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## Importance of the Sustainable Product Life Cycle to Achieving Competitive Advantage

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## ABSTRACT

This research aims to shed light on the product life cycle technology in terms of sustainability and its importance to achieving competitive advantage. A picture of the product characteristics of the economic unit at an early stage, based on the evaluation of the value of the characteristics of the competing products by linking them to the optimal time spent on activities that contribute to the production of the product characteristics that have been identified under the sustainable life of the product. As a result, the information obtained will be useful and useful and help in promoting the process of improvement the value of the product of the economic unit and the achievement of competitive advantage.

To achieve the goal of the research, this research was divided into five parts, as the first part was devoted to the research methodology and some previous studies on the subject, the second dealt with the sustainable product life cycle, and in the third the competitive advantage was addressed, leading to the fourth part, which was devoted to demonstrating the importance of the sustainable product life cycle. In achieving competitive advantage, as for the fifth and final part, some of the conclusions reached by the researchers and the most important recommendations made in light of them were presented.

The logo for the International Journal of Research in Social Sciences and Humanities (IJRS&H) is a large, stylized graphic composed of several overlapping, curved shapes in shades of blue, green, yellow, and orange, resembling a sunburst or a stylized 'S' shape. Below this graphic, the acronym 'IJRS&H' is written in a bold, orange, sans-serif font.

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## FIRST: RESEARCH METHODOLOGY AND PREVIOUS STUDIES

### Study Problem:

The increase in global competition and the acceleration of technological progress and the resulting results represented by diversity, renewal and innovation in providing high quality products at low prices with rapid response to change in customer tastes, made the outputs of the Iraqi manufacturing environment suffer from a wide competitive industrial gap between it and the products offered in the market and it was one of the characteristics of the Iraqi manufacturing environment. that gap:

- 1-The weakness of industrial companies keeping pace with the continuous changes in customer tastes and the high quality of competing products led to the reluctance of customers to purchase their products and weaken their competitive position.
- 2-The weak environmental and social performance of the facility in addition to the economic performance.
- 3-Weakness of traditional cost management techniques in responding to customer requirements by achieving competitive prices, which negatively affected the dimensions of competitive advantage.

### Study Importance

The importance of the research lies in that it deals with one of the modern topics, which is the sustainable product life cycle and the possibility of reducing those costs, as the features of the image of the product of the economic unit are determined at an early stage of the product life cycle, based on the evaluation of the value of the characteristics of the competing products in an integrated process between the two inputs. The information obtained will be useful and useful and help in enhancing the process of improving the value of the product of the economic unit and achieving competitive advantage.

### Study Objectives

- 1-A statement of the knowledge bases of the sustainable product life cycle technology and its implications for the dimensions of competitive advantage.
- 2-Shedding light mainly on the positive results that result from analyzing the life cycle of a sustainable product in terms of drawing a picture of the characteristics of the product at an early stage of its design and in a way that is reflected in improving the value of the product by reducing its cost, increasing its quality, increasing customer satisfaction, and as a result achieving competitive advantage Measure the cost of a product during each stage of its life cycle.

**Study Hypothesis**

Based on the problem that this research seeks to answer its question, the researcher formulated the following hypothesis:

((The application of sustainable product life cycle technology contributes to achieving competitive advantage)).

**Some Previous Studies**

N	Statement			Study details		
1	Researcher	Time	Place	Al-Ugaili, Majed Abdul Redha Shalaka	2014	Iraq
Study Title		The product life cycle and its impact on reducing costs using continuous improvement technology - applied research in the Electronic Industries Company				
Study type		An applied research submitted to the Council of the Higher Institute for Accounting and Financial Studies, University of Baghdad, which is part of the requirements for obtaining a certificate of cost and management accounting.				
The research sample		An applied theoretical study in the Electronic Industries Company				
Objectives research		The application of contemporary costly and administrative techniques, represented by (value chain and continuous improvement) in order to reduce costs without compromising the quality of the product. Determine the activities that add value and that do not add value and then exclude them and get rid of their costs or reduce them and then reduce their role in draining resources, and the study aims to Clarify the relationship between the product life cycle and cost and to what extent competition can be achieved.				
The most important conclusions reached by the study		The decrease in the market share of the Electronic Industries Company in the local market due to competition factors and the company's failure to keep pace with the development taking place in this field. The research sample company produces and collects products that are characterized by rapid development and that their life cycle is short in the market, and it faces severe competition from imported products, but it does not spend on research and development as it should nor at the level of competition. Continuous improvement technology is linked to production activity, while the target cost is linked to research and development activities through the method of disjointed analysis, value engineering is linked to design activity, and process re-engineering is linked to all activities as it focuses on the radical re-design of business processes.				
N	Statement			Study details		
2	Researcher	Time	Place	Khattab and Al Hassan	2015	Kuwait
Study Title		A proposed framework for the integration between the activity-based costing system and the product life cycle costing system for the accounting treatment of environmental costs in business establishments in the Arab Gulf region.				
Study type		Research published in the Journal of Administrative and Economic Sciences / University of				

	Aden - College of Economics and Administrative Sciences					
The research sample	An applied theoretical study in business establishments in the Arab Gulf region					
Objectives research	The study mainly aims to highlight the role of the activity-based costing system and the product life cycle costing system in addressing the environmental costs of business establishments in the Arab Gulf region and motivating them towards commitment to environmental standards (ISO 14000) through the development of a proposed framework that includes a set of factors and variables that help economic units in Determine how and why environmental issues are taken into account and involved in their remediation.					
The most important conclusions reached by the study	The product life cycle costing system (PLCC) takes into account all the costs of the product life cycle from the stage of research and development to the stage of product disposal. Also, the analysis of environmental costs through the analysis of product life cycle activities and the use of the activity-based costing system helps economic units determine Activities that achieve better profitability and activities that achieve conservation of the environment, which helps in better addressing environmental costs.					
N	Statement			Study details		
3	Researcher	Time	Place	Al-Hawazi, Muhannad Hadi Saleh	2016	Iraq
Study Title	Analysis of product life cycle costs in light of the value chain and its reflection on the profits of the State Company for the Fertilizer Industry - Southern Region.					
Study type	Unpublished PhD thesis in Accounting, College of Administration and Economics / University of Baghdad, 2016.					
The research sample	An applied theoretical study in the State Company for Fertilizers Industry - Southern Region.					
Objectives research	The study aims to develop a proposed framework for integrating the costs of the product life cycle and the value chain to reduce costs and its reflection on profits by measuring the cost of the product during each stage of its life cycle in the study sample company.					
The most important conclusions reached by the study	There are techniques and methods to manage and reduce costs that are appropriate for each stage of the product life cycle. As each stage of the product life cycle has its own characteristics and advantages, and the most appropriate technique that can be used to reduce costs in the pre-production stage is the target cost technique. And that the research sample company uses traditional methods to price its products, as it prices its products (at cost + required profit margin). on the revenues of the period in which it occurs when it must be capitalized) that this method necessarily leads to the loss of customers as a result of the high prices of products compared to competitors in light of the open market and competition.					



## SECOND: SUSTAINABLE PRODUCT LIFE CYCLE TECHNOLOGY

### The Concept of Product Life Cycle Technology

The product life cycle is concerned with estimating the costs associated with the total life cycle of the product, starting from the research and development stage and the design stage through production, marketing and delivery until the provision of after-sales services to the customer. Taking into account all the economic factors related to the future costs of the operations, products and services of the economic unit, the importance of this technology comes through the following: (Alnawaiseh, 2013, 34)

- Determining and controlling the cost of the product during its life cycle.
- Reducing unjustified costs associated with activities or components that do not add value at every stage of the product life cycle.
- Helping determine the profitability of the product, while providing important information.

As for the concept and definition of the product life cycle, there are various points of view in this regard, as follows:

The product life cycle is defined and it is estimated that it is related to production as the period of time in which the product passes from the stage of research and development to the stage in which services and support are

provided to the customer. (Rajan & Datar, 2018 , 560) Therefore, the stages of the product life cycle from the production point of view include the research and development stage, the design stage, the production stage, the marketing and distribution stage, and finally the customer service stage.

The product life cycle is defined from the point of view of marketing that it is a sequence of the stages of the life of the 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 decay and withdrawal of the product from the market. (Blocher et al, 2010: 549).

The customer's point of view is defined as the period that the product goes through, starting from the purchase stage, the operating stage, the support and services stage, and finally the stage of product disposal. (Emblems, 2003:17). Hansen & Mowen, 2006, 503 finds that the above three views of the product life cycle contribute to generating important ideas for producers who cannot overlook the three viewpoints. Finally, the customer's point of view is based on the level of product efficiency based on the paid price, which is the acquisition cost that includes the purchase price as well as post-purchase costs such as operating costs, maintenance, and disposal costs, and that profits and costs are both linked to product efficiency and price.

## Stages of The Product Life Cycle

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

### Stages of the Product Life Cycle in Terms of Production

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

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

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

- Market research: At this stage, new customer needs are assessed and ideas about new products are generated.
- Product design: At this stage, the technical specifications required for products that meet the needs of customers are determined.
- Product development: In this stage, the company determines the important characteristics of the product that lead to customer satisfaction, designs the product prototype, and determines the production processes and any of the

necessary tools that it needs in the production processes.

And 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 holistic point of view, the total costs include the costs incurred by the product during the product life cycle as well as the costs that will be borne by customers, because customers have become more sensitive to increase The costs after the product purchase process and the environmental costs (El.Kelety, 2006:434) and that these costs are called the costs of the actual product life cycle. Therefore, the total cost of the product life cycle should include the following costs:

- Product (factory) costs: These include research and development costs, planning and design costs, manufacturing costs and marketing costs.
- Customer (buyer) costs: purchase, operating, maintenance and disposal costs.
- Environmental costs: These include the costs of external influences for using the product and the costs resulting from companies' non-compliance with environmental laws and rules.

#### 2-Manufacturing stage:

After completing the research and development stage, the economic unit

enters the manufacturing stage 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 take engineering decisions to reduce production costs through re-design decisions because most of the costs have been identified in advance 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 phase, as shown in Figure (1)

through the decisions taken by the economic unit related to product design specifications, in the light of which the costs are clearly determined. It is necessary to achieve during the production stage, but in the case of the existing product that is currently produced, most of the costs have been achieved during the manufacturing stage. Accordingly, the opportunity to reduce costs is weaker in the manufacturing phase compared to the planning and design phase of the product life cycle. ( Kadarova et. Al , 2015, 548 l).

