

ANALYSIS OF QUALITY COSTS BASED ON ACTIVITIES TO REDUCE FAILURE COSTS AND IMPROVE PRODUCT VALUE

(AN APPLIED STUDY IN THE GENERAL COMPANY FOR FOOD PRODUCTS)

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ABSTRACT

The research aims to introduce the tools of total quality and the concept of quality costs and their types, then analyze these costs on the basis of activities in order to help reduce the costs of failure and improve the value of products in a manner commensurate with contemporary environmental requirements. The research community is represented by Iraqi industrial companies, while the research sample is represented by the General Company for Food Products for the years 2019, 2020, 2021. The research reached a set of conclusions, the most important of which was that quality improvement is an essential element of total quality management, as improved quality leads to low cost by reducing errors, non-recurrence, and reducing production time. Which leads to the optimal utilization of time and resources, and the analysis of quality costs on the basis of activities can help reduce the costs of failure and improve the value of the product.

INTRODUCTION

In light of the changes in the contemporary business environment, the economic unit has a desire to grow, develop and excel over the rest of the economic units. It is necessary to provide products and services that meet the needs of the target consumer, and the most important point that can be focused on to achieve consumer satisfaction is quality. And that quality is a strategic goal and a competitive advantage for most economic units. It was placed at the forefront of the objectives of the economic unit as evidence of its success, development and continuous improvement of its performance. economy in foreign markets, Poor quality usually leads to an increase in certain types of costs borne exclusively by the economic unit, including those related to defective units, re-production costs, examination and transportation costs, costs of dealing with customer complaints, and costs related to the discount granted to products of poor quality.

The first topic: research methodology and previous studies

1-1 Research problem:

Iraqi industrial companies suffer from the problem of high costs and low level of quality of their products, which leads to their weakness in competition in the industry. The level of its performance and the research problem emerges through the following question: Are the industrial companies able to reduce the costs of failure and improve the value of their products by analyzing the costs of quality.

1-2 Research importance:

The importance of the research comes from the importance of quality and its impact on the production process and on the activities of companies. Commitment to quality activities requires the classification of quality costs in line with the competitive business environment to highlight the financial importance of quality costs by providing appropriate information to reduce the costs of failure and improve the value of products.

1-3 Research objectives:

The research aims to introduce the tools of total quality and the concept of quality costs and their types, then analyze these costs on the basis of activities in order to help reduce the costs of failure and improve the value of products in a manner commensurate with contemporary environmental requirements.

1-4 Research hypothesis:

The research is based on the following hypothesis: The analysis of quality costs based on activities can help reduce failure costs and improve product value.

1-5 Research community and sample:

The research community is represented by the Iraqi industrial companies, while the research sample is represented by the General Company for Food Products for the year 2021.

The second topic: the theoretical side of the research**2-1 The concept and elements of total quality management:**

The concept of total quality management is one of the modern management concepts that is based on a set of ideas and principles that any department can adopt in order to achieve the best possible performance to provide products and services that are consistent with the needs of customers (Al-Daraka, 2011: 15).

Total quality management means the participation of all enterprise functions in the process of continuous quality improvement, a concept through which enterprises wanted to expand from focusing on quality control of the manufacturing process to a customer-oriented process that focuses on delivering a quality product (Faraj, 2014: 37).

Therefore, total quality management is an application of quality principles to achieve all goals in order to satisfy customers, as it is assumed that high quality levels are followed through the participation and commitment of management and employees in rationalizing work by providing what the customer expects or exceeds his expectations, and this definition includes the following three important elements: (Horngren, et.al., 2018: 158)

1. Management and staff participation and commitment.
2. Total quality management is a method of performing work and not just a program.
3. Customer count and expectations are the goal of quality improvement.

