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Accounting Analysis Of Product Life Cycle Costs Directed At Continuous Improvement And Its Role In Reducing Costs Applied Research In Nasr General Company For Mechanical Industries

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Abstract. *The product life cycle was first used in US Department of Defense military matters, where it applied mainly to DoD procurement of military equipment. Its use has expanded by companies operating in various sectors, such as building and construction, machinery and equipment manufacturing, and other industries that require high costs, and the life cycle of their products is relatively long and has clear stages, as the complete product life cycle mainly covers the costs of research, experimentation, acquisition, maintenance, transportation, and storage, and that the essence LCC is not only the running cost, but also the cost related to the product.The research at Nasr General Company for Mechanical Industries aims to shed light on two main tools of contemporary cost management that work to calculate the cost of the product over the product life cycle and make improvements to it continuously according to the continuous improvement technique. Thus, they work appropriately to reduce product costs and the costs are calculated according to The accounting system prepared in the company under investigation..*

Keywords: *product life cycle costs, continuous improvement, reducing costs, Research Methodology*

introduction

Traditional accounting procedures have neglected pre-manufacturing costs (such as product design, research and development) as well as post-manufacturing costs (such as disposal and completion costs). Therefore, the old systems focus primarily on the costs that occur in the manufacturing stage, while the pre- and post-manufacturing costs Manufacturing deals with duration costs. These costs are included in calculating the cost of production when following traditional management accounting control procedures. On the other hand, LCC takes the total life cycle of the product into consideration when estimating and grouping costs in order to determine whether the revenues collected during the manufacturing stage will cover the total costs incurred. During all stages of manufacturing (Drury, 2006: 430).

1- Research problem

The nature of the accounting systems used in industrial companies is (traditional) systems that work to determine the costs of the production stage without the other stages through which other processes pass, which leads to burdening the final product with unnecessary costs that do not add value to the product. The research problem can be formulated as follows:

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- Does continuous improvement technology lead to the exclusion of activities that do not add value in calculating production costs and reducing product costs through the product life cycle?

2- The importance of research

The importance of the research is based on its reliance on some contemporary cost and management techniques represented by (the product life cycle and continuous improvement), which are as follows:.

B- The research is concerned with raising the level of operational performance and reducing product costs.

C- The research analyzes the product life cycle and diagnoses activities that do not add value to the product, which contribute to raising performance and reducing costs through the use of continuous improvement technology.

3- Research objective

The research objectives can be defined as follows: -

A- It aims to apply contemporary cost and management techniques, represented by (product life cycle and continuous improvement) with the aim of reducing costs without compromising product quality.

B - It aims to identify activities that do not add value, exclude them, eliminate or reduce their costs, and then reduce their role in draining resources.

C - It aims to clarify the relationship between the production stages during the application of the product life cycle in order to make improvements to it.

4- Research hypothesis

The research is based on a basic hypothesis that says ((the use of continuous improvement procedures during the product life cycle leads to reducing costs without compromising the quality of the product according to the data of the accounting system applied in the researched company))

5- Spatial boundaries

Applied research at Nasr General Company for Mechanical Industries in Baghdad / Al-Taji

6- Temporal boundaries : Accounts2020

The first topic: product life cycle costs

first: The concept of product life cycle costs (LCC):

Bradford defined product life cycle costing (as a method of costing that looks at the entire production value chain from a cost perspective), while other types of costing systems

look at the production process only, while LCC tracks and evaluates costs from the research and development stage of the product's life until After-sales service costs.

On this basis, LCC offers a different way of looking at total costs than other costing systems such as the production order costing system, production stage costing system, and ABC. While these systems appear similar, LCC stands out from this crowd in that it adopts a completely different point of view than Other types of cost systems, as finding a way to calculate production costs represents the essence of business in a world of intense competition. (Luis, J., Maldonado,2017:78).

Bodie defined the product life cycle (as the period during which the product remains in the market). This simplified definition reflects a marketing and revenue planning point of view, but it does not include the effect of product innovation as well as the effect of product disposal on the profitability of the product life cycle, because the essence of LCC is to look at the product life cycle for the period that falls between the birth and the end of the product from the market.

Determining the moment of the birth and completion of the product is not completely clear, as the initial idea for the product does not represent the date of the product's birth, and is sometimes attributed to years and even decades prior, and even if there are some drawings or plans for a specific project, it is extremely difficult to trace them, and the original or experimental model represents the first incarnation. For a new product. (Bodie, et., 2008: 11).

Some have defined it as the sequence of stages of a product's life in the markets, which begins with introducing the product to the markets, then the stage of growth in sales, and finally the stage of maturity, decline, and withdrawal of the product from the markets. (Blocher, et.,al.,2010:549)

It is also the period of time that the product passes from the research and development stage to the stage in which services and support are provided to the customer. (Kotler,2018:17)

Second: product life cycle costing framework LCC

Based on the international standards for product life cycle costs prepared by the International Electrotechnical Committee, the LCC includes costs that occur in several stages, such as the emergence of the idea, feasibility study, design, development, manufacturing, installation, operation, maintenance, and disposal.

The total costs can be calculated by summarizing the costs related to each stage and on the basis of that, dividing the product's life cycle into the following (Zhu& Huan, 2009:90)

1- PC Purchase Cost

2- OC Ownership Cost

3- DC Disposal Cost

This can be expressed by the following equation:-

LCC = p C + O C + D C

Third: The importance and objectives of product life cycle costs:

Many writers have emphasized that LCC does not stray far from the issues resulting from the intense competition between companies, whether at the local or global level, as attention to the entire product life cycle has become a major issue in most industries, especially the construction industry and major industries, so that the use of LCC enables Determining the costs of construction, operation, disposal, etc., and it is also used as a basis for controlling and managing costs over the life of the product, because the basic and important thing is that LCC can be implemented during any stage of the product life cycle, and its information can be used as input for decisions related to product design and manufacturing. Installation, operation, support, and disposal. Also, decisions taken early in the product life cycle have a greater impact on LCC than those made late in the product life cycle and lead to the development of the concept of discount costs. (Lucie,Sychrova: 8).

Based on this importance, a basic goal can be set for product life cycle costs, with emphasis on the primary goal is to evaluate and improve LCC and provide methods to assist in the decision-making process at all stages of the product's life. .(Bradford, 2010:33).

Examples of this include (. (Kotler,2018:28):

1- Evaluation and comparison of alternative design approaches.

2- Study the economic feasibility of the project or products.

3- Determine cost drivers and costs of effective improvements.

4- Evaluating and comparing alternatives related to the use of production, operation, testing, inspection, maintenance, etc.

It is clear to us that LCC represents a comprehensive technology for everything related to the product, asset or service from its inception until it leaves the market or (from cradle to grave), and for the purpose of tracking all the details of the life cycle of the product, asset or service, the economic unit and its accounting system must be prepared for that. In advance in terms of the accounting system's ability to provide detailed and timely information at each stage of the product life cycle. Determining the costs occurring during the various stages of the product's life cycle provides an understanding and ability to manage the cost during its life cycle, as LCC helps management determine effective locations. In this regard, Drury confirms that most accounting systems monitor and submit production and profit reports on a per-period

basis and not on a per-period basis. The basis of the total life cycle, and writing reports on the product life cycle includes tracking costs and revenues on the basis of production and production during the product life cycles, thus covering multiple calendar periods. Failure to do so prevents management from understanding the profitability of the product, because the actual life cycle profit of the product Unknown and inaccurate feedback information may be obtained through the success or failure of developing a new product. Because the important proportion of costs occurs in the design and production planning phase, cost management can be practiced effectively in this early phase and not in the manufacturing phase when production design processes take place. To complete it, the costs have been determined and clarified, as in the manufacturing stage, the focus is more on containing costs than on cost management (Drury, 2006: 430).

Fourth: Stages of the product life cycle.

The writer (Rayburn) explained that in light of modern technology, costs increase as a percentage of the total costs of the product, as the costs of the product's life cycle may be about (70% - 80%) committed costs and are contracted at the design stage, so accountants are interested in In the early stages of the product life cycle because the planning, research, development and design stages are usually ignored when analyzing the product life cycle.(Atkinson,A,K,2007:21)

Traditional costing systems focused only on the stages of maturity and completion of the product life cycle, so Rayburn suggested that the product life cycle should be expanded to include the costs of the planning, design and preparation stages for production as well. The most important stages of product life cycle costs according to modern systems are (Rayburn1996: 139-140).

1- Planning stage.

Planning is an important and vital element for the success of industrial facilities in order to be able to produce products of the required quality that are accepted by customers. At this stage of the product life cycle, initial specifications are determined, product design schedules are set, production and marketing activities are determined, selling prices and sizes are set, as well as the target cost of the product is determined. Through it, managers try to find ways to reduce costs by redesigning the product, and studying the established value chain and its relationship to everything. From the value chain to suppliers and the value chain to consumers. The design team uses value analysis to achieve the function of the product or service at a lower cost. When using target costing, management can confirm cost reduction efforts before the engineers finish setting the specifications and final design of the product. (Bradford, 2010:38).

2- Design stage.

Design is an activity that becomes increasingly important in an organization in the event of competition and continued survival.

Controlling external competition provides a strong reason to shift from the need for good accounting information to supporting the design and development phase.

Burch emphasized that design is an essential part of the facility's production process, as the cost management and design teams work together to develop the design mechanism more effectively for profitability. (Compt, H.,2009:35).

3- Production stage:

During this stage of the product life cycle costs, the production process is designed in light of the target cost approach, and detailed cost estimates are prepared to determine whether preparation for production is within the target cost limits or not.

At this stage, most of the product costs occur and include (Krajewski, & Mahatma,2010:55).

A. Costs of acquiring materials needed for production.

B. Costs of preparing the machines needed to produce the products.

C. The costs of assembling the product parts and the costs of manufacturing it.

4- Sales and customer service stage:

In fact, this stage of the product life cycle costs begins as soon as the facility delivers the products to customers, and companies must satisfy the desires and needs of consumers and obtain information from the methods that lead to product improvement and development. (Compt, H.,2009:36).

Fifth: The motives that called for analyzing and measuring costs during the product's life cycle:-

There are many factors that called for analyzing and measuring cost during the product's life cycle, and they can be presented as follows: (Blocher, et.,al.,2010:552)

a. Increasing the impact of inflation during the product life cycle.
b. The increasing importance of rationalization considerations for the cost elements that are used and incurred.
c. The increasing importance of maintenance costs, especially associated with after-sales emergency maintenance.
d. Increasing intensity of competition in the modern production environment.
e. Increase in production cost elements, especially products that enjoy modern technological advantages.

f. Recent developments in production technology have led to the emergence of modern, high-technology goods, which gives importance to the increasing need to apply a cost system during the product's life cycle.
g. The occurrence of continuous developments, and what this requires of working to maximize the added value of the facility by supporting activities that achieve added value, which necessitated the necessity of determining the cost of the product during its life cycle.

Summary of product life cycle costs:

The researcher believes that the contemporary method of determining the cost of a product requires determining the costs of its life cycle from the beginning of research and development and ending with after-sales services, and that analyzing these activities contributes to reducing costs by identifying activities that do not add value and working to integrate them with other activities..

The second top: continuous improvement

First: Definition of continuous improvement

Some definitions will be included for researchers in continuous improvement, the most important of which are:

Source	the definition
Kaplan,2004; 297	Through gradual and incremental improvement of operations and not radical change, which leads management to tend towards paying attention to details and parts instead of paying attention to the comprehensive production system.
Hilton,,2008:130	Continuous improvement is taking continuous steps that include every individual, managers and workers alike, and improves the level of work through gradual improvements.
Horngren , 2009 ; 317	Continuous improvement is an unwavering commitment to progress and is part of the organization's culture as a guiding force for the pursuit of quality
Harold, Lother,2010:23	Continuous improvement is the conduct of sequential, sequential and continuous processes that seek to make simple and incremental changes over a long period to improve the efficiency and quality of the product and eliminate any aspect of loss in the facility's material, human and financial resources.
Chu,Lu Binnin,2016:158	Continuous improvement is one of the tools of management accounting and can be considered the lifeblood of the company as it revitalizes both production processes and administrative procedures and helps in solving any future problems that obstruct the company's work by overcoming past

	mistakes and at a continuous and increasing pace with the participation of all employees.

Second: The concept of continuous improvement

Continuous improvement is considered a management philosophy that aims to work on continuously developing processes and activities related to machines, materials, individuals, and production methods. It is also one of the pillars of the comprehensive quality management methodology, which requires the support and encouragement of senior management through appropriate material and moral incentives. It is the responsibility of management to provide the requirements for success. Continuous improvement efforts.

The President's goal for continuous improvement is to reach complete or almost complete mastery in the future through continued improvement in the productive processes of the economic unit. The process of complete mastery is a difficult goal to achieve, but efforts must be made to reach it. (Dalshi Chung,2012:111)

Third: The Importance of Continuous Improvement

The process of continuous improvement within the framework of quality and performance focuses on raising the level of customer satisfaction through continuous and incremental improvements to processes, including the elimination of unnecessary activities. Achieving higher levels of performance requires a continuous improvement approach, that is, improvement in successive steps (Douglas Helman, 2007:54).