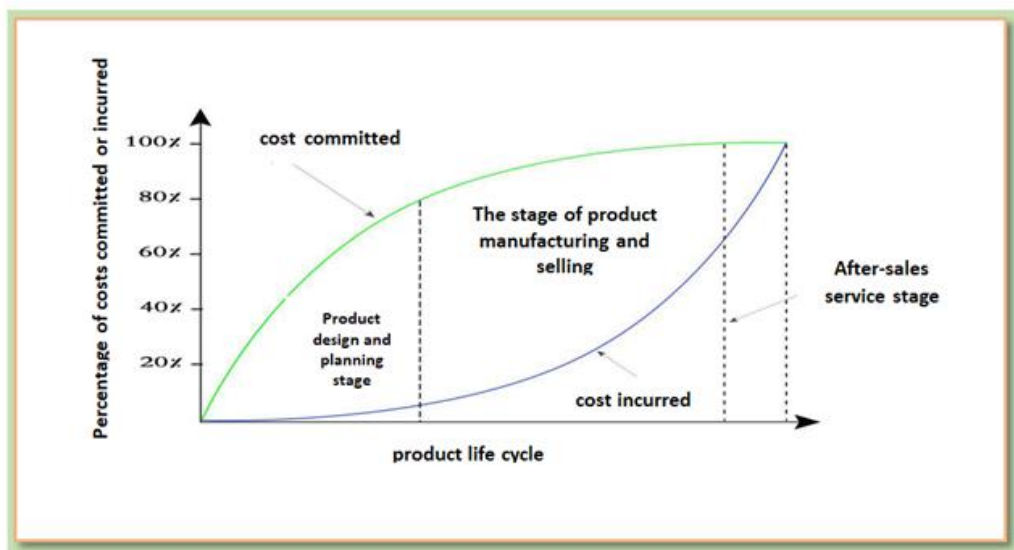


Figure (1)

Commitment costs and costs incurred during the product life cycle

Source: Drury, Colin, "Management and Cost Accounting "8th edition printed in china by RR Donnelley , 2012 .p.527.

### 3-Marketing and distribution stage:

This stage begins after the manufacturing stage ends, where the product is marketed and distributed in the

market. Marketing costs include the following:

- Costs of materials that are used in the marketing process such as packaging,



shipping, printing and market research expenses.

- Salaries and wages received by workers in the marketing process, such as commissions of sales agents, transportation and distribution.
- Other expenses related to the marketing process, such as selling, distribution and communication expenses.

At this stage, the company bears the costs of customer service and product disposal. 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 The three sub-steps are as follows:

- Rapid growth in costs from the first time the product is shipped, and this growth continues with increased sales.
- Moving from peak sales to peak after-sales services.
- The maturity of the peak of services provided in the after-sales stage until the time of the last shipment provided to the customer, after which disposal occurs at the end of the product's life.

### **The Stage of After-Sales Services to Customers**

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

### **Stages of The Product Life Cycle in Terms of Marketing**

The stages that the product passes through (in marketing terms) are the succession of phases in the life of the product in the market, starting with the product's introduction, growth in sales and maturity, and then deterioration and decay. Accordingly, the product life cycle consists of four distinct phases (in marketing terms), (Blocher et al, 2010: 566) :

**1-Product introduction stage:** This stage is characterized by little competition, a slow rise in sales and high costs, due to the high costs of research and development and capital costs necessary to create production requirements and marketing efforts, and that the price is high because of product excellence and high costs at this stage, and that the diversity of the product at this stage is Limited. At this stage, the administration's focus is on design, excellence, and marketing.

**2-Growth stage:** At this stage, sales begin to increase rapidly due to the diversity of the product and the product is still distinguished, competition begins to increase and prices begin to decline.

**3-Maturity stage:** In this stage, sales continue to increase, but at a decreasing rate. The number of competitors and the diversity of the product begin to decline, and the product has a stable market share in the market. And prices start to decline and differentiation is not important at

this stage and competition depends on cost and quality.

**4-Deterioration stage:** prices and sales at this stage begin to decline and deteriorate as a result of the increase in the number of competitors. The market share of the product begins to decline. Cost control and effective distribution networks are the main key to continuity.

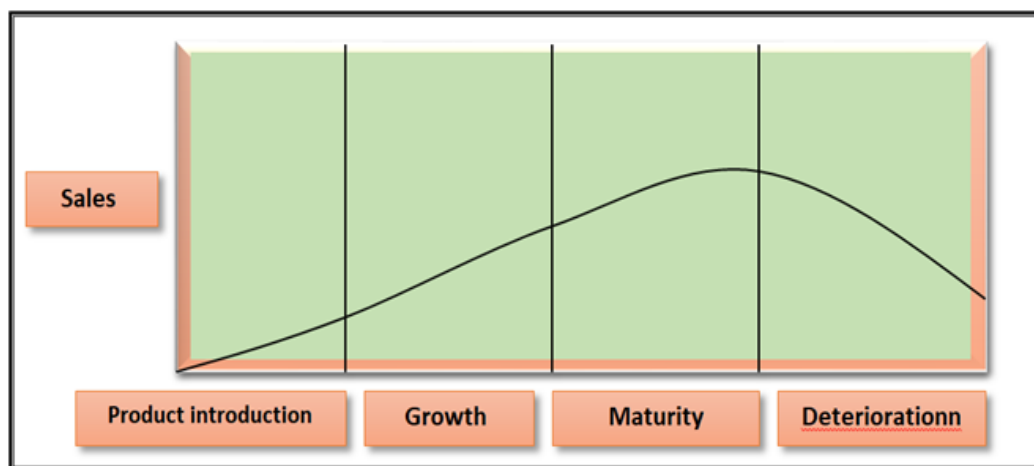


Figure (2)

Product life cycle from a market point of view

Source: Blocher, Edward J., Stout, David E., Cokins, Gary "Cost Management a Strategic Emphasis" .McGraw- Hill Irwin 2010 . ,P-546.

### LCC Framework

Based on the international standards for product life-cycle costs prepared by the International Electrotechnical Committee, the LCC includes the costs that occur in several stages such as idea generation, 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 the product life cycle can be divided into the following: (Zur&Huang,2009:90).

- 1- Purchase Cost (PC).
- 2- Ownership Cost (OC) .
- 3- Disposal Cost (DC).

This can be expressed by the following equation:-

$$LCC = PC + OC + DC$$

While Chandara & Mahbub put another, more detailed equation for LCC, as follows: (Chandara & Mmahbub, 2007:7).

$$LCC = PC + OC + DC + IC + OC + MC - SV$$

It is noted from the Chandra & Mahbub equation that they have added the following costs to production costs:

- 4- Initial cost (IC).
- 5- Operating costs (OC).
- 6- Maintenance cost (MC).

Salvage value was excluded from them in the equation for calculating LCC. Accordingly, it can be said that LCC represents an integrated technology that relies a lot on detailed information that is represented as input and depends on product, asset and service monitoring, analyzes feedback information and provides important and detailed information on the life of the asset.

### Steps to Determine Product Lifecycle Costs

Determining the costs that occur during the different stages of the product life cycle provides an understanding and ability to manage the cost during its life cycle, because LCC helps management in determining effective locations, and in this regard, Drury confirms that most accounting systems monitor and submit production and profit reports on a periodic basis and not On the basis of the total life cycle, and that writing reports on the product life cycle includes tracking costs and revenues on the basis of production during the life cycles of the product, covering multiple calendar periods, and failure to do so prevents management from understanding the profitability of the product, because the actual product life cycle profit is unknown and inaccurate feedback information can be obtained through success or failure in developing a new product, and because the important proportion of costs occurs in the design and production planning stage, it is possible to practice cost management effectively at this early stage and not in the stage Manufacturing When the production design and completion processes have been identified and costs are clarified, as in the manufacturing stage, the focus is more on cost containment than on cost management. (Drury, 2006: 430).

Accordingly, Barringer & Weber explained a set of operations for the implementation of LCC in the form of a scheme and as shown in Figure (3):