Therefore, total quality management is an administrative philosophy that includes all functions and areas of work in the organization, employee participation, teamwork, customer satisfaction and continuous improvement, in addition to being an integrated management concept towards continuous improvement in the quality of products and services to participate in all levels and

functions in the organization and that the goal of quality management is building Quality from the outset makes it the task and responsibility of each individual (Zimmerman & Schunk, 2001:429).

Total quality management seeks to achieve quality according to the specifications that satisfy the consumer, and there are several elements of total quality management, which are as follows: (Al-Janabi, 2011: 67-69)

1. Strategic planning: In total quality management, organizations use a comprehensive strategic plan that contains at least the vision, mission, goals, and activities of the company.
2. Assigning senior management: This is determined by establishing a set of priorities through which it tries to support the ability of senior management to be committed to supporting the quality program for a long time.
3. Focus on the consumer: the consumer is the oriented in total quality management, as the consumer helps in determining the quality of individuals, key processes, and the work environment.
4. Continuous improvement: This improvement represents both the improvement of the offer in a new creative way and additional improvements as part of the operations and for all business units.
5. Training and education: Total quality provides the basis for a better and continuous way to improve individuals in the organization. Education and training raise the level of capabilities of individuals to perform jobs.
6. Participation of individuals and their delegation of authority: Participation relies on exploiting the intellectual energies of workers, especially those close to work problems.
7. Control: It represents a set of methods and methods that aim to ensure that the goals of the organization and the plans set to achieve those goals have been accomplished.

2-2 The concept and types of quality costs:

The issue of costs and their reduction is one of the important and urgent issues. It is based on the steady increase in the use of the cost factor and the intensification of various aspects of competition, which in its final form affects the level of return achieved by the establishment, which is thus reflected in the economy in general. In order to survive in any business, the company must make a profit that helps it to Growth and development, and this requires achieving customer requirements and providing quality at the lowest cost. And at a time when it is not possible to avoid the costs of labor, materials, facilities, and machinery, the costs incurred as a result of preventing, ending, and correcting errors during production are costs that can be canceled, and this in turn can lead to directing market prices to decline and support customer satisfaction (Al-Sheikhly, 2006: 58).

Quality costs are divided into the following main types:

1. Prevention costs: These are the costs that occur in order to prevent the production of non-conforming products. These costs are as follows: design engineering, process engineering, supplier assessments, preventive maintenance of equipment, quality training, new materials used in the manufacture of products, and prevention costs are The most important in terms of its impact, as each monetary unit spent on prevention can save ten

monetary units from the costs of failure, examination and testing (Horngren, et.al., 2018:655).

2. Evaluation costs: These are the costs that occur to discover which of the produced units do not conform to the specifications. The most important of these costs are: product inspection costs, process inspection, purchase inspection, final inspection, standards for measuring and quality control tools. Theoretically, these costs are unnecessary if everything is done correctly from the outset in the economic unit (Al-Qarghouli, 2014: 20).
3. Internal failure costs: They are the costs that occur when the product does not conform to the specifications and before it is shipped to customers. These costs are represented in damage, rework, scrap, remedial maintenance, and engineering of the production process in internal failure, that is, they are the costs that occur before the product is delivered to the customer (Horngren). ,et.al.,2018:677-678).
4. External failure costs: These are the costs that occur after the product is delivered to the customer, and are defined as the costs that occur when the product does not conform to the specifications after it is shipped to the customers. These costs are customer support, transportation costs, process engineering, maintenance costs, and legal cases (Al-Naimi, 2015: 98).

2-3 Concept and importance of cost reduction:

Poor quality usually leads to an increase in certain types of costs that the economic unit bears exclusively, and these include those related to defective units, costs of reproduction, costs of examination and transportation, costs of dealing with customer complaints, and costs related to the discount granted to products of poor quality (Al-Bakri, 2000: 166). .

The concept of cost reduction must indicate a permanent and real reduction in the unit cost of production or services without reducing the benefit of the product or service while preserving quality and quality. The concept of cost reduction must include a substantial reduction in the cost of manufacