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ROLE CONCURRENT ENGINEERING TECHNOLOGY REDUCES AND IMPROVES PRODUCT LIFE CYCLE COSTS TO ACHIEVE AN INCREASE IN COMPETITION-AN APPLIED STUDY IN WASIT GENERAL COMPANY FOR TEXTILE INDUSTRIES

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Abstract:

The concurrent engineering technique is considered one of the important techniques in modern accounting because of its importance in improving product quality. This technique complemented the product life cycle costing technique and became an integrated model that helps reduce costs and develop the current product design model according to the customer's requirements through the sum of the relative weights and the importance of each component on the basis of the relationship between customer requirements and component functionality. This research aims to show the cognitive foundations of the two techniques of product life cycle costing and concurrent engineering and their importance in achieving competitive advantage. Concurrent engineering technique has worked to reduce costs. and use program SPSS for investigation purpose Goals Research and verify its hypotheses Through this study, several conclusions were reached, the most important of which is :The concurrent engineering technique is the value engineering of an existing product to a new design that meets customer requirements by identifying components that need to be simplified and components that need to be enhanced .The research reached a set of recommendations, the most important of which are :Focus on using modern technologies and methods to reduce costs, which are compatible with the characteristics of the modern environment and appropriate to the nature of the work of the Or General Company for Engineering Industries and which are compatible with its cost structure. The most appropriate and best techniques should be chosen. The most appropriate technology that can be used at the present time is the technology of product life cycle cost management and simultaneous engineering because of their great benefit in managing and reducing costs and achieving competitive advantage.

Keywords: auditing profession - creative accounting.

INTRODUCTION

Recently, the modern business environment has witnessed developments represented by strong competition, technological development, openness of markets, and reduction of the product life cycle. The reason is due to the difference in customer tastes through the constant need for products that contribute to customer service with excellent quality and appropriate prices that are compatible with the individual's income. The reason behind research into developing accounting systems and techniques is that the economic units exposed the accounting systems and techniques to criticism, which led to the inability to provide information that reflects the progress of the business environment because it is focused on the environment inside the economic units and work to improve accounting techniques in the field of management accounting and cost accounting and thus meet the requirements. In addition to the customer, it helps in managing the cost by reducing it while improving the quality of the product. Thus, it supports the accounting advantage of economic units. It is known that there is a group of techniques that work to improve the quality of the product, the most important of which is concurrent engineering, which is an organizing tool.It is integrated through which the design activity is synchronized with the methods related to the product, which include manufacturing, marketing and support.

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First: research methodology

1- Research problem.

The problem of the research lies in how to adopt the appropriate modern accounting method for cost management that suits the requirements that work to reduce the costs of the product's life cycle to achieve an increase in competition, as well as how to work on applying the simultaneous engineering technique that works to reduce the product's life cycle.

2- Research objective.

The research aims to study the product life cycle as well as demonstrate the simultaneous engineering technique in reducing the product life cycle as well

3- Research hypothesis.

Based on what was stated in the research problem, the research hypothesis can be formulated as follows:
There is a statistically significant relationship between Simultaneous engineering technology reduces and improves the life cycle cost of the product to achieve increased competition.

Second: The theoretical aspect

Firstly: A concept acquired by concurrent engineering

Concurrent engineering technology is considered one of the important technologies that many researchers have discussed, and its most important concepts appeared in the 1980s in advanced research projects for the US Department of Defense, which defined it as organized and integrated through the synchronization of design activity with operations.(Luh, et., al., 2009, 43) and (Darr & Birmingham, 1994, 35) refer to the definition of concurrent engineering as a method that works to integrate the steps necessary to develop the product into what it consists of. From the design and manufacturing processes and early in the product life cycle. As defined by the researcher (Al-Barzanji,2007, 27) Banha technology based on
Principle Constructive scientific planning and synchronization of all product processes, with emphasis on the role of the customer and the supplier in these processes. As for Al-Dulaimi, 2012, 60He demonstrated that the concurrent engineering technique is a competitive strategy for manufacturing that works on an important goal, which is to achieve its dimensions, which are synchronization, integration, standardization, and optimization, with the aim of making the best use of resources in the design and manufacturing processes and in a way that works to improve the performance of these processes and maximize added value. For the customer
The researcher also stated that this technique is one of the techniques that works on Developing and improving the product at an early stage of its life cycle by integrating and synchronizing research and development, design, production, marketing, and after-sales services while activating the principle of the multi-functional team and with the participation of the customer.