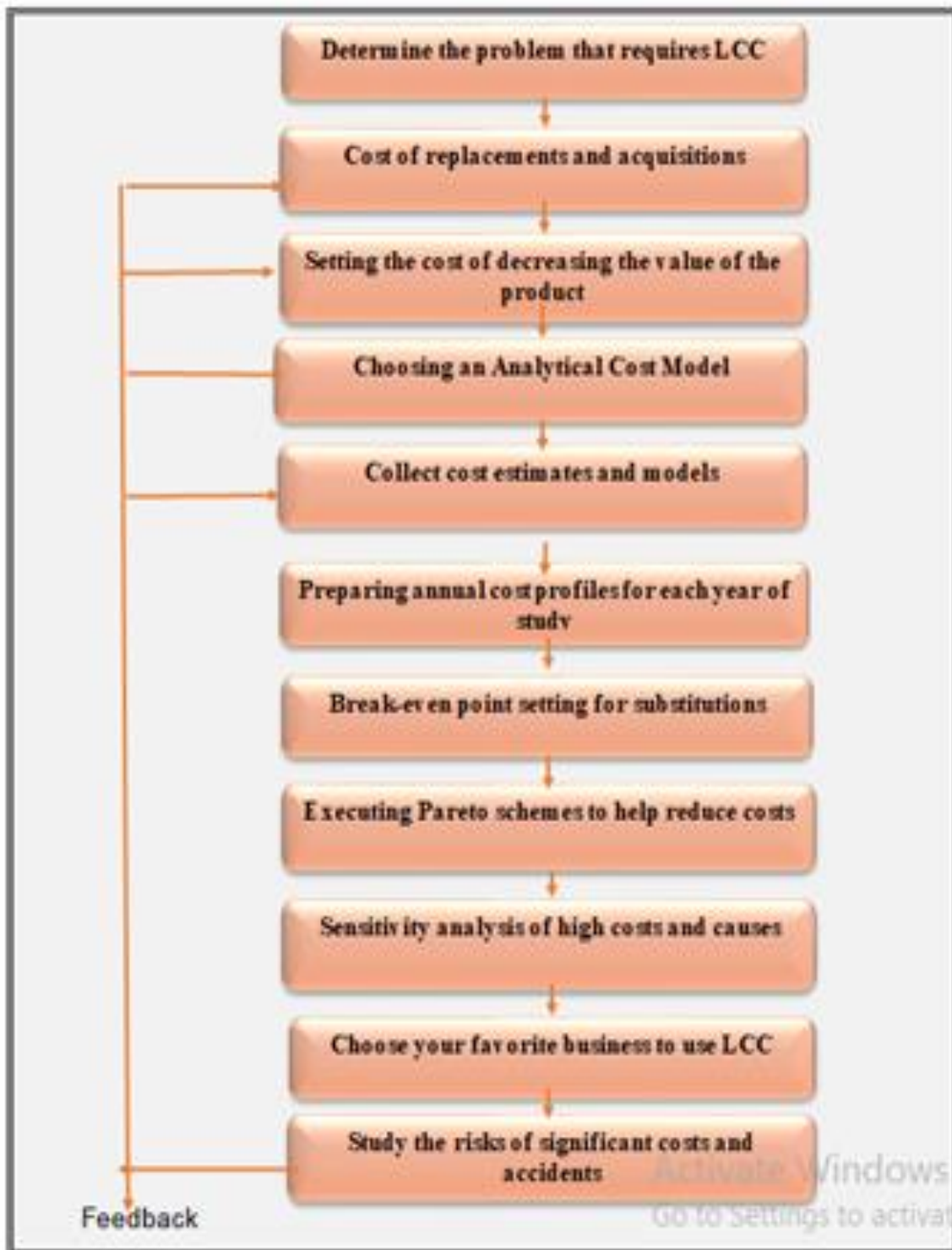


Figure (3)  
Implementation of the LCC process

Source Barranger, H. Paul, & Weber, P. David,(291) "Life Cycle Cost Tutorial", Fifth International conference on process plant Reliability, 2011 .

### THIRD: COMPETITIVE ADVANTAGE

#### The Concept of Competitive Advantage

Competitive advantage has been defined as: "the ability to produce goods and services with good quality, at the right price, at the right time, and this means meeting the needs of consumers more efficiently than other establishments." (Bataineh, 2011:9)

Pederzini also defines competitive advantage as: the concept of basic strategic management that is linked to two main issues: superior performance and relative standing against competitors. (Pederzini, 2017:8), Competitive advantage is generally defined as "the favorable position of an economic unit that makes it different from competitors in the market because of its own capabilities" (Ferdousi et al, 2017:4).

Maury sees competitive advantage as: a set of capabilities or resources that can give an economic unit an advantage over its competitors, leading to a relative increase in profits. (Maury,2018:101)

As for Jaworski and Kohli, he showed that it is the results of work, procedures, and administrative decisions that lead to the superior performance of the economic unit compared to its competitors. The superiority is achieved by adopting innovation strategies, improving quality, reducing costs and integrating social and environmental concepts

to improve the unit's economic performance. (Guimaraes et al., 2018: 1654)

The researcher believes that the concept of competitive advantage is the essence of strategic thinking because it is a basis for the success of the economic unit and its economic efficiency. Strong in its competitive environment.

#### Removing the Competitive Advantage

Dimensions of competitive advantage This term is synonymous with other terms (competitive priorities, performance objectives, manufacturing tasks, output efficiencies, market-based success criteria), as the idea of competitive priorities was first put forward by (Skinner), who emphasized that the Organizations have to make choices about which dimension of competition should take the greatest investment in terms of resources and time. These competitive dimensions have been considered as a variable. This emphasis guides the decision about production process, capacity, technology, and planning (Sayem et al, 2018, 4).

1- **Cost dimension:** This dimension refers to providing a service or product at the lowest possible cost to the satisfaction of external or internal customers of the process or supply chain, and in order to reduce costs by designing and operating the processes



to make them effective using a careful analysis of manpower, methods, scrap or labor Returns, overheads and other factors such as investments in new automated facilities or technologies to reduce the cost per unit and the lowest cost is the first competitive dimension that many organizations seek (Khalaf et al, 2019, 250), Horngren believes that cost is a competitive advantage through the unit's ability to implement at the lowest costs compared to the ability of competitors, and that is through improving productivity and efficiency, excluding losses and possible control over costs (Horngren, et.al, 2021:463) and in order to achieve the economic unit for complete success. Their production costs should be low. However, success and profitability are not always guaranteed, as the products that are sold on the basis of cost, for example, but not limited to, are ordinary goods (flour and sugar), in other words, customers cannot easily distinguish between the products manufactured by the other economic unit As a result, those customers use cost primarily as a function of determining purchases. (Chase, et. al., 2003: 24).

2- **Quality dimension** :- As a result of the rapid changes and successive developments, the interest of

institutions has increased in meeting the desires of consumers and ensuring their satisfaction. As price is no longer the driving factor for consumer behavior, but intonation has become his first concern and the value he seeks to obtain. This is why an organization that wants to stay ahead of the competition must make high quality products, (Nima et al, 2020 , 271). A successful quality strategy begins with an organizational culture that enhances quality, followed by an understanding of the principles of quality, and then involving workers in the activities necessary to implement quality. When these things are done well, the organization usually throws away its customers and works on a sustainable competitive advantage. Meet the needs of customers. (slack, at.al; 2004: 45) shows that quality is one of the important competitive advantages, which refers to the performance of cases in a healthy manner to provide products that suit the needs of customers. Krajewsky & Ritzman; 2005:62 show that there are two competitive advantages that deal with quality, namely, design quality and conformity quality. It represents the degree of conformity with the specifications of the product.

3- **Post-delivery:** (Stevenson, 2013, 12) refers to the delivery dimension with the concept of quick response, which means the ability of organizations to quickly introduce new or improved products or services to the market, or the ability to quickly present existing products and services to customers after To be folded, in addition to quickly dealing with customer complaints and this is largely done through quick decision-making and movement speed of materials and information within the organization, and the benefit you get from the quick delivery of products and services in that just as they can get the product or service faster, the increased The probability that they will buy or pay more for the product or service quickly so that you can achieve a sustainable competitive advantage. (slack, et.al;

2004:64) confirms that when you want to perform work quickly, this means reducing the time it takes when customers receive orders for products and deliver them permanently. (Garrison, & Noreen, 2008; 447) believes that time and delivery are determined according to Responding to the customer in the modern manufacturing environment with the time that adds value and is known as the time of the manufacturing and delivery cycle to the customer, and it includes the time of receiving the order from the customer, the time of manufacturing operations and the time of delivering the final product to the customer, after the time that does not add value (waiting time, inspection time, time of storage) to reduce cycle time by improving manufacturing cycle efficiency. Figure (4) shows:

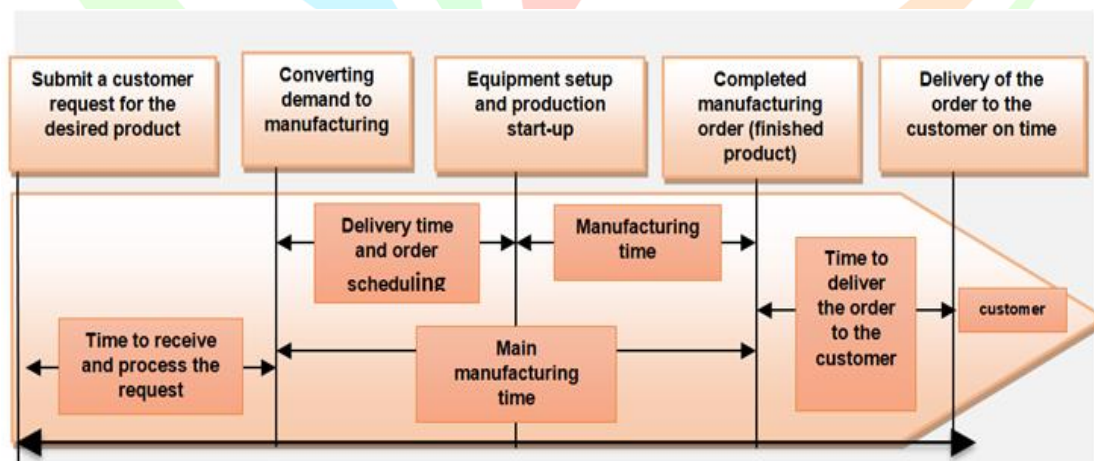


Figure (4)

Response time to customer requests

Source; Horngren.,Chorles, T., & Dater, srikant, M. & Rajan V madhav, "cost Accounting; A managerial Emphasis", 14th, ed., Pearson, Prentice Hall, 2012, 703.

- 4- **Dimension of flexibility:** Flexibility can be defined as the ability to adapt to changes in product mix, production volume, or design, and this ability means producing a wide range of products, to introduce new products and modify high products, and respond to customer needs quickly, ( Russell & Taylor , 2011 , 21 ). And (Slack, et. al., 2004: 45) believes that flexibility means the ability of the economic unit to change operations to other methods, and this means that the performance of operations may change as well as change the method and time of performing operations, as the customer needs to change operations to provide four requirements:
- Product flexibility: It is the ability of operations to introduce new products.
  - Mix flexibility: The ability of operations to produce a mix of products.
  - Flexibility of scale: The ability of operations to change the level of output or the level of production activity to provide different sizes of products.
  - Flexibility of delivery: The ability of operations to change the time of delivery of products.
- 5- **After creativity:** It refers to the nature of the new technological changes necessary to meet the market

need and thus achieve the competitive advantage of the organization. Creativity can be achieved by creating new opportunities in the external environment, monitoring the activities of competitors and speed of response. (Bustnge 2014: 201).

### **Indicators for Measuring Sustainable Competitive Advantage**

Indicators for measuring sustainable competitive advantage: The economic unit uses various measures (financial and non-financial) to identify the extent of the success or failure of its strategy to achieve sustainable competitive advantage. The financial measures are as follows: (Khantimirov, 2017: 589).

1- Profitability measures: the economic unit can achieve high profits if it enjoys sustainable competitive advantages, and these advantages are reflected in the continued profitability of the economic unit and the stability of its market share. Return on sales (the ratio of profit margin to sales) .

2-Market share: Market share is a good measure of the performance of the economic unit and its competitive capabilities against its competitors and to meet the needs of current and potential customers. Increasing the market share is an indication of the economic unit enjoying competitive advantages and thus leads to an increase in its profits,

and the economic unit must take into account the external factors. Such levels of instability are affected by these factors, for example, the presence of the economy and the structure of the industry when using the measure of market share because it is a product of a certain quality, but the market share is low for the unit due to the presence of a large number of competitors, market share is measured using the total market share measure, which is the sales of the economic unit of a particular product as a percentage to the total sales in the market, and this requires determining the specific total market or using the relative market share, and it represents the market share of the economic unit relative to the share of its largest competitor in the market.

3- Productivity: productivity represents the quantitative relationship between the products produced and the resources used to produce them, i.e. the ratio of outputs to inputs. The measure of productivity can be enhanced through the optimal use of resources and the possibility of increasing production by using modern production technology and reducing resources from inputs by reducing waste.

4-Cost of Production: If the rate of production cost exceeds the price of the products of the economic unit in the

market, then it loses its ability to compete, and in light of the highly competitive market, reducing quality costs enhances the position of the economic unit by focusing on the customer's direction and thus leads to a decrease in production costs, which is an indicator of a unique competitive advantage, (Gupte & Londhe, 2017:163).

#### **Fourth: The Importance of Applying Sustainable Product Life Cycle Technology in Achieving Competitive Advantage**

The modern basic approach to cost reduction is the entrance to the product life cycle, or more precisely the costs of the product during its life cycle. (Arab Society of Certified Public Accountants, 2001: 438). As it covers all phases of value chain activities (pre-production stage, production stage as well as post-production stage), and the total cost of the product during its life cycle allows designing a more cost-effective product.

There is a close relationship between the product life cycle and the value chain and the process of cost reduction, where the comprehensive cost approach of the product life cycle depends on the value chain, as the value chain meets with the costs of the product life cycle as it is concerned with understanding the activities of different production methods from converting materials into commodities and even delivering them to the customer (Kaplinshy & Morrise, 2001: 49). The value

chain requires expanding the focus outside the boundaries of the economic unit, that is, understanding the nature of the relationship between the economic unit and customers on the one hand, and the nature of the relationship with suppliers on the one hand. As understanding the nature of the relationship between the economic unit and customers leads to knowing how much the customer pays for obtaining the products of the economic unit and to knowing the total costs incurred by the customer during the customer's product life cycle, and then this determines the opportunities and methods for reducing costs that the economic unit must follow. The focus on reducing costs should also focus on suppliers of raw materials, because raw materials constitute a large proportion of the total costs. Therefore, processing raw materials with low quality will lead to an increase in quality costs in the rest of the value chain activities. If a supplier provides low quality raw materials This will cause the economic unit to bear the costs of restarting due to the low quality of the sold product as a result of the low quality of the inputs from the raw materials. Therefore, the production of a low-quality product will lead to a decrease in sales, a decrease in revenues and profits, a decrease in its market share, and a loss of its competitive advantage and strength. To achieve a competitive advantage, each economic unit must have a sustainable product life cycle better than its competitors. This

means that the economic unit reduces its costs while increasing the competitive advantage. But this does not mean that all costs should be low. Which means that all costs that do not adversely affect a competitive advantage can and must be reduced. (Akenbor & Okoye, 2011: 190-192). To do this, the following steps must be followed:(Blocher et al. 2010, 39):

- 1-Determine the competitive advantage (cost leadership or differentiation): The analysis of the sustainable product life cycle helps the management to better understand the competitive strategy of the economic unit.
- 2-Identifying value-adding opportunities: The analysis of the sustainable product life cycle helps identify activities that add value to customers. For example, food processing factories and packaging factories are located near huge population centers and crowded city centers in order to provide the fastest delivery services at the lowest transportation cost.
- 3-Identifying opportunities to reduce costs: Studying the sustainable product life cycle can help the economic unit to identify those parts of the sustainable product life cycle that are considered non-competitive. Some economic units have found that relying on some economic units to supply them with some parts leads to lower costs. Instead



of manufacturing, economic units began to rely on direct purchase.

## CONCLUSIONS AND RECOMMENDATIONS

### Conclusions

1. The changes in the modern manufacturing environment, the use of modern production techniques, the intensity of competition, and the tendency to meet the customers' desires have affected the structure and structure of costs, making the techniques and methods used to reduce costs useless and useless at the present time.
2. A large proportion of the costs incurred in the life cycle of the total sustainable product are mandatory future costs arising from decisions taken in the research, development and engineering cycle. Therefore, the decisions taken in this cycle are critical and extremely important decisions.
3. By adopting a sustainable product life cycle, manufacturers can balance the elements of quality costs by eliminating unnecessary requirements while focusing on the important and necessary parts.
4. The adoption of a sustainable product life cycle must be in line with the huge and rapid developments in our current era, especially with regard to cost forecasting and the method of estimating it by the committees, taking into

consideration the requirements of competitive advantage during the stages of the product life cycle.

