



MEASURING ENVIRONMENTAL COSTS AND QUALITY COSTS AND THEIR ROLE IN IMPROVING PRODUCT QUALITY AND ACHIEVING CUSTOMER SATISFACTION

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Article history:	Abstract:
Received: November 7 th 2021 Accepted: December 7 th 2021 Published: January 8 th 2022	<p>The research dealt with the objective of environmental costs and quality costs, and through this study, the concept of environmental costs, its objectives and types in terms of its association with the economic institution and in terms of its financial effects on the economic unit, was identified. Disclosure is a presentation of information related to environmental activities, and the importance of disclosing environmental costs was mentioned, as it was found that it is the factor that gives legitimacy to the activities carried out by various economic institutions, and environmental disclosure increases the community's confidence in establishments that fulfill their environmental responsibilities.</p> <p>There are several problems and difficulties encountering the process of measuring environmental costs, which must be overcome or facilitated. As for the methods of measuring environmental costs, there were many, including those that depend for their measurement on traditional markets of various types, and others that depend on virtual markets.</p> <p>With regard to quality costs, its multiple concepts and dimensions have been identified, as quality is the suitability of the product for use, and quality costs are the costs incurred to prevent the production of a low-quality product, and quality costs are important to the reputation of the institution, and have a role in consumer protection, the application of the quality system. It leads to a significant increase in the market share of productive institutions, as well as an increase in productivity and quality costs. The higher the quality, the higher the productivity and the lower costs.</p> <p>Quality costs are on two types of conformity (prevention and evaluation), and non-conformity (internal failure and external failure), as it was found that the higher the conformity costs, the lower the non-conformity costs, and it was recommended to increase the investment in prevention costs to the level at which its positive impact remains in reducing Quality costs in general and the costs of internal failure and external failure in particular, and that attention should be paid to quality costs as they affect the quality of the product provided to the consumer, and prevention costs occupy the highest relative importance among the types of costs because they contribute effectively to reducing the occurrence of other costs of quality.</p> <p>The methods of analyzing quality costs are also numerous, the most important of which are trend analysis and Pareto analysis, where the latter is considered one of the most successful techniques in analyzing quality costs and one of the most powerful tools that man has invented.</p>
Keywords: Environmental costs, quality costs, types of environmental costs, types of quality costs. .	

INTRODUCTION

Protecting and preserving the environment is no longer optional by economic institutions at the moment, it has become inevitable, due to the aggravation of

environmental corruption and social performance and increased diversity in pollution, and therefore has become an urgent problem for different states, bodies and organizations, and since the various economic



institutions aim to ensure their continuation, in light of this overwhelming competition on these institutions must take into account social problems, in order to contribute to reducing the negative external effects of their activity, and from It is necessary to contribute to solving the problems that concern society, i.e. it must assume its social responsibility.

These environmental impacts resulting from the practice of industrial units for their economic activities have had serious implications for the environment, and therefore it is the duty of the units that carry out such activities to take responsibility for the environment and work on its development by maintaining its resources and consumption ideally and reducing or preventing industrial pollutants, and accountingly this responsibility is reflected in the fact that this unit bears environmental costs and requirements, and in order for environmental and economic decisions to be rational, there must be an environmental cost management whose task is to manage these Costs according to the foundations and standards to achieve environmental quality that helps to optimize the use of available resources and work to reduce the rate of waste in resources as well as avoid failure in production to save the cost of materials, work and expenses, which are elements of basic cost, which means lower production cost, higher profits, customer satisfaction, greater market share and competitive advantage.

Global and local institutions face many changes and challenges, the most important of which is increased competition at the global and local levels, and the accompanying change in consumer behaviour, which has become more aware and cultural in its consumption, and is more able to select the product as a commodity or service the best, after the adoption of quality as a basic criterion.

Having aimed at satisfying the growing quantitative demand by improving production capacity, but with the increasing number of producers and also the freedom of trade, the enterprise has no room left to improve its performance and maintain its position in the market only through its behavior on the road of quality, which is not a new requirement but has become necessary and important for each enterprise, after the products became multiple in their forms and types, and the customer can trade between many of the products provided.

