expansion of the ABC (Activity Based Costing) approach by providing appropriate and most useful information for the management decisions of economic units to improve their performance as a result of the use of ABC11. This latter system depends on the analysis of all cost aspects of activities and processes based on product specifications that meet the growing demand for appropriate information to the modern business environment, instead of relying on traditional cost systems (TCS) that have become unable to deal with changes in the modern business environment (Aziz et al., 2020, p. 2). Researchers have come up with several definitions of ABC11 technology, which were different in concept, but similar in principle. Sandborn (2017, p. 104) defined it as a method of measuring the cost of the product by determining the specifications of the product through cost guides, and then the costs related to these activities are determined on the basis of which the cost of the product is calculated. (Pirretti et al. 2020, p 32) also defined it as a cost approach that allocates costs based on activities according to product characteristics and specifications, with the aim of better measuring the cost of the product.

4.1 Objectives of Attribute-Based Costing Technology (ABCII)

ABCII technology seeks to help economic units achieve a set of the following goals: (Al-Shami et al., 2017, pp. 220-234; Nowlis & Simonson, 2018, pp.154-183).

A) Making products of high specifications and quality at the lowest possible cost in order to strengthen the competitive position of the economic unit.
B) Forming an accounting information system, in terns of both cost and administration to provide appropriate, objective and accurate information, to assist management in making decisions.
C) Achieving customer satisfaction by making products according to their needs and desires and according to the specifications specified by them and at the prices they accept.
D) Maintaining sustainable competitiveness of economic units.
E) Measuring the cost of the product more accurately by managing costs based on the specifications required by customers.

4.2 Steps of implementation of Attribute-Based Costing Technology (ABCII)

The steps to apply ABCII technology can be briefly defined as follows: Al-Quraishia & Al-Ghabban, 2020, p. 204)

First Step: Identifying the needs and desires of customers

Berry et al., consider that focusing on the needs and desires of customers is one of the parts of the core value chain as well as a key objective on which the competitive position of the economic unit is based (Berry et sl., 2000, p.74). On this basis, the economic units must pay attention to studying the needs and desires of customers carefully and with a clear

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Vol. 18, January 2023
ISSN: 2749-3628,

strategic methodology in order to provide data and information that contribute to predicting those needs and desires and labor to analyze, understand and determine product specifications. , This makes it easier to identify value-adding and non-value-adding specifications for the product from the customers' point of view.

Step Two: Determining a set of basic product specifications

The basic specifications of the product are the main goal for customers to obtain the product, as they represent the functions and benefits that customers obtain from it, which leads to satisfying their needs and desires and achieving their goals (Saeed, 2015, p. 143).). To determine the product specifications, MacMillan & McGrath classified them into three basic, distinctive and motivational levels. They have also been classified by Bromwich in terms of use into technical and service. To determine them, several methods are used, including the Conjoint Analysis, Application-Self method, and Value Engineering (VE) method (Hilton & Platt, 2020, p. 686).

Step 3 - Determining the relative importance of each specification.

After determining the basic specifications that constitute the main driver of customers' decisions in the acquisition of the product, it became possible to determine the relative importance of each specification for customers to determine what constitutes it in terms of technical and service value, so that the The company gives importance commensurate with the importance of customers when manufacturing the product (Al-Rubaie & Saad, 2018, p. 709).

Step 4 - Determining the activities and their costs to accomplish each of the specifications of the product.

The activities and processes necessary to accomplish each specification of the product specification are determined. The aim of this is to evaluate the performance measures of the activities and processes, and the extent to which each activity and process contributes to the value of the product. This is done in such a way that enables a distinction between activities and processes that add value and those that do not add value and how to dispose of them as unnecessary or necessary and are carried out inefficiently and ineffectively (Abdulrahman, 2020, p. 112). To determine the completion costs of each specification, they need to be first classified according to the causes of their change as follows: (Jasim et al., 2019, p. 8962).