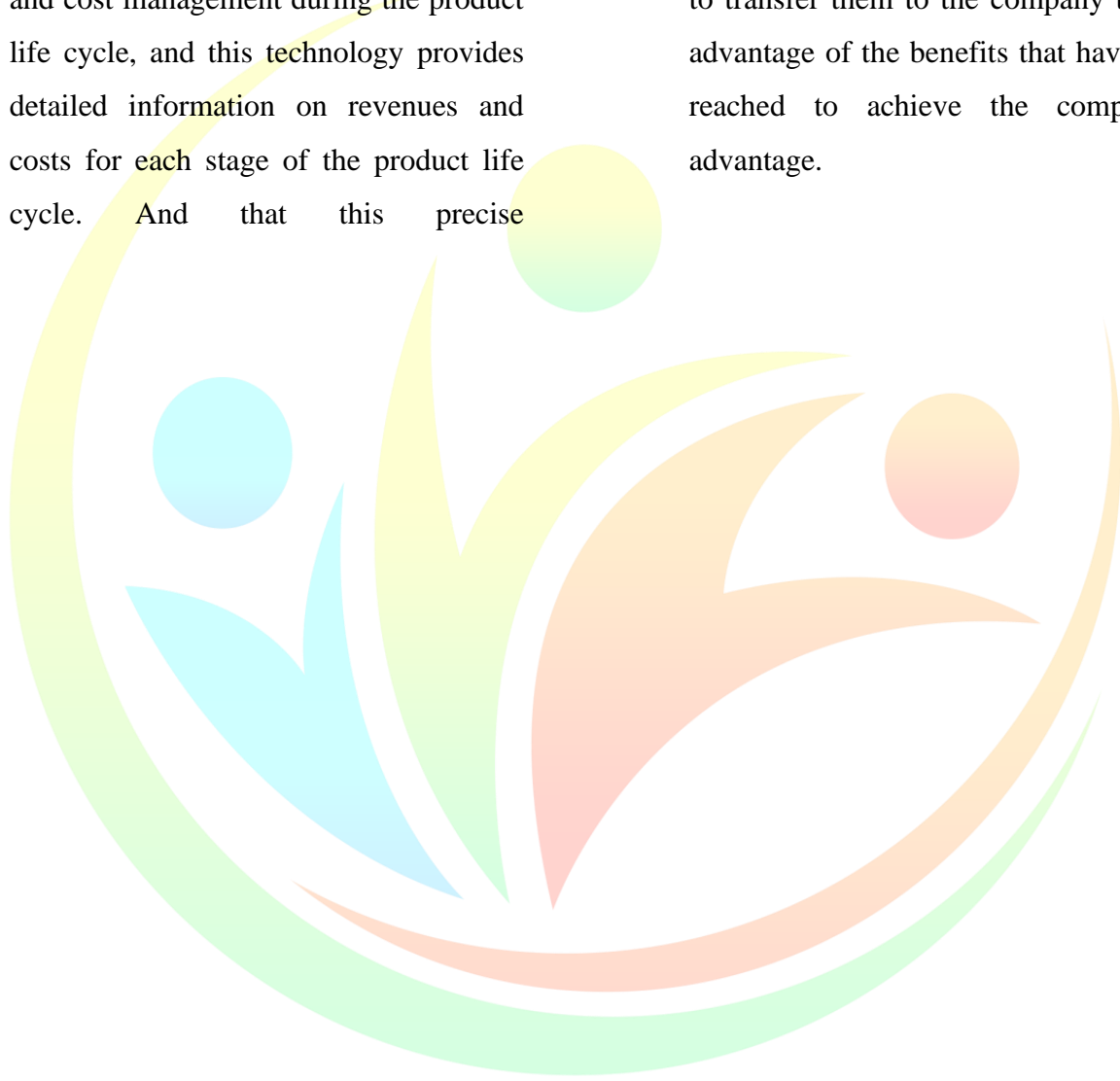
### Recommendations

1. The most appropriate and best techniques should be chosen for the work of the economic unit, which would achieve the goals of the economic unit. The most appropriate technology that can be used at the present time is the cost management technique during the life cycle of the sustainable product because of its great benefit in managing and reducing costs during the product life cycle.
2. The sustainable product life cycle costing technique should be used to calculate the cost of the product, because the product life cycle costing technique takes into consideration the costs that occur before production, such as the costs of sustainable research and development and sustainable design, as well as the costs that occur after production sustainable, such as maintenance and customer service costs, when calculating The cost of products and services. Also, this technology gives a complete perception of the costs and profits of the product during each stage of its life cycle, which helps identify opportunities to reduce costs at each stage of the product life cycle.

3. The sustainable product life cycle costing technology should be adopted and used for the purposes of product pricing and cost management. Because this technology provides important information for the purposes of pricing and cost management during the product life cycle, and this technology provides detailed information on revenues and costs for each stage of the product life cycle. And that this precise

determination enables management to know whether the profits will cover the costs during the life cycle of the product.

4. The necessity of simulating some successful experiences to implement the sustainable product life cycle and trying to transfer them to the company to take advantage of the benefits that have been reached to achieve the competitive advantage.



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