The continuity and presence of the organization depends on the presence of its customers, so ensuring survival requires customer satisfaction, and the adoption of the quality system helps to improve the ability of the organization to raise its market share thanks to the quality of the product, and reduce the

costs of development and improvement, production and maintenance, thanks to comprehensive quality management.

RESEARCH METHODOLOGY

Study problem

In light of the growing interest and new direction of economic institutions, the problem that is addressed in this study is reflected in the following questions:

What do environmental costs mean and how are they measured?

What do quality costs mean and how are they measured?

What are the types of environmental and quality costs?

What is the impact of quality services on customer satisfaction?

The importance of study

The importance of this study lies in measuring and analyzing the behavior of the elements of the environmental performance costs of the economic unit, because of the role of this in rationalizing and determining the cost of products correctly, and then achieving a fair interview between revenues and total expenses that contributed directly and indirectly to the achievement of the products of that unit and this distinguishes them from others with a product of higher quality and lower cost and thus maintain its competitive position.

It is important to recognize the terms and concepts of quality costs in all its basic details of the importance of elements and indicators of measuring quality costs, and the study of quality costs is considered one of the most important ideas in comprehensive quality management and is an important and integrative part of any quality program in organizations and production facilities.

Study objectives

This study aims to achieve the following:

- 1- Study the methods and methods available to measure and disclose environmental costs.
- 2- To demonstrate the concept of quality, dimensions and customer satisfaction.
- 3- Identify quality classifications of internal failure costs, costs of external failure, evaluation costs, prevention costs.

Study parts

This study was divided into two researchers dealing with the first environmental costs and types and addressing their disclosure and methods of measurement, while the second research mentioned the costs of quality, its dimensions, its types and all other details.

First research

Environmental costs



I/ The concept of environmental costs

These are the costs that protect the environment from damage, and environmental costs are defined as "the costs incurred by companies as a result of their commitment to the application of a range of activities that will protect the environment from damage to environmental pollution elements".ⁱ

It was also defined as "the result of furnishings to which society, enterprises and individuals are exposed by activities that affect the quality of the environmental system, which can be expressed in financial or other mal terms and long-term or short-term financial associations on the facility, considering that they include direct and direct change and are often not tracked, often hidden".ⁱⁱ According to the 1999 UN report, environmental costs "include the cost of actions taken or required to manage the environmental impacts of the unit's activity in an environmentally responsible manner, as well as other costs required by the unit's environmental objectives and requirements".ⁱⁱⁱ

Jackson defined it as "production costs, marketing, and delivery of products and services, including any post-purchase costs resulting from the use and disposal of products".^{iv}

As for the accounting thought of the environmental costs as enabling institutions to prepare financial reports for use by investors, lenders and other respondents of these reports, in line with the principle of disclosure, which is a generally accepted principle, therefore, the cost of disclosure is generally accepted. From a management accounting point of view, environmental costs are a process that collects accounting information for administrative decision-making purposes in the areas of environmental protection and pollution reduction. This is in addition to limiting the foundation's contribution to achieving sustainable development.^v

II/ Environmental Cost Targets

The environmental costs of the following are aimed at:

- 1- These costs help organizations study the negative impacts of operational processes on the environment, the associated development and budgeting of protection programmes, their impacts on profit and the discovery of new ways to reduce these negative impacts on the environment.
- 2- The process of disclosing the physical costs of the institutions leads to the availability of information on the nature of their activity, the physical nature of their activity, the physical and financial expenditures resulting from the compliance with those transactions, and the

associated costs, and their impact on both the financial position, liquidity and equity returns.

- 3- Environmental information provides decision makers with investment in enterprise shares and making them invest in highly efficient areas in pollution control.
- 4- The presence of environmental costs in the annual reports helps the competent agencies in the country in preparing long-term plans for natural resources and reports of environmental indicators for different regions of the country and the crisis to achieve control over the elements of environmental pollution.
- 5- Environmental costs are better managed, so they should be reviewed regularly to uncover shortcomings in the accounting program and enable organizations to measure environmental revenues and benefits.
- 6- Through environmental cost reports, we are aware of the commitment of companies to apply the prevailing laws and spreads for the purposes of preserving resources or not.^{vi}
- 7- It aims to control and price products through decision-making, understanding and monitoring of the costs and performance of processes and products.^{vii}

From this we conclude that environmental costs help companies and enable them to study the negative effects of operational processes on the environment and the associated development of protection programmes and a budget for these programmes, and the impact of these costs on profit and find other new ways to reduce negative impacts on the environment.

Types of environmental costs

There are several types of cost-effectiveness in terms of its association with the economic institution divided into:^{viii}

1- Direct environmental costs^{ix}

These are the economic sacrifices that the economic institution voluntarily bears in order to protect the environment from the negative effects of its activity:

- Medical treatments for diseases caused by companies.
- Environmental costs related to reducing waste and reducing its damage through the use of rust-based alternatives to the environment.



- Costs of eliminating and avoiding waste, maintaining air quality, as well as resulting from processors in industries and industrial irregularities.
- Pay and salaries for people with diseases they have been infected with during their work and their failure to work.

2- Indirect environmental costs

These are the economic sacrifices that society bears because of the damage caused by the harmful activities of the institution. They are the costs that serve the production stages as a whole, for example the costs of environmental resources drained during the production process, such as air, water and wildlife.

3- Environmentally related costs

They are the costs of materials for production outputs, including the cost of purchasing medical resources such as water and other materials converted into products, material costs for outputs other than the product, and includes energy and water procurement costs, Other materials that become production outputs and are not productive such as waste and emissions, and prevention costs and other environmental management costs, include environmental management activities such as cleaner projects and production plans.^x

According to their financial implications for the economic unit, environmental costs were divided into:^{xi}

Costs of prevention activities: these costs resulting from all activities carried out by the Unit for the purpose of reducing or eliminating the causes of pollution that can lead to negative environmental effects in the future, these costs can be limited to the cost of redesigning production processes, so that environmentally friendly materials that do not produce gas, liquid or solid residues are used for the purpose of providing the desired environmental safety or using chemicals and means to reduce pollution.

Costs of inventory and measurement activities: these are the costs resulting from the activities carried out by the Unit for the purpose of measuring and monitoring potential sources of environmental damage, consisting of activities to follow up on pollution levels in the raw materials used within the unit, activities to monitor levels of pollution in the remnants of the operational process, follow-up activities of environmental audits, and activities to follow up the relationship between the unit and various environmental agencies.

Costs of control activities: the costs resulting from the activities carried out by the Unit for the purpose of controlling and controlling all sources of pollution,

consisting of activities using environmentally friendly materials, activities of the use of environmentally friendly production methods, and activities to reduce sources of pollution.

Costs of environmental failure activities: the costs of misuse of resources involved in the manufacturing process and the misuse of natural resources of air, water, etc., are also defined as the costs of removing environmental damage that has already occurred as a result of the failure of the economic unit to occur as a result of the activities of the Unit, and can be divided into the costs of treating environmentally harmful production wastes, whether liquid, gas or solid, and fines resulting from the unit's violation of environmental instructions.

Thus, the division of environmental costs is important and necessary in order to protect the environment and to show the amount of environmental interest of the economic unit, as these classifications help to easily identify and measure environmental costs.

The expenses and costs incurred by industrial companies are the result of their commitment to implement a range of activities that will protect the environment from the damage of environmental pollution elements, which are triggered by environmental costs or material sacrifices, which companies bear in order to comply with the standards governing environmental laws in addition to achieving targeted growth rates.