- Costs related to production volume for each specification
- Activity-related costs for each specification
- Energy related costs for each specification
- Decision-related costs for each specification

Step five: Determining the cost of the product

Based on the results of the fourth step, the cost of each specification of the product is determined independently according to its levels of completion. This is in order that the total cost of the product can be determined and measured by adding the cost of each specification of the product specification (Al-Aguidi, (2019, p. 39).

Based on the foregoing, the researchers show that ABCII technology provides a

A detailed analytical study of how to produce the product and present it to customers in line with their needs and desires. This is operationalized by identifying the raw materials and their link ratios to each specification, and also determining the cost and time for each specification of the product specifications necessary to complete it to help reduce waste and loss of resources and contribute to the optimal use of resources .

5. IMPROVING THE PERFORMANCE

The concept of performance varies according to the different objectives of using this term. So, there are many concepts for this term. It has been defined by Naz et al., (2016, p. 82) as the performance of work, implementation, completion and achievement of specific tasks that can be measured against specific sets of accuracy, costs and timing. Numan (2017, p. 111) views performance as the outcome of the economic unit's ability to make optimal use of its material and human resources and direct it in a way that makes it able to achieve its required goals. The researchers define performance as the outcome of the actual implementation of the labor phases and the level of efficiency, effectiveness and effort of that implementation or in other words to achieve the objectives of the economic unit with the least possible costs.

5.1 Operational performance

World Economics & Finance Bulletin (WEFB)
Available Online at: https://www.scholarexpress.net
Vol. 18, January 2023
ISSN: 2749-3628,

Operational performance represents the essential indicator that reflects the ability of the economic unit and the extent of success achieved at the competitive and financial level. Hallgren & Olhager (2009, p. 983) performance is a concept to measure the degree of success of the economic unit in maximizing the use of productive resources available to produce and provide products or services to meet the requirements and desires of customers in terms of four main aspects, namely cost, quality, time, creativity and flexibility. The objectives of operational performance are reflected in the ability of the economic unit to stabilize its competitive and financial position by improving the performance of its operations, products and services by achieving the following: (Slack et al., 2019, p. 44):

a. Reducing the costs of producing products and services through more accurate cost management.
b. Achieving and gaining the satisfaction and loyalty of customers by providing products with high quality specifications and in a timely manner.
c. Continuing the process of creativity and flexibility with regard to product design and the process of pricing products or services.
d. The optimal use of material and human resources, which contributes to reducing waste and wastage of those resources.

The dimensions of operational performance are as follows cost, quality, time, creativity and flexibility.

6. PRACTICAL APPLICATION

6.1 Research sample: the company Al-Narjis Company for Pipe Production

This company is one of the private sector companies. It manufactures multi-purpose plastic pipes, including power line pipes, as the company's memorandum of association was issued based on the provisions of Article (19) of the Companies Law (21) of 1997 (as amended) with a certificate of incorporation number (12756) dated 10/21/2020 and with a capital of (100,000,000) one hundred million Iraqi dinars only. The headquarters of the company's management in Basra Governorate / Iraq. Al Narjis Pipe Production Company has obtained many quality and business development certificates according to international standards and specifications, including ISO 9001: 2015, and ISO 21138-1: 2020.

6.2 Application of ABCII technique to the research sample

Application of ABCII technology on UPVC pipe product (25 mm \ 1.5 mm \ 10 bar); one of the products of the research sample company (Al-Narjis for pipe production) to verify whether this technique can be actually applied through the following stages:-

First Step: Identify the needs and desires of customers

This step is accomplished by studying the market to determine the needs and desires of customers on the basis of which the product is offered UPVC pipe (25 mm / 1.5 mm / 10 bar) that meets those needs and desires.

Second step: Determining a set of basic product specifications

This step comes after the completion of the first step to determine the basic specifications of the product UPVC pipe (25 mm \ 1.5 mm \ 10 bar) which represents the drive and the main motivation for attracting customers for the product. After the researchers studied the company's product UPVC pipe (25 mm \ 1.5 mm \ 10 bar) through the use of some methods of joint analysis, self-interpretation, and value engineering, it turns out that the product contains four basic specifications, three of which are technical specifications and the other is service. These run as follows Size, Durability Design, Safety and reliablility,

Step Three - Determining the relative importance of each specification.

This step depends on what was determined from the basic specifications of the
product in the previous step, and can benefit from determining the relative importance according to the opinions of customers for each of the product specifications. This is in order to give the company importance commensurate with the importance of customers for those specifications when manufacturing the product. It can also benefit from determining the relative importance of each specification in determining the share of each specification of costs. The researchers designed a questionnaire with a number of (75) forms distributed to the target parties that use this product such as customers, retailers and construction companies, in order to poll their opinions on the importance of each specification of the UPVC pipe product specifications (25 mm / 1.5 mm / 10 bar). The researchers designed the questionnaire by

World Economics & Finance Bulletin (WEFB)
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Vol. 18, January 2023
ISSN: 2749-3628,

giving each item a relative weight representing the degree of relative importance of each specification of the UPVC pipe product specifications (25 mm \ 1.5 mm \ 10 bar) for the sample. The results of the collected questionnaire forms can be clarified and analyzed to determine the total weight and the relative importance of each specification of the UPVC pipe product specifications (25 mm \ 1.5 mm \ 10 bar) in Table (1) below

Table (1): Weighted sum and relative importance of each UPVC pipe product specification

Specifications	1	2	3	4	5	6	7
	very important(5)	important (4)	kinda (3)	Unimportant(2)	Not so important(1)	Weighted Sum ((5*1)+(4*2)+(3*3)+(2*4)+(1*5))	Relative importance of specifications %(5/total)
Size	73	2				373	0.29
Durability	45	20	10			335	0.26
the design	15	20	30	10		265	0.21
Safety and reliability	30	27	18			312	0.24
Total						1285	100%

Source: prepared by the authors

The fourth step: Determining activities and their costs to achieve each product specification.
First: Determining the materials, activities and production stages associated with each specification

World Economics & Finance Bulletin (WEFB)
Available Online at: https://www.scholarexpress.net
Vol. 18, January 2023
ISSN: 2749-3628,

Table (2) Materials and production stages associated with each UPVC pipe product specification.

NO	Materials	Specifications			
		safety (reliability)	the design	Durability (thickness, durability)	Size (diameter, weight)
1	Raisen Al-Ghadeer (pvc)			30%	70%
2	calcium carbonate		30%	40%	30%
3	Thermal stabilizer	50%	30%		20%
4	Titanium		20%	65%	15%
5	stearic acid	20%	60%	10%	10%
6	CPEIM888		20%	75%	5%
7	Process Sync	50%		50%	
8	Wax	50%	50%		
9	white dye (flowered)		95%		5%
10	Sticky tape	100%			
11	Packaging materials (nylon bag)	80%			20%
Activities and production stages					
1	manual mixing stage				100%
2	fracture stage			20%	80%
3	heating stage (oven)			50%	50%
4	template stage		40%	30%	30%
5	cooling stage		50%	50%	
6	printing stage		100%		
7	withdrawal phase		80%	20%	
8	shredding stage		80%		20%
9	Formation stage		100%		
10	Quality check	60%	20%	20%	
11	Packaging	95%			5%
12	Complete production store	50%	50%		
13	processing to customers	100%			

Source: prepared by the authors based on interviews with the director of the production department and engineering staff within the company

World Economics & Finance Bulletin (WEFB)
Available Online at: https://www.scholarexpress.net
Vol. 18, January 2023
ISSN: 2749-3628,

Second: Determining the total cost of each specification

After the correlation ratios of materials, activities and production stages have been determined for each specification as shown in Table (2), it is now possible to determine the total cost of each specification of the UPVC pipe product specification (25 mm \ 1.5 mm \ 10 bar) by calculating its share of the following costs:

1) Determining the costs associated with the volume of production for each specification.
2) Determining the costs associated with the activity for each specification.
3) Determining the energy-related costs of each specification.
4) Determining the costs associated with the decision for each specification.

1) Determining the costs associated with the volume of production for each specification

The costs associated with the volume of production include all the costs of raw materials spent on producing one ton of UPVC pipe product (25 mm / 1.5 mm / 10 bar). These are listed according to the correlation ratios shown in Table (2) for those materials with each of the product specifications represented in size (diameter, weight), durability (thickness, durability), design, safety and reliability, as shown in the following tables.

Table (3): Costs associated with the volume of production of the volume specification for the production of one ton of UPVC pipe

Raw materials	1	2	3	4	5	6
	Measurement	Quantity	The percentage of material for each attribute	The quantity associated with the attribute (2 * 3)	Weighted price	Amount in dollars (4 * 5)
Ghadeer Resin (pvc)	**Kg**	**680**	**70%**	**476**	**2.00 $**	**952.00 $**
Calcium carbonate	**Kg**	**180**	**30%**	**54**	**0.16 $**	**8.64 $**
Thermal stabilizer	**Kg**	**25**	**20%**	**5**	**2.000 $**	**10.00 $**
Titanium	**Kg**	**10**	**15%**	**1.5**	**3.850 $**	**5.78 $**
Stearic acid	**Kg**	**2**	**10%**	**0.2**	**4.000 $**	**0.80 $**
CPEIM888	**Kg**	**1**	**5%**	**0.05**	**2.540 $**	**0.13 $**
White dye (flowered)	**Kg**	**1**	**5%**	**0.05**	**32 $**	**1.60 $**
Packaging materials (nylon bag)	**Kg**	**25**	**20%**	**5**	**1.50 $**	**7.50 $**
					Total	**986 $**

Source; Prepared by the authors

The costs associated with the volume of production are found in the same way for the specifications of durability, design, safety and reliability. Table (4) summarizes the share of each specification of the UPVC pipe product (25 mm / 1.5 mm / 10 bar) of the costs associated with the volume of production. This includes the costs of all raw materials that have been disbursed according to the German specifications DIN 8061 \ 8062 to produce one ton of UPVC pipe product (25 mm \ 1.5 mm \ 10 bar) as well as according to the weighted price rates for those materials

World Economics & Finance Bulletin (WEFB)
Available Online at: https://www.scholarexpress.net
Vol. 18, January 2023
ISSN: 2749-3628,

Table (4): Summary of costs associated with production volume for each specification for the production of one ton of UPVC pipe product.

NO	specification	Costs associated with production volume for each specification (dollar amounts)
1.	Size (diameter, weight)	$986
2.	Durability (thickness, durability)	$449
3.	the design	$68
4.	safety (reliability)	$75
	Size (diameter, weight)	$1,578

Source: Prepared by the authors

2) Determining the costs associated with the activity for each specification

The costs associated with the activity include both labor costs and indirect industrial costs (after depreciation). Using ABCII technology, the researchers identified several steps to calculate more accurately the costs associated with the activity for each specification (labor costs and indirect industrial costs) through the following:

A. Determining the labor costs for each specification

The labor costs of each specification are determined by determining the time of activities and production stages necessary to complete each specification and then determining the cost of labor for each specification according to that time, and this is shown in the following tables:

Table (5): Time required for activities and production stages to complete the size specification

Activities and production stages	1	2	3	4	5
	Responsible section	Time required for each production stage (in minutes)	time ratio for each specification	Number of employees	Total time / in minutes (2 * 3 * 4)
Manual mixing stage	Production	17	100%	1	17.0
Breaker stage	Production	20	80%	1	16.0
Heating (oven) stage	Production	25	50%	1	12.5
Template stage	Production	123	30%	1	36.9
Shredding stage	Production	20	20%	1	4.0
Packaging	Production	28	5%	1	1.4
Total					87.8