Second: the importance of concurrent engineering technology:

The importance of concurrent engineering is highlighted by the transition from the traditional classical environment to an accomplished work environment The tasks are parallel and simultaneous, as the researcher Al-Barzanji explained**,2007, 25**) from the most important focus on concurrent engineering is the Kalati joint:

1. Enhancing competitive advantage through strategic planning for new product development.
2. Achieving the required quality that meets customer requirements.
3. Study the market's needs and try to cover them.
4. Achieving customer satisfaction at all stages of the product life cycle.
5. Determine the resources and manufacturing processes required.

Third Objectives of concurrent engineering technology

According to the researcher, the goals of concurrent engineering lie(Dhillon, 2002, 35) as follows:
1- Reducing product development costs: Concurrent engineering technology reduces costs related to product development by reducing the number of redesign times as well as considering customer requirements from the beginning of the design process related to product development
.
2- Improving the quality of products One of the most important things that concurrent engineering technology does is improve quality.
Products by producing products with engineering and technical characteristics that take into account the customer's voice.

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3- Enhancing competitive advantage: That is, applying simultaneous engineering technology not only helps the economic unit achieve competitive advantage, but also maintains and enhances it based on the idea that product planning considers not only the customer but also the supplier and after-sales services.
4- Reducing testing costs (trial runs) for products: The development and complexity of products may lead to an increase in trial operation costs, but in light of the application of concurrent engineering technology, this type of cost may be reduced by using tools that support this technology, such as design for assembly (DFA), which in turn reduces the complexity of the product by planning the number of parts that are assembled. The materials and processes required to produce each part.
5-Increase profit margin: Good use of concurrent engineering technology may help achieve what economic units seek, which is increasing revenues, reducing costs, and as a result, increasing the profit margin.

Fourthly: Application **of concurrent engineering technology**
It is one of the most important steps in the process of applying concurrent engineering, according to the researcher**(alecost, 2016, 9)** Done According to the following steps:
1. Supporting senior management: It is one of the most important steps of the concurrent engineering technique, which is considered the first step. It is done through the senior management's awareness of the economic unit according to the need for technologies that help it survive in light of the intense competition imposed by the business environment.
2. Forming a concurrent engineering team: The second step in implementing concurrent engineering is to select the team members, which consists of representatives in the various departments of the economic unit (marketing, engineering, design, production, research and development, sales, cost accounting).
3. Formation of ideas: Members of the marketing and research and development departments play the largest role in implementing this step by surveying the market and determining the customer's requirements regarding the product to which the simultaneous engineering technology will be applied.
4. Selection of ideas: In this step, ideas are selected that help in meeting the customer's requirements, which are limited to product planning, determining product components, determining product operations, and production planning, noting that the tool that fulfills the selection of these ideas is (QFD) through the stages that pass through It has the following agencies
a. Product layout: Called This stage is also carried out by Quality House (QFD) in translating the customer's requirements into engineering characteristics of the product by applying the following steps:(Blocher etal ,2010,552)

Step1 Determine customer requirements: Complete In this step, we determine the customer requirements that should be provided in the product, as well as determining the relative importance of these requirements based on the survey lists that are distributed to customers or the interviews that are conducted with them.
Step2 Competitive evaluation: Complete In this step, we collect information about competing products and then compare them with the economic unit's product with the aim of evaluating it based on the extent of its ability to meet the customer's requirements that were identified in the step .
Step3 Determine the geometric properties: Includes This step determines the engineering characteristics of the product that help in achieving the customer's requirements, while determining the relative importance of these characteristics to the customer.
Step4 Relationships or correlation matrix: Includes This step studies the relationship between each of the customer's requirements and the engineering characteristics of the product by using specific symbols that represent as an expression of the relationship and its strength, which may have a strong positive connection and symbolize it.⊕(Positive correlation) O or the absence of any connection or relationship between them.)×(, negative correlation)
Step5 Comparison of geometric properties: indicate This step refers to the exchanges that occur between engineering properties, which are located at the top of the quality house, and their determination depends on the type of relationship that occurs between these properties.

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Step6 target values: This step demonstrates the importance The relative position of each customer's requirement considering the relationship of each requirement to the engineering characteristics of the product, while determining the competitive position of the economic unit's product compared to competing products.

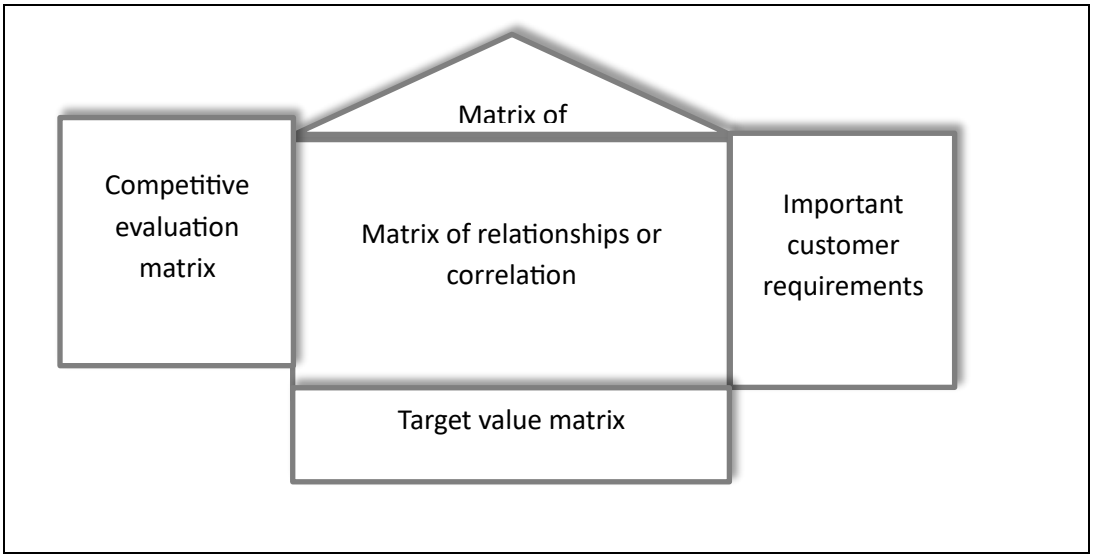

Figure (1) shows the House of Quality

B. Determine the product components: The most important thing is to refer to the researcher's mechanism(Jaiswal, 2012, 30) The best tool used to determine product components, which is integrated with QFD, is (DFMA), as it includes translating the engineering characteristics of the product into its components that should be included in the product.
T. Process planning: Complete It is applied using the QFD tool, through which the product components are translated into processes whose design is planned according to the following steps:
a-**Preparation Initial process design: Includes** This step develops the initial design related to the product's operations, based on the product's components in relation to its engineering characteristics.
B-**reprocess design:** Includes This stage is a redesign of the product processes, in order to reach the final design that achieves high quality of the product.
C-**to set Operations costs: complete** In this step, we determine the costs related to the processes that were identified in the previous step to demonstrate the extent to which these processes contribute to improving the quality of the product by reducing its costs.
T-**Preparation Final design: Complete** Applying this step is based on the results of the initial design of the product processes and the costs related to them.
Th. Production Planning: complete In this step, production is planned in light of the demand the economic unit expects for the product.
Fifth Concurrent engineering technology tools
that Achieving success as a result of applying the concurrent engineering technique requires the use of some important tools such as (QFD) and (DFMA), which were discussed previously when dealing with the steps of applying this technology. The following is an explanation of these two tools:
1. Quality Function Deployment: (QFD) Quality Function Deployment
Prepare(QFD) is one of the tools that was widely used by Japanese companies and then companies operating in Europe and America. The main advantage of this tool is that it aims to spread the voice of the customer, representing his requirements and desires that must be provided in the product through all the stages included in the application of this tool. (Iqbal, 2017, 4) defines the QFD tool as a methodology.
To developDesign quality aims to achieve customer satisfaction by translating the requirements that should be provided in the product into the targeted design while maintaining quality. As he knows
(Anderson, 2014, 86) and (Jaiswal, 2012, 32) describe the QFD tool as an organized methodology that focuses on the customer's desires and requirements and brings them down to the level of detailed processes related to the product . And he mentions(Abdul Rahim & Baksh, 2003, 376) The application of the QFD tool (QFD) within the concurrent engineering technique goes through several stages (discussed previously) that were developed by the American Supplier

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Institute (ASI) so that it has become widely accepted as it is being applied. Through a successive series of matrices that provide information that helps economic units produce products that meet the customer's requirements and desires.

2. Design for Manufacture and Assembly (DFMA)

Indicates (Edwards, 2002, 651) (Design for Manufacturing and Assembly (DFMA) is a systematic procedure for analyzing proposed designs with the aim of achieving the maximum possible benefit from manufacturing processes in exchange for a smaller number of components in parts or components of the product, in other words, obtaining processes that achieve simplicity in design and form. Which achieves the lowest possible cost. Belay (2009, 36 - 37) adds in this regard that the DFMA tool includes a set of sub-tools that can be used to simplify designs related to the processes of manufacturing and assembling product components. It is DFM, which specializes in developing designs related to processes related to manufacturing components. Product DFA, which is related to developing designs related to the assembly processes of product components (Kuo, et,. al., 2001, 245-246) that by applying (DFA) the number of parts, the number of redesign times, assembly operations, and assembly directions are reduced (as for the (DFM) tool, its application helps in choosing Raw materials, simplifying manufacturing processes to the maximum extent, and as a result achieving a reduction in both cost and development time, as well as speeding up access to the market, noting that the application of DFMA encourages breaking down barriers between design and manufacturing engineers and any other party that has a role in determining the cost of the final product at the stage. early in its life cycle.

Sixthly: The role of concurrent engineering technology

had become The customer's voice is the primary goal for the economic unit to be able to survive in the market in light of intense competition, so it seeks to use techniques through which it seeks to achieve this goal as well as helping to achieve profits, increase market share, and enhance competitive advantage. Poor response or failure to take into account the customer's voice leads to adverse results, and as a result, when the economic unit wants to develop a product of high quality, with the product remaining for a longer period in

market At a lower cost, it must use techniques that allow spreading the customer's voice through the stages that the product planning process passes through, starting from determining its engineering characteristics all the way to developing its final or targeted design. The most prominent of these techniques is simultaneous engineering, which was previously discussed in the first section, as he points out (Dhillon, 2002, 175) The goal of applying the concurrent engineering technique is to improve the quality of the product by producing products with engineering characteristics that are consistent with the customer's requirements, and on the basis of this, product operations are planned in a way that leads to reducing the cost, which in turn leads to reducing the number of redesign times. Concurrent Engineering (CE) technology tools that play a major role in this regard are Quality Function Deployment (QFD) and Design for Manufacture and Assembly (DFMA) which are implemented through a set of matrices called (Quality House) that start from defining the engineering characteristics of the product all the way to planning. For production, all of this leads to improving the quality of the product from the point of view of the economic unit and the customer.

And he mentions (Li, 2010, 11–12) In this regard, applying CE technology considering the changes in the modern environment is necessary. Donghai takes into account the customer's requirements and expectations, in addition to making the economic units focus on the planning and design stages of the product in a way that is compatible with those requirements and the modern environment. Tsai & Chang (2004, 115) point out that 75% of the cost of manufacturing a product and 80% of its quality are determined early in the product's life cycle. This confirms the importance of managing both cost and quality during the design phase and by applying modern technologies such as CE. It is very important considering the developments in the modern environment because it gives a broad view of the product, its cost, the processes that will accompany its production, and according to the resources that are identified.