The importance of continuous improvement is highlighted by the following: (Thundry, Thom's,2014:15)

1. Process improvement focuses on the concept of customer satisfaction, which is the company’s goal.
2. Focus on suppliers (suppliers) and end users (customers).
3. Knowing customers’ expectations drives the improvement process forward.
4. Each main work can have several processes branch out from it.
5. Every person or employee who manages a specific process.
6. Every process has specific inputs and outputs.
7. Each process has specific resources and controls.
8. Process characteristics affect production.

It is clear that the process of continuous improvement is an approach that should be followed and carried forward because it is a behavior that the employee or worker adheres to, each according to his activity, as its importance lies in its continuity and making it more like the full

time of the employee in his organization, but with innovation and improvement in the performance of the process or task assigned to it, and not stability.

The usual routine, and the researcher believes it is necessary to establish specific ratios to measure the extent of improvements and changes that have occurred in the production process and the product from one year to another. Their upward increase in the positive indicates the presence of continuous improvement, which is the basis for comprehensive quality management.(Horngren , 2009 ; 321)

Fourth: Continuous improvement tools

Leading companies admit that they use a set of techniques and tools for continuous improvement, and the basic rule is that there is no single method that is suitable for use by all companies and in all situations.

There are many programs and techniques used for continuous improvement, including: (Dalshi Chung,2012:111)

1. Statistical quality control.
2. Quality teams.
3. Suggestion systems.
4. Work environment quality projects.
5. Automation.
6. Computer-aided design.
7. CNC manufacturing.
8. Improve product design.
9. Comparison with competing organizations and employee training.

Fifth: Procedures for implementing continuous improvement

Any project for continuous improvement must identify quality problems and study and analyze them so that solving these problems is the gateway to improving the quality of the product or service. Therefore, the problem and its type must be identified, then analyzed and studied, then arriving at the solution and choosing to follow and evaluate it.(Sardar Killon,2012:20)

Among the most important methods that effectively help in solving quality problems and then improving them are: (Harold, Lother,2010:28)

1- A method of collecting statistical data on the number of times a problem occurs repeatedly, and the loss resulting from each of them (Pareto analysis). The aim of this is to identify the problems that occur most frequently or cause the most loss.

2- Cause and effect analysis: This method is used to analyze the main causes and sub-causes that are likely to be the real cause behind the problem for the purpose of knowing the roots of the problem and then arriving at radical solutions.

The continuous improvement movement can be followed through a cycle (Plan - Do - Review - Correct), which is called the Deeming Wheel. This cycle begins with choosing a production process or service that needs to be improved, and it can be explained as follows: (Fredrick Gray,2012:241)

A- Planning: All of the following elements are identified in the field of planning:

1. The amount of current achievements of the production process and the amount of the gap between the customer's needs and the performance of the production process.
2. The amount of achievements required to be achieved that equal or exceed the customer's requirements.
3. The necessary resources and skills.
4. Activities and instructions necessary to achieve the required level of quality for the product.
5. Time frame for implementing the plan.
6. Side effects that may result from implementing the quality improvement plan.

B- Work: It is explained through the following points:

1. Educating and informing the employees of the institution or company about the relationship between the variables of the production process and reducing the gap between customer requirements and the performance of the production process.
2. Training and informing employees of the side and negative effects expected as a result of implementing the plan, so that they can modify their work methods if this is necessary.
3. Begin implementing the quality improvement plan.

C - Review :It is explained through the following points:

1. Study the impact of variables in the production process or specific service on improving its performance and raising the level of its outputs.
2. Detecting and measuring the side effects of the quality improvement plan.
3. Determine the necessary modifications to the plan or production process to achieve quality improvement goals.

D- Correction: It is explained through the following points:

1. Implementing the amendments that were approved during the study, evaluation and testing stages.

2. Continuing the process of reducing the gap between customer requirements and the performance of the production process.

3. Return to the planning stage again through feedback to search for other variables in the production process through which the difference between the customer's requirements and the performance of the production process can be reduced on an ongoing basis.

Summary of the research

It is clear that continuous improvement is of great importance after following the proper procedures and steps necessary to implement it during the stages of the product life cycle.