Source: Prepared by the authors based on observation and field calculation and according to Table (2)

The time required for the activities and production stages to complete the remaining specifications is determined in the same way as that for the size specification. Also, the previous times required to complete each specification of the UPVC pipe product specification (25 mm \ 1.5 mm \ 10 bar) can be summarized in the following table

World Economics & Finance Bulletin (WEFB)
Available Online at: https://www.scholarexpress.net
Vol. 18, January 2023
ISSN: 2749-3628,

Table (6): Summary of the total time required to complete each UPVC pipe product specification

NO	specification	Time % per specification	Total time / in minutes
1	**Size (diameter, weight)**	**24%**	**87.8**
2	**Durability (thickness, durability)**	**20%**	**72.7**
3	**the design**	**41%**	**148.9**
4	**safety (reliability)**	**15%**	**56.6**
	Total	**100%**	**366**

Source: Prepared by the authors

According to Table (6), the labor costs of each specification, which represents one of the costs associated with the activity, can be calculated on the basis of the time required for each specification and the rate of wage per minute, as shown in Table (7) below:

Table (7): Labor costs required to complete each UPVC pipe product specification.

	1	2	3	4
No	Attribute	Average wage per minute ($/minute)	Total time per minute	Labor costs per attribute (in dollars(2*3)
1.	(Size (diameter, weight	0.56 $	87.8	49.2 $
2.	Durability (thickness)	0.56 $	72.7	40.7 $
3.	Design	0.56 $	148.9	83.4 $
4.	Safety (reliability)	0.56 $	56.6	31.7 $
	Total		**366**	205 $

Source: Prepared by the authors

B. Determining the indirect industrial costs of each specification

Indirect industrial costs, including depreciation, represent 40% of the labor costs as shown in the table, which is $82. The costs of depreciation must be excluded from indirect industrial costs per ton of UPVC pipe product (25 mm / 1.5 mm / 10 bar), which is $33, so that the remaining indirect industrial costs for each specification are charged on the basis of relative importance, which is $49. Table (8) shows a summary of the total costs associated with the activity for each specification as follows:

Table (8): Summary of the total costs associated with the activity for each specification of the UPVC pipe product

No	1	2	3	4
	Attribute	Labor costs per attribute	indirect industrial costs for each attribute (except for depreciation	Activity-related costs for each attribute (2+3)
1.	(Size (diameter, weight	49.2$	14.2 $	63.4 $
2.	Durability (thickness)	40.7 $	12.8 $	53.5 $
3.	Design	83.4 $	10.1 $	93.5 $
4.	Safety (reliability)	31.7 $	11.9 $	43.6 $
	Total	205$	49 $	254 $

Source: Prepared by the authors.

3) Determining the energy-related costs of each specification.

Energy-related costs include the share incurred by the annual depreciation costs of $33 on the cost of producing one ton of UPVC pipe product (25 mm \ 1.5 mm \ 10 bar). These costs are calculated on the basis of the percentage of time required to complete each specification of the product rather than on the relative importance of each specification. The purpose of this is to give greater accuracy in charging each specification with its share

World Economics & Finance Bulletin (WEFB)
Available Online at: https://www.scholarexpress.net
Vol. 18, January 2023
ISSN: 2749-3628,

of the annual depreciation cost that is charged to the cost of its production as energy-related costs, for which time is one of the main drivers of those costs. Table (9) shows a summary of the costs associated with energy represented by the depreciation costs charged to each specification, as follows:

Table (9) Summary of energy-related costs for each UPVC pipe product specification

	1	3	2	4
NO	**specification**	**obsolescence costs**	**percentage of time required to accomplish Each specification (in minutes)**	**Energy related costs per specification (2 * 3)**
1	**Size (diameter, weight)**	**$33**	**24%**	**$8**
2	**Durability (thickness, durability)**	**$33**	**20%**	**$7**
3	**the design**	**$33**	**41%**	**$13**
4	**safety (reliability)**	**$33**	**15%**	**$5**
Total		**100%**		**$33**

Source: Prepared by the researchers based on Table (6)

4) Determining the costs associated with the decision for each specification

The costs associated with the decision include both the administrative and marketing costs incurred by the company at a rate of 6% of the total industrial costs per ton of UPVC pipe product (25 mm / 1.5 mm / 10 bar) amounting to 112 dollars. These costs are charged for each specification of the product on the basis of the relative importance of each specification and as shown in the following Table (10) as follows:

Table (10) Summary of costs associated with the decision for each UPVC pipe product specification

	1	3	2	4
NO	**specification**	**The share of one ton of a pipe product UPVC administrative and marketing costs**	**The relative importance of each specification %**	**Energy related costs per specification (2 * 3)**
1	**Size (diameter, weight)**	**$112**	**0.29**	**$33**
2	**Durability (thickness, durability)**	**$112**	**0.26**	**$29**
3	**the design**	**$112**	**0.21**	**$23**
4	**safety (reliability)**	**$112**	**0.24**	**$27**
Total			**100%**	**$112**

Source: Prepared by the authors based on Table (1)

Step Five - Determining the cost of the product

After completing the previous four steps, the fifth step of applying ABCII technology to determine the total cost of the product is achieved through the Partridge & Perren matrix. This matrix shows the cost of each specification of the UPVC pipe product specification (25 mm \ 1.5 mm \ 10 bar) related to the four costs previously shown in Tables (10,9,8,4) to determine the total cost of each specification of those costs, thus, the cost of the product based on

World Economics & Finance Bulletin (WEFB)
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Vol. 18, January 2023
ISSN: 2749-3628,

those specifications, which represents the current cost of the product UPVC pipe (25 mm \ 1.5 mm \ 10 bar), is determined by the company according to the requirements and desires of customers as shown in Table (11) below:-

Table (11): Current cost based on specifications for UPVC pipe product

No	1 Attribute	2 Production volume costs per attribute	3 Activity-related costs per attribute	4 Energy related costs per attribute	5 Costs associated with the decision per attribute	6 The total cost per attribute (2+3+4+5)
1	Size (diameter, (weight	986 $	63.4 $	8 $	33 $	1,090 $
2	Durability (thickness)	449 $	53.5 $	7 $	29 $	538 $
3	Design	68 $	93.5 $	13 $	23 $	198 $
4	Safety (reliability)	75 $	43.6 $	5 $	27 $	151 $
	The total cost of a tube product UPVC(25 mm \ 1.5 mm \ 10 (bar	1,578 $	254 $	33$	112 $	1,977 $

Source: Preparation of researchers based on tables (4, 8, 9, 10)

The table displays a comparison between the cost of producing one ton of UPVC pipe (25 mm / 1.5 mm / 10 bar) according to the traditional system, which was at the amount of (1,998) dollars. On the other hand, the cost of producing one ton of the product and according to the cost technique based on specifications (ABCII) which represents the current cost of the product as in Table (11) was at the amount of (1,977) dollars. The comparison shows that the cost of producing one ton of UPVC pipe (25 mm / 1.5 mm / 10 bar) decreased by (21) dollars. Also, the comparison shows the time required to produce a single ton of product according to the standard system (440) minutes while the time required to produce one ton of product and according to ABCDI as in Table (7) is estimated to be 366 minutes . This shows a decrease in the required time in (74) minutes. Table (12) illustrates the detailed differences between the use of conventional systems and the use of ABCDI by the company and the role in improving the operational performance of the optimal exploitation of resources, the choice of the appropriate synthesis of production and the accurate calculation of the product cost. Thus, this is positively reflected on the improvement of competitive and financial performance

Table (12): the difference between Conventional Systems and Cost Based Technology (ABCII).

NO	comparison items		1 measuring unit	2 traditional systems	3 ABCII Technique	4 differences (3-2)	5 decrease or increase
1	current cost to produce One ton of extruded tube	The cost of raw materials	dollar	1578	1578	0	0
		Other costs (labor, indirect industrial, administrative	dollar	420	399	$21	drop

World Economics & Finance Bulletin (WEFB)
Available Online at: https://www.scholarexpress.net
Vol. 18, January 2023
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	UPVC(25 mm \ 1.5 mm \ 10 bar	and marketing costs)					
	Total cost difference		dollar	1,998	1,977	$21	drop
2	The current time required to produce one ton of pipe product UPVC(25 mm \ 1.5 mm \ 10 bar) The difference between standard and actual time	Size specification time (diameter, weight)	minute	102.5	87.8	14.7	drop
		Durability specification time (thickness, durability)	minute	66.8	72.7	-5.9	more
		design specification time	minute	180	148.9	31.1	drop
		Safety specification time (reliability)	minute	90.8	56.6	34.2	drop
	The total time difference		minute	440	366	74	drop

Source: Prepared by the authors

The results of the table above show the achievement of the objectives and validity of the research hypothesis, as a result of what the application of (ABCII) technology provides to the company's management of a comprehensive vision. It also provides a clear picture of how to improve operational performance by choosing the appropriate combination of production and optimal use of resources in terms of determining the areas of cost disbursement and time use in detail and accurately and calculating the most accurate cost of the product. Thus, it helps to identify areas of waste and loss of costs and time to address them in a manner commensurate with the importance of costs and time for customers. It also attaches importance to customers' views on product specifications that conform to their needs and desires. This conformity relates to reducing the cost and time of production and delivery of the product and taking the requirements of the specifications and quality required for the product, and flexibility and creativity in the designing, developing and pricing of the product. Thus, this leads to improving operational performance and supports the stability of the competitive and financial position of the product.

7. CONCLUSIONS AND RECOMMENDATIONS

The application of ABCII technology has been proven to reduce the current cost of production per ton of UPVC pipe (25 mm / 1.5 mm / 10 bar) by (21) dollars. This is shown in the amount which was (1,998) according to traditional systems (standard) while it decreased to (1,977) dollars after applying ABCII technology. The application of ABCII technology has also been proven to reduce the time required to produce one ton of product by (74) minutes. According to the traditional systems (standard), it was (440) minutes, while it became (366) minutes when applying ABCII technology. Thus, this is reflected in improving operational performance, which leads to improving the competitive and financial performance of economic units. The researchers recommend the need for the company's adoption of the research sample on modern administrative and cost-effective methods and techniques, including ABCII techniques. This is because of the latter's significant impact on improving

World Economics & Finance Bulletin (WEFB)
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performance to ensure the stability of the competitive and financial position of the company, and to increase the contribution of (ABCII) technology in improving the performance of economic units. This provides an important entrance to integrating with strategic cost management techniques, including TC technology, in order to raise efficiency and effectiveness and activate its impact in improving operational performance to ensure greater competitive and financial performance. This is because of the latter's significant impact on improving performance to ensure the stability of the competitive and financial position of the company, and to increase the contribution of (ABCII) technology in improving the performance of economic units. This provides an important entrance to integrating with strategic cost management techniques, including TC technology, in order to raise efficiency and effectiveness and activate its impact in improving operational performance to ensure greater competitive and financial performance. This is because of the latter's significant impact on improving performance to ensure the stability of the competitive and financial position of the company, and to increase the contribution of (ABCII) technology in improving the performance of economic units. This provides an important entrance to integrating with strategic cost management techniques, including TC technology, in order to raise efficiency and effectiveness and activate its impact in improving operational performance to ensure greater competitive and financial performance

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