Seventh: Product life cycle costs

Product life cycle costing technology is the latest method for reducing costs and calculating product costs more accurately during its production life cycle. The importance of this method stems from the fact that it addresses the pre-production stage as well as the production stage and post-production stage. Understanding and analyzing product life cycle costs helps economic units. To understand and realize the appropriate time to introduce products into the markets and know the appropriate time to withdraw the product from the markets based on the competitive position of the economic units' products in the markets and the extent of the success or failure of the product(.Komninos, 2012,3)

And points (2012, 19, Richard, et.al) indicated that in light of the changes that have occurred in the business environment and the use of modern manufacturing systems and the accompanying clear change in production techniques and the increase in industrial automation, which in turn led to a tangible change in the cost structure and the trend towards meeting Customer requirements and providing new products at the lowest prices while ensuring high quality, preserving traditional markets and entering modern markets

1- Product life cycle concept:

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The product life cycle is defined from the marketing point of view as a sequence of stages in the life of a product or service in the market, starting with the introduction of the product or service in the market, then growth in sales, and finally maturity, then decline, and withdrawal of the product from the market.(Blocher et al, 2018, 549)

The product life cycle is defined from the customer's point of view as the period that the product passes through, starting from the purchase stage, the operation stage, the support and services stage, and finally the product disposal stage (Emblems, 2003,17)

This is what he sees (2020, 503, Hansen & Mowen) The above three points of view of the product life cycle contribute to generating important ideas for producers who cannot ignore the three points of view. There is a relationship between the three points of view, as the market point of view is based on the nature of the sales pattern during the product's life cycle. Its goal is based on profits, while the production point of view focuses on important internal activities such as research and development, production, marketing, and after-sales services for the product. The production stages were found to support the sales goal in the stage related to marketing, and this requires resources and costs. Therefore, this destination is described as a destination. A cost-based view, and finally the customer view, is based on the level of product efficiency based on the price paid, which is represented by the acquisition cost, which includes the purchase price as well as post-purchase costs such as operating costs, maintenance, and product disposal costs, and that profits and costs are linked. Both with product efficiency and price.

2-Stages of the product life cycle

Much research and literature related to the matter indicates the stages of the product life cycle, which can be defined as follows:

Stages of the product life cycle from a production point of view

The stages of the product life cycle from a production point of view include the research and development stage, engineering or design of the product, the manufacturing stage, the marketing and distribution stage, and the last stage of after-sales services to customers: (2018,562, Blocher, et.al) (Horngren, et.al, 2021, 546)

1- The research, development and engineering or design stage of the product

This stage consists of three sub-stages: (Atkinson et al, 2012,303)

A-Market research: In this stage, new customer needs are evaluated and ideas about new products are generated.

B-Product design: At this stage, the technical specifications required for the products that meet the needs of customers are determined.

A- Product development: In this stage, the company identifies the important characteristics of the product that lead to customer satisfaction, designs the prototype of the product, and determines the production processes and any of the necessary tools it needs in the production processes.

C-The product life cycle technique, from the point of view of strategic cost management, focuses on the total costs that occur during the life of the product, and from a comprehensive point of view, the total costs include the costs that the product bears during the product's life cycle, as well as the costs that customers will bear, because customers have become more sensitive to increased costs. Costs after purchasing the product and environmental costs. (El.Kelety, 2006,434)

These costs are called the actual product life cycle costs. Therefore, the total cost of the product life cycle must include the following costs:

A-Product-specific costs (factory): These include research and development costs, planning and design costs, manufacturing costs, and marketing costs.

B-Customer (buyer) costs: purchase, operation, maintenance, and product disposal costs.

C-Environmental costs: These include the costs of external influences on the use of the product and the costs resulting from companies' non-compliance with environmental laws and rules.

2-Manufacturing stage

After completing the research and development phase, the economic unit enters the manufacturing phase and begins spending money on raw materials, labor, and indirect industrial costs in order to produce and distribute its products. At this stage, there are few opportunities to make engineering decisions to reduce production costs through redesign decisions because most of the costs have been previously determined in the research and development stage. (Atkinson et al, 2012, 303).

The results of some studies indicate that more than (80%) of the product costs are committed during the planning and design stage through decisions taken by the economic unit related to the product design specifications, in light of which the costs that must be achieved during the production stage are clearly determined. In the case of an existing product that is currently produced, most of the costs have been incurred during the manufacturing stage. Accordingly, the opportunity to reduce costs is weaker in the manufacturing stage compared to the planning and design stage of the product life cycle .

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3- Marketing and distribution stage

This stage begins after the end of the manufacturing stage, where the product is marketed and distributed in the market. Marketing costs include the following: (El.Kelety, 2006,438)

a-Costs of materials used in the marketing process, such as packaging, shipping, printing, and market research expenses.

B-Salaries and wages received by workers in the marketing process, such as commissions for sales, transportation, and distribution agents .

C -Other expenses related to the marketing process, such as sales, distribution, and communication expenses.

At this stage, the company bears the costs of servicing customers and disposing of the product. Although these costs are determined in the research, development and design stage, the actual service stage begins as soon as the product is delivered to the customer. This stage overlaps to some extent with the production stage, as this stage consists of It consists of three sub-steps as follows:

D -Rapid growth of costs from the first time a product is shipped, and this growth continues as sales increase.

E -Moving from peak sales to peak after-sales services.

F-Aftermarket services peak at the time of the last shipment made to the customer, after which disposal occurs at the end of the product's life.

4-After-sales services stage for customers

At this stage, the economic units bear costs in order to provide after-sales services, and these costs are determined in advance in the research and development stage. This stage begins when the first unit of the product is presented to the customer. (Atkinson et al, 2012,303)

Objectives of product life cycle costs

Many writers have emphasized that PLCC 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. The use of PLCC enables the determination of costs of construction, operation, disposal, etc., and it is also used as a basis for control. And cost management during the product life cycle. The basic and important thing is that PLCC can be implemented during any stage of the product life cycle costs, and its information can be used as input for decisions related to product design, manufacturing, installation, operation, support, and disposal, and the decisions made Early in the product life cycle costs have a greater influence than those taken late in the product life cycle and lead to the development of the concept of discounted costs. Discount Cost (Wales Treasury, 2004, 8)

The primary goal of product life cycle costing is to evaluate and improve LCC and provide methods to assist in the decision-making process at all stages of the product's life: (Snodgrass, 2008, 4)

A- Study the economic feasibility of the project or products.
B- Determine cost drivers Cost Drivers and cost-effective improvements.
C- Evaluate and compare alternatives related to production use, operation, testing, inspection, maintenance, etc.

Much research and literature related to accounting indicates that trying to link the cost to each stage of the product life cycle to time is an indication of the time-oriented product life cycle costing technique, which can achieve the following goals if applied:(EIKelety, 2016,437)

1- It provides information about the energy used and indicates the time required to complete each stage.
2- Providing the various cost information that managers rely on in the field of cost management more effectively because it focuses on the cost at each stage of the product life cycle costs.
3- Preparing information that helps in conducting a strategic analysis of the product life cycle cost to identify the reduction opportunities that management needs in making operational and strategic decisions.
4- It provides information about the cost of the product's life cycle and its stages with the aim of improving the value of the product to suit the requirements and needs of customers.

The role of reverse engineering in reducing product life cycle costs

The reverse engineering method is taken by the designer for himself, through which he expects to obtain a number of results, such as evaluating the quality of the product in general, gaining information in general to measure complexity and composition, understanding the most important components and parts that represent a major part in the composition of the product, and understanding designs in terms of application, as well as in terms of Functional

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(Michele, 2013, 23) Defining the product is the critical point when designing and developing any product, as the product has different points of view. From the customer's point of view, it means a group or package of characteristics that satisfy customers' requirements, while from the unit's point of view, it means a group of different components and interconnected parts resulting from Operational processes (Kelety, 2006, 142) Reverse engineering is a design method based on identifying customer needs, coordinating or matching those requirements with components, and transforming those components into characteristics or qualities that achieve the desired functional level (Michele, 2003, 24).

For organizations to become more sustainable, managers must address different dimensions of sustainability at the strategic level, both during the strategic decision-making process and as part of the strategic content at the company, business and functional levels. Developing an economic unit requires sustainability to be considered a cornerstone of doing business and a strategic approach that integrates economic, environmental, and social considerations into all aspects of the business on an ongoing basis. (Tikkanen & Jaakkola, 2019, 411).

Sustainable reverse engineering is a reverse process of design activity. It basically includes rebuilding design models that are related to the original product, and its main goal is to return to the results of the original design process to create a sustainable version of it, as shown in the figure. Accordingly, concurrent engineering uses the knowledge extracted from the analysis of the real product characteristics. Along with knowledge of manufacturing processes, concurrent engineering is a technique for generating data and recreating products from parts or raw materials. It is a product design method and is usually used to design and modify an existing product, that is, based on existing products. In addition, there are a number of advantages. Reverse engineering achieves work to reduce product life cycle costs, including:

1. Reducing product life cycle costs by reducing waste, gases, and toxic fumes, which leads to reducing fines and sustainable taxes, as well as reducing handling and maintenance costs as a result of using clean reverse engineering techniques.
2. Improving the reputation of the economic unit because of its contribution to reducing pollution rates and manufacturing sustainable products.
3. Improving the quality of products through contracting with suppliers who take into account environmental requirements and controls, as well as improving the quality and efficiency of production processes through the use of product life cycle costing and reverse engineering techniques.
4. Preserving natural resources and optimal energy consumption by reducing the amount of raw materials used in production that can be recycled during the life of the product.

Reducing waste by designing products that are recyclable and biodegradable.

Third: The practical aspect:

With regard to the practical aspect, represented by the statistical analysis of the study data and determining the level of importance of the variables in this aspect, the Wasit General Company for Textile Industries was taken into account, which is one of the most important companies in Iraq and affiliated with the Ministry of Industry. The data obtained from distributing the questionnaire to the Wasit General Company for Textile Industries was taken into account. Study using a programSPSS through the percentage of responses to the questionnaire for detailed research on sample answers from the work site within the field of reducing the costs of Wasit General Company's product, which in turn achieves high quality and efficiency. The results were taken from the opinions of a group of specialists, including academics and some who practice the reality of work.

Table (1) Descriptive analysis of personal information of sample members

26.33%	From 25 years to less than 41 years	the age
73,67	From 41 years and over	
73.34%	Bachelor's	Educational Qualification
13.33%	diploma	
13.33%	Preparatory school and below	
53.33%	20-10	Number of years of service
46.67%	-20 or more	
60%	boss	

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40%	Assistant manager	Position

1- Independent variable: concurrent engineering
The descriptive analysis of the application of the variable simultaneous engineering has reached (78.61876), and this indicates that most members of the study sample agreed on the independent variable items, and from it we infer that Wasit General Company for Textile Industries clearly depends on (defining product characteristics, developing product characteristics, tracking the production of product characteristics, configuring the technical characteristics of the product, modifying Product characteristics) when applying simultaneous engineering, but in varying proportions, as shown in Table (2)

Table (2) Independent variable (concurrent engineering)

Direction of response level	Relative importance %	standard deviation	Weighted arithmetic mean	questions	Sequence
I agree	78.637	0.86508	3.83286	The application of concurrent engineering serves to improve the work of economic units	1
I agree	78.5524	0.850084	3.82862	Implementing concurrent engineering helps reduce costs	2
I agree	79.876	0.854106	3.8948	Concurrent engineering is applied in order to achieve competitive advantage	3
I agree	77.3524	0.840084	3.62862	Concurrent engineering is adopted in order to develop product features	4
I agree	78.676	0.844106	3.6948	Implementing concurrent engineering helps improve relationships with suppliers	5
I agree	78.61876	0.850692	3.77594	Total	W2

1- Dependent variable:Stages of the product life cycle
We note from the results of Table (3) that the relative importance of the product life cycle variable reached (79.876%), which shows the agreement of most members of the study sample on the items of the dependent variable, and from it we infer that Wasit General Company for Textile Industries clearly relies on the use of modern technologies, including simultaneous engineering, in reducing the product's life cycle.

Table (3) Dependent variable (product life cycle)

Direction of the answer	Relative importance %	standard deviation	Weighted arithmetic mean	questions	code
I agree	80.121	0.7182	4.8462	The application of concurrent engineering improves product characteristics	1
I agree	77.086	0.8462	3.6943	The application of concurrent engineering helps to develop product characteristics	2
I agree	80.586	0.7943	3.8693	The application of concurrent engineering has an impact on the provision of after-sales services to customers	3
I agree	79.229	0.7286	4.7515	The application of concurrent engineering has an impact on	4

the decision	F – test	The coefficient of determination R2% Interpretation rate	Beta regression coefficientβ	Constant alpha term α	Variables		Hypothesis
	valueF calculated				Follower	The Independent	
Accept the hypothesis	50.069	56.3	1.653	3.145	Product design	Concurrent engineering	2
valueTabular F at 95% confidence level equals (4.0012)							

				improving marketing and distribution services	
I agree	80.5165	0.871576	3.81528	Total	Y

Hypothesis testing:

First: Testing the first hypothesis:

It is clear from Table (4) that all of the first hypothesis are accepted, as the values of the t calculated for the first secondary hypothesis was (5.01032), which is significant because it is greater than the tabulated t value of (1.96) at a significance level of (0.05), which confirms the existence of a relationship between concurrent engineering and the

the decision	t – test	Simple correlation coefficient	Variables		Hypothesis
	t Calculated value		Follower	The Independent	
Accept the hypothesis	5.01032	0.602	Product design	Concurrent engineering	1-
valueTabular t at 95% confidence level equals (1.96)					

product life cycle. Also, the value of the simple correlation coefficient (which measures the strength of the correlation between two variables) between concurrent engineering and the product life cycle was (0.602), thereby establishing the existence of a noticeable relationship between concurrent engineering as a main variable and the product life cycle as a dependent variable.

Table (4): Results of testing the correlation hypothesis Concurrent engineering and the product life cycle.

Second: Testing the second hypothesis

We note from Table (5) that the valuesThe F calculated for the second hypothesis was (50.069) and is More than its valueF, which is equal to (4.0012), is therefore significant at a significant level of (0.05), which confirms the acceptance of the second hypothesis with a confidence rate of 95%. Which confirms the hypothesis, bringing the percentage of the accepted influence hypothesis to 71.43%, and thus accepting the second hypothesis with a confidence rate of (95%), including It confirms that there is a clear influence relationship of the concurrent engineering variable on the product life cycle

Table (5)

Fourth: Conclusions and recommendations

CONCLUSIONS

Using product life cycle costs (PLCC is a modern method in the manufacturing environment, especially in Iraq, as this method provides accurate data and numbers on the main and subsidiary activities that enable the economic unit to avoid the causes of waste and loss during the stages in which the production of a product or the provision of a service passes.

Using product life cycle costs (PLCC) leads to reducing costs and assessing price competitiveness by studying the interrelationships between the value chain and product life cycle costs, which leads to tracking the actual costs associated with each product across the value chain, as product life cycle costs consist of the sum of the activities that make up the value chain starting from the stage Research and development until the product reaches the customer, and this enhances the stages of growth and maturity of the product in the market.

A- The concurrent engineering technique is the value engineering of an existing product to a new design that meets customer requirements by identifying components that need to be simplified and components that need to be enhanced.

B- The technology of concurrent engineering she Deconstructing product components through product life cycle costing technology and building product characteristics through functional analysis to include cost elements other than components (raw materials).

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RECOMMENDATIONS

A- Adopting the concept of concurrent engineering in the medium term by supporting the state and economic institutions in providing the necessary resources and technology, as well as providing specialized teams and training other teams to be prepared to absorb advanced technologies**..**

B-Focus on using modern technologies and methods to reduce costs, which are compatible with the characteristics of the modern environment and appropriate to the nature of the work of the Or General Company for Engineering Industries and which are compatible with its cost structure. The most appropriate and best techniques should be chosen. The most appropriate technology that can be used at the present time is the technology of product life cycle cost management and simultaneous engineering because of their great benefit in managing and reducing costs and achieving competitive advantage.

C-Economic units must adopt and use the product life cycle costing technique for the purposes of pricing products and managing costs, because this technique provides important information for pricing purposes and cost management during the product life cycle. This technique also provides detailed information about revenues and costs for each stage of the product life cycle, and this Accurate determination enables management to know whether profits will cover costs during the product's life cycle.

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