The third topic: the practical aspect

- An overview of the history of Nasr General Company for Mechanical Industries

The company was established on 9/15/1981. Under the name of the Al-Taji Industrial Complex, it is a public company established in accordance with the Public Institutions Law No. (66) of 1965, with a capital of (one hundred million Iraqi dinars), and it has been linked to the General Corporation for Engineering Industries, affiliated with the Ministry of Industry and Minerals. A tipper body product was selected from the company's total products to calculate its cost according to the research variables..

Calculating the cost of a Renault 2×4 tipper truck chassis (pricing form) for the cost of one unit and the number of units produced is 15 units.

Details	Amount
Raw materials and auxiliary materials	77372203
M. Running man hour 400	4000000
Profit 26%	20627797
Total costs	102000000

From the company's records (costs form)

First: Applying the stages of the product life cycle in the researched company

For each stage, my agencies can be calculated:

1 – Research and development stage			
Guide	the account	Amount 2020	The ratio%
31	Salaries and wages	15228135	96

3252	Stationery	98715	0.72
3272	electricity	300000	1.02
3341	Staff transfer	231958	1.5
the total		15858808	100
2- Design stage			
31	Salaries and wages	18138959	95.94
3272	electricity	300000	1.5
3341	Staff transfer	466314	2.47
the total		18905270	100
3 – Production stage			
31	Salaries and wages	130639127	29.68
321	Raw materials and raw materials	33357858	7.57
3252	Stationery	572160	0.14
3272	electricity	2000000	0.45
3341	Staff transfer	9084858	2.08
373	Destruction of machinery and equipment	264427647	60.08
the total		440081650	100
4 – Marketing and distribution stage			
31	Salaries and wages	98826008	72.5
3252	Stationery	1939504	1.41
3272	electricity	350000	0.25
3341	Staff transfer	3129299	2.28
3343	Travel and delegation	570000	0.42
37	Extinction	32174833	23.49
the total		136989944	100
5 – After-sales services stage			
31	Salaries and wages	744904949	97
3313	Maintenance of devices and equipment	15680000	2.05
3272	electricity	500000	0.06
3341	Staff transfer	320000	0.04
3343	Travel and delegation	680000	0.09
the total		762084949	100

It is noted from the previous table that the costs of the stages of the product life cycle were collected according to the production report of the surveyed company, taking into account all costs (employee salaries, stationery, electricity, employee transportation, travel and delegation) for all stages.

Total production cost according to the product life cycle

stage	the amount
Research and development stage	15858808
Design stage	18905270
Production stage	440081650
Marketing and distribution stage	136989944
After-sales service stage	762084949
the total	1373920621
÷	÷
Number of units produced	15
Unit cost	91594708

It is noted from the previous table that the unit cost according to the product life cycle is (91,594,708) and the product cost according to the company's calculation is (102,000,000). The difference between the two costs is (10,405,292) dinars, and accordingly the company's cost is reduced to the product's life cycle cost.

102000000 – 91594708 = 10405292 dinars.

Second: A shift towards continuous improvement in the researched company

In order to continuously improve the product life cycle, that is, reduce the cost of each stage with activities that do not add value by excluding them from the cost of the stage, as shown below:

1 – Research and development stage			
the account	Costs add value	Doesn't add value	Amount 2020
Salaries and wages	11573383	3654752	15228135
Stationery	86870	11845	98715
electricity	300000	----	300000
Staff transfer	202004	29954	231958
the total	12162004	3696551	15858808

It is noted from the table above that activities that do not add value at the company level are included in the salaries of employees of the Research and Development Department. This is due to the presence of disguised unemployment in the number of employees in the department. The

department's salaries were reduced by transferring some employees to other departments by (3,654,752 dinars), and stationery was reduced by ((3,654,752 dinars). 1845 dinars) As for the transfer of employees, it was reduced by (29954 dinars), meaning the total reduced amount was (3696551 dinars).

2- Design stage			
the account	Costs add value	Doesn't add value	Amount 2020
Salaries and wages	13785607	4353349	18138959
electricity	300000	-----	300000
Staff transfer	401031	65283	466314
the total	14486638	4418632	18905270

It is noted from the table above that activities that do not add value at the company level are limited to salaries, wages, and employee transportation, due to the presence of redundant staff by (4,353,349 dinars) and (65,283 dinars) respectively, and the total reduction was (4,418,632 dinars).

3 – Production stage			
the account	Costs add value	Doesn't add value	Amount 2020
Salaries and wages	125635449	5003678	130639127
Raw materials and raw materials	33357858	------	33357858
Stationery	486336	85824	572160
electricity	2000000	-----	2000000
Staff transfer	7267887	1816971	9084858
Destruction of machinery and equipment	264427647	-------	264427647
the total	443175177	6906473	440081650

It is noted from the table above that the activities that do not add value at the company level are limited to salaries, wages, stationery, and employee transportation by (5,003,678 dinars), (85,824 dinars), and (1,816,971 dinars), respectively, and the total reduction was (6,906,473 dinars).

4 – Marketing and distribution stage			
the account	Costs add value	Doesn't add value	Amount 2020
Salaries and wages	90919928	7906080	98826008
Stationery	1493419	446085	1939504
electricity	350000	-----	350000
Staff transfer	2722491	406808	3129299
Travel and delegation	342000	228000	570000

Extinction	32174833	-----	32174833
the total	128002671	8987273	136989944

It is noted from the table above that activities that do not add value at the company level are limited to salaries, wages, stationery, employee transportation, travel, and delegation by (7,906,080 dinars), (446,085 dinars), (406,808 dinars), and (228,000 dinars) respectively, and the total reduction was (8,987,273 dinars) .

5 – After-sales services stage			
the account	Costs add value	Doesn't add value	Amount 2020
Salaries and wages	654546090	90358859	744904949
Maintenance of devices and equipment	15680000	-----	15680000
electricity	500000	-----	500000
Staff transfer	180000	140000	320000
Travel and delegation	560000	120000	680000
the total	671466090	90618859	762084949

It is noted from the table above that activities that do not add value are limited to salaries, wages, employee transportation, travel, and delegation by (90,358,859 dinars), (140,000 dinars), and (120,000 dinars) respectively, and the total reduction was (90,618,859 dinars).

The total cost of production ensures continuous improvement of product costs

stage	the amount
Research and development stage	12162257
Design stage	14486638
Production stage	433175177
Marketing and distribution stage	128002671
After-sales service stage	671466090
the total	1259292833
÷	÷
Number of units produced	15
Unit cost	83,952,855

Through the above, it is possible to calculate the difference between the cost of the product according to the product life cycle technique and the cost extracted after eliminating or reducing activities that do not add value, as shown below.

The cost of the product according to the product life cycle - the cost of the product after discount = the difference

91,594,708 - 83,952,855 = 7,641,853 dinars

Conclusion

When applying continuous improvement in the product life cycle and dividing the product's life into stages represented by (research and development, design, production and operations, marketing and distribution, and after-sales services), as well as reducing some activities that do not add value to the product according to the accounting analysis of the applied system. In the company, this leads to proving the research hypothesis of ((The use of continuous improvement procedures during the product life cycle leads to reducing costs without compromising the quality of the product)).

Conclusions:

1- The company's pricing form for the product, the tipper chassis, was approved at a cost of (102,000,000) dinars according to the accounting guide for production costs. Likewise, the costs of the tipper chassis product were calculated according to the product's life cycle for one unit at a cost of (91,594,708) dinars, as the costs decreased at a cost of (10,405,292) from Company calculation of the product. The costs of the tipper chassis product were calculated after continuous improvement of the product life cycle for one unit, and it was at a cost of (83,952,855) dinars, as the costs decreased by a cost of (7,641,853) when calculating the stages of the product life cycle.

2- The presence of a number of workers in the factory that are redundant, which makes the costs of the manufactured product, the research sample, high, and this is what is proven in calculation (31) in most stages of the product's life cycle.

3- The cost of after-sales services was found to be very high compared to the stages of the product's life cycle, and this indicates the presence of a product that does not conform to specifications after completing its production.

4- Low amounts spent during the research and development phase of the product life cycle.

5- Lack of training courses for employees at all stages of the product life cycle.

Recommendations:

1- The process of calculating product life cycle costs and continuous improvement depends on reducing product costs without compromising product quality and working to increase its market share.

2- Moving towards increasing the amounts allocated to the research and development phase in order to increase the company's ability to reduce costs without compromising on product quality.

3- The great interest in training contributes to developing the efficiency of employees and thus achieving the required quality of work and helps them work according to modern technologies.
4- Work to reduce the number of workers in the company's factories and transfer those who are redundant in order to reduce the cost of the product.
5- Working to produce a product according to modern technologies of high quality and conforming to ISO specifications, as it works to reduce after-sales service costs.

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