Disclosure of environmental costs

After the increased responsibility placed on economic units, particularly environmental responsibility, the importance of disclosing accounting information increased, and Hognerbelieves that social disclosures are driven by the need to legitimize activities in light of the reaction to the expectations of the community. As a member of society governed by a legislative framework, companies are required to operate within the limits of this community, and therefore activities with negative effects on the environment can be revealed through a theory of legitimacy that increases awareness of the community and sets the standards that companies must adhere to in order to provide evidence that their main activities are acceptable to the community, so that the company's annual report can be used to enhance community confidence when management responds to disclosure. about its environmental performance.^{xii}

There are many views on the concept and limits of disclosure, and the general and comprehensive meaning of disclosure is the disclosure and disclosure of confidential information, and environmental disclosure can be defined as (the method by which the economic



unit can inform the community of its various parties about its various activities with social implications).^{xiii}

It was also defined as (the presentation of evidence and information related to the environmental activities of the enterprise in the lists, regular reports and accompanying clarifications, which facilitates the task of the users of the buildings and accounting information when estimating the performance of the environment and the promotion of decision-making related to it).^{xiv}

Environmental disclosure is also defined as "a set of information relating to the performance and activities of the environmental management of economic institutions and their financial implications in the past, present and future."^{xv}

We conclude from this that environmental disclosure is a presentation of information on environmental activities in lists and regular reports, which facilitates the task of users of information when assessing environmental performance and guides their decisions in relation to environmental expenditures.

The importance of disclosing information about environmental costs lies in using it to strengthen the ability of the organization's management to manage environmental issues and integrate them into strategic problems, as well as to compare the institution with other institutions that have similar continuous industrial activity, and through disclosure it is known the extent to which the institution is likely to be exposed to environmental hazards, which would affect the decisions of shareholders.^{xvi}

Increased interest in environmental disclosure is due to several reasons, including the development of the supply and public disclosure of the pace of expansion of the evidence and information disclosed from the relevant form and content to include the economic and environmental performance of the enterprise to meet the needs of the users of financial lists of information. However, investors do not want to invest in the shares of companies that do not disclose their environmental performance, and may be the result of the continued development of the shares of the establishment or the boycott of consumers of their products that harm the environment, as well as the promotion of Economic decisions of the users of financial lists, which relate to assessing the extent to which the establishment fulfills its responsibilities towards maintaining the environment of pollution and increasing the community's confidence in facilities that meet their environmental responsibilities and encourage them to develop and develop their activities, With pressure on enterprises that do not meet that responsibility, the disclosure of the economic effects of environmental pollution helps to analyze and predict the efficiency of the state's

economic resources in light of the changes that lead to the increase in the effectiveness of the economic mistakes of the state.^{xvii}

We conclude that environmental disclosure increases the community's confidence in facilities that meet their environmental responsibilities and encourage them to develop and develop their activities and expand their investments, in return increase pressure on enterprises that do not meet this responsibility to protect their activities and protect them from the burden of dealing with damage caused by environmental pollution due to their productive processes.

Disclosure is either optional or compulsory, the optional disclosure is the one that investors do not participate in the management of the daily activities of the institution where they delegate these responsibilities to the administration and this leads to two important problems, the first is the asymmetry of the information, investors are less knowledgeable compared to management about activities and the value of the institution, and the second problem is the existence of ethical risks where the administration works to take advantage of the advantages of knowing the activities of the institution and the expectations of the future, so institutions must voluntarily disclose what information they have.^{xviii}

The other compulsory (mandatory) disclosure, which is contrary to optional, as this type of disclosure must disclose the types of items that the institution considers environmental costs while demonstrating the size of the environmental costs loaded on the income list and those sent during the period, which requires disclosure of the following things, waste costs fines, imposed on non-compliance with environmental regulations and laws and finally compensation paid to others.^{xix}

Problems of measuring environmental costs

The measurement of environmental costs is subject to several problems and difficulties, the most important of which are:

1- Determining the causal relationship between the offending conduct and the resulting harm:

This factor raises several problems, including:

A. Distance: The distance between the source of the damage and the place where the damage occurred cannot be precisely determined, such as air pollution, radioactive waste contamination or fumes contamination that knows no specific limits.^{xx}

B. Compensation assessment: It is difficult to estimate compensation in certain cases of pollution, such as in the case of chemical contamination, the effects of which do not appear immediately, but appear after several years and therefore it is difficult to quantify the extent of losses and damages as soon as they occur.



(t) Difficulty in accounting for types of pollution: in some cases affecting plants, animals or even buildings, it is difficult to determine the source or type of pollution that causes damage, which occurs as a result of the reaction of several types of pollution, such as in the case of pollution of river water by dumping waste or by the disposal of factory water.

W- The difficulty of accounting for the effects of pollution: It is scientifically established that sources of pollution do not always produce similar results, because natural conditions play an important role in this area, the dumping of contaminated waste in the river does not cause the same damage during the duration of the movement of water, and there are also other factors such as wind, sun and fog that can affect air pollution and here it is difficult to assign damage to a specific source, and therefore difficult to measure for such damage.^{xxi}

Difficulty in estimating the financial value of environmental damage:

It is not easy to estimate the financial values of all environmental damage, as some may have market value such as loss of fish and coastal resources, and others have no market value such as human health damage as a result of pollution.^{xxii}

3- The desire of the economic units to maximize profits: This necessarily requires reducing costs to the lowest possible extent (by imposing the stability of other elements), and therefore because it is in the interest of the economic unit to limit production costs only without taking into account the social costs of environmental pollution.^{xxiii}

Lack of information to measure environmental costs:

Such as the destruction of natural materials and pollution outputs where there is insufficient information to measure them, to evaluate them financially and to register them in book according to the dual registration system.^{xxiv}

The difficulty of linking environmental costs to environmental benefits:

The process of measuring the company's economic performance is carried out by interviewing the elements of economic performance costs over a period of time with the economic benefits and benefits generated by that performance during the same period and therefore the possibility of reporting on the efficiency of that performance translated in the reflected business results of the figures and profit rates achieved at the end of the period under measurement, despite the importance of measuring and reporting on the return on the environmental performance of the company, considering that the environmental benefits achieved as a result of the environmental costs borne by the

company represent the part of the period under measurement. Supplementing the equation of measuring social contribution, however, the costs of environmental performance, as opposed to the costs of economic performance, are usually difficult to judge their effectiveness or efficiency because of the difficulty of linking these environmental costs to environmental returns or benefits.^{xxv}

Lack of strategic environmental plans:

Plans are an important factor for environmental measurement, without standard performance assessment and other levels that cannot measure damage to environmental performance, and compare it with standard performance levels and evaluation.^{xxvi}

Bias in asset measurement and environmental obligations:

There are several difficulties in the accounting measurement of the environmental impacts of environmental processes affecting the assets of the establishment or its obligations in the form of verifiable accounting figures, where the measurement and accounting evaluation of those assets or obligations are linked to personal judgment when estimating the value of those environmental impacts.^{xxvii}

Ways to measure environmental costs

There are several ways to measure environmental costs^{xxviii}

1- Entrance to roads and curricula based on traditional markets

This set of measurement methods deals with market data and indicators through the following methods:^{xxix}

A- The way to respond or influence

This method is based on the study of the response sign to pollution quantities from indirect roads, which depends on the assessment of the relationships between exposure to pollution quantities and their impact on human or physical assets such as buildings, machinery and equipment, and this type of method focuses on a causal relationship between pollution and the impact on human, material and natural wealth, for example, measuring patient costs resulting from pollution by measuring direct and indirect costs as follows:

Direct costs include the costs of treating pollution-induced disease such as hospital, nursing and health care costs.

Indirect costs include costs related to the inability of the injured person to work as efficiently as he or she did before the diseases caused by pollution and environmental damage.

How to affect productivity

This method is based on observing material change on production associated with certain changes in the



environment and air pollution can negatively affect agricultural productivity and reduce production in quantity and quality. The following equation shows an improvement in the economic value of this material change on production or a decline in production.

$$\text{مقدار الانخفاض في الانتاجية الزراعية كما} \times \text{سعر الطن} \\ = \text{القيمة الاقتصادية للغير}$$

Replacement cost method

Pollution and environmental degradation usually result in damage to various assets and resources such as agricultural land and constructed real estate, in which case these effects can now be calculated by calculating the costs of replacing the affected asset or the costs of returning it to its original state, and it should be noted that this method is difficult to apply if the affected assets are assets of historical or cultural value.

The method of preventive costs

Preventive or environmental costs are reflected in the difference between the cost of spending on housing in dangerous places with nuclear radiation or exposed to environmental disasters or air pollution, and housing in safer and cleaner places in terms of air and space, which is an indication of economic sacrifice, such as living in a relatively safe place.^{xxx}

Second: The methods and approaches of virtual markets

These methods depend on the use of random questionnaires on individuals who are or are likely to be exposed to pollution and ask whether they wish to pay to avoid environmental degradation and a certain reduction in air quality or may ask how much compensation they wish to accept in order to allow acceptance of a particular reduction and in this way the difficulty of applying them in developing countries is more appropriate in application in developed countries because of the different standard of living of individuals and their social preferences. Accounting measurement requires flexibility in the accounting system so that it is in line with the prevailing economic and social conditions and the extent of the development of society, the previous method can be applied in developed countries as studies have shown, while the methods and approaches that depend on traditional and implicit markets are in application in developing countries.^{xxxi}

Second research

Quality costs

The economic units in the world have come to agree in achieving a basic goal focused on satisfying the customer and satisfying his needs, so the role of these units lies in adopting the desire of the customer by accurately defining the specifications of the commodity or service, durability, price, after-sales services in accordance with those desires.

I/ The concept of quality costs

Quality as *qualité* is a word derived from the Latin word "Qualities", which means the nature of the object and the degree of repair, and it does not necessarily mean the best or the best always, but is a relative concept that varies depending on who is used.^{xxxii}

Quality costs are the costs that occur to prevent low quality, or those that occur as a result of low quality, and have provided many definitions of the concept of quality that Juran defined as: the suitability of the product for use, as Crosby defined it as: product conformity to the specifications established, Cohen & Brand described it as: meeting and even exceeding the requirements of the beneficiary.^{xxxiii}

Quality is a set of characteristics and features of a product or service that depends on its ability to satisfy specific needs, and is considered by the International Standards Organization^{xxxiv} (ISO) for quality as (the set of characteristics of a product or service qualified to respond to declared or implied needs).^{xxxv}

Quality costs have been defined according to British specifications (2) BS6143: the cost for confirming and ensuring quality in addition to loss and loss when quality is not completed or obtained.

Quality costs can be defined as those achieved to prevent the production of a low-quality product or as a result of the production of a low-quality product.^{xxxvi}

Thus, the concept of quality costs goes to the money spent by the company to maintain the required quality level, and to help the administration make the appropriate decision to prevent losses from lack of interest in quality. Although there is a multiplicity of jurisprudence in giving a well-defined concept of quality costs, they all agree on the correlation of what needs to be spent to obtain a specific quality level.

II/ Objectives and the importance of quality costs

Quality costs are aimed at achieving the following:^{xxxvii}

- 1- Different administrative levels help to focus and pay attention to the economic worker.
- 2- Proof that the area of improvements is possible.
- 3- To note that corrective business is a necessity.

Thus, a quality cost system allows for:

- 4- Control the nature of non-conformity costs.
- 5- Know the savings in the overall activities of the company.
- 6- Managing investments related to preventive and supervisory activities.

The importance of quality costs lies in:^{xxxviii}

- 1- The reputation of the organization: The quality of the products produced by the organizations is the basis of their fame, and this is illustrated by the relationships that the organization has



with suppliers and the experience and skills of the employees, and trying to provide products that meet the wishes and needs of the customers of the organization, if the products of an organization are of low quality can be improved in order for the organization to achieve the fame and reputation that enable it to compete.

- 2- Legal responsibility for quality: Each organization or organization is legally responsible for any harm caused to the customer by its use of its product, as the number of courts hearing cases of institutions designing products or providing services that are not good at producing or distributing them is constantly increasing.
- 3- Scientific competition: Quality is of paramount importance and therefore the result of economic and political changes as each organization seeks to improve and deliver a product that will enable it to compete in global markets.
- 4- Consumer Protection: Applying quality in the organization's activities protects consumers from fraud and enhances confidence in the organization's products.

In addition, the application of the quality system leads to a significant increase in the market share of productive enterprises, as well as increased productivity and quality costs, deming sees. E The better the quality, the higher productivity and lower costs, and also reduces accidents and complaints.^{xxxix}

III/ Types of quality costs

There are two types of quality costs:^{xl}

- 1- Matching costs are divided into:
 - Cost of prevention: These costs help to prevent and get rid of the defective units before they occur, including the cost of planning quality, including the cost of designing new machines, and the cost of controlling operations, including the cost of process analysis, the commissioning of information systems and includes the cost of developing the data required for work, and the cost of working with the processors, which is tasked with increasing the quality of purchases of materials involved in production.^{xli}
 - Cost of evaluation: It is a preventive cost in order to improve quality and aims to assess the

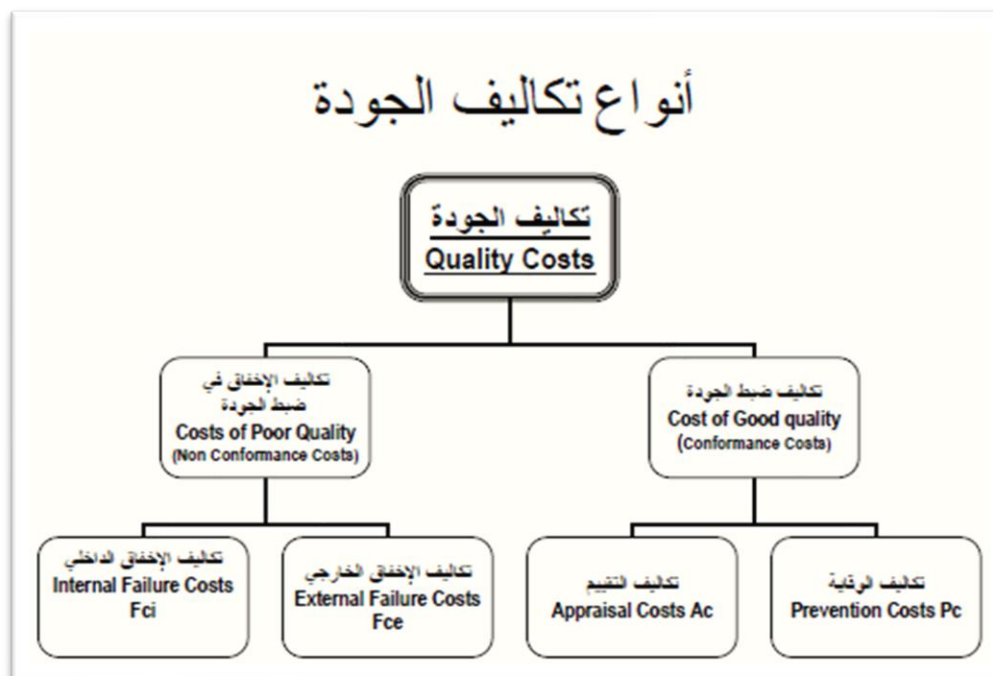
level of quality achieved through the system of operations, as this type of cost helps management in identifying quality problems and these costs include the cost of testing and examination, which is the cost of examining materials, measuring the cost of the operation, costing equipment, salaries, and the cost of maintenance of measurement equipment, which is the cost of repairing measurement equipment, and the cost of measuring and controlling the process, and includes the cost of time spent from the workers To collect and analyze data on quality standards.^{xlii}

We believe that the costs of matching both types (prevention and evaluation) have an impact relationship, as adaptation costs affect prevention costs, as the higher the prevention costs, the lower the evaluation costs.

- 2- Non-conformity costs are divided into:
 - The cost of internal failure: these costs resulting from errors and cause the loss of return as a result of the company's disposal of the damaged units, as well as the cost of rework as a result of the recurrence of operations on those units and the cost of waste, which is the cost of waste and rework, including the cost of materials and the cost of indirect work, and the cost of correction, and produces this cost of time spent to determine the causes of failure and correct the problems of production, and cost the failure of the process, which is the cost of using machinery for periods of time longer than planned.^{xliii}
 - Cost of external failure: The total costs of the defective product detected after delivery to the customer or consumer include the costs of processing customer complaints, replacement of defective and returned products, costs of liability resulting from accidents and costs of payment of guarantees and compensation.^{xliv}

We note that the higher the costs of conformity, the lower the costs of non-conformity, i.e. internal and external failure, and all institutions strive to reach perfection, as we note that most institutions seek to increase the costs of conformity to reduce the cost of failure, whether internally or externally.

A chart showing the types of quality costs



Fourth/ Keeping out quality costs

- 1- Suitable for use: the quality of the performance of the product or service for the specified purpose, the customer takes into account the mechanical characteristics or any other dimensions that are suitable for him, to judge the appropriateness of the product for him.^{xlv}
- 2- Expression of excellence: The quality of the item or service means a sense of happiness, pride, prestige and thus excellence.
- 3- Value: Which means how the product or service will perform its specific purpose and at the price desired by customers.
- 4- Conforming to specifications: i.e. the extent to which the product matches or agrees, whether it is a commodity or a service, with the design specifications of either of them.^{xlvi}

V/ Methods and methods of quality cost analysis

QualityCosts Report is the basis for these methods and methods, as all costs related to product quality are accounted for.

- 1- Trend analysis: Current cost levels are compared to past levels and useful information can be extracted for future planning to improve quality.^{xlvii}
- 2- Barreto Analysis: One of the most successful techniques in quality cost analysis and one of the most powerful tools created by man, which

came up with the idea that 20% of problems lead to 80% of the impact, Barreto is an Italian economist from the 19th century, and Barreto analysis consists of four steps:^{xlviii}

- Make a list of all possible reasons.
- Monitor operations in sufficient time so you can determine the cause of problems.
- Arrange causes from the most important to the least important.
- Map Barreto, which shows the frequency of the cause.

The following mathematical equation is a key way to measure quality costs and is as follows:

Quality costs = evaluation costs + prevention costs + internal failure costs + external failure costs

RESULTS

Through this study we have reached the following conclusions:

- 1- Management's interest in environmental cost measurements and information helps establish good relationships with internal and external parties.
- 2- Environmental disclosures have become important and relevant to the legality of key corporate activities, given the growing interest of the community and its lobbyists in the subject of the environment and how to deal



with them to avoid damage caused by major corporate production processes, which will have a direct impact on legislative authorities to use their tools to force companies to disclose their activities and environmental policy, as well as to stop environmentally damaging practices used in production processes.

- 3- Measuring environmental costs helps the company achieve production quality.
- 4- Environmental cost information helps management rationalize the decision to purchase the product or manufacture it internally.
- 5- Poor quality increases certain types of costs incurred by an enterprise or organization.
- 6- Quality costs are of great importance as they affect the quality of the product provided to the consumer, and prevention costs are of the highest relative importance among the types of costs because they contribute effectively to reducing the incidence of other costs of quality.

- 1- The prevailing view of the costs of preserving the environment changes from social costs to costs to the company.
- 2- Management should take care of the results of environmental cost measurements when sewing for the future and taking into account the effects of environmental costs.
- 3- All quality costs should be taken care of without exception.
- 4- Investment in prevention costs should be increased to the level where their impact remains positive in reducing quality costs in general and costs of internal failure and external failure in particular.
- 5- Pay more attention to the costs of external failure and take the necessary administrative measures and procedures.
- 6- Discover and satisfy customers' needs in a way that makes a distinction in increasing their association with their products and gaining customer loyalty.

RECOMMENDATIONS

The most important recommendations I have made from this study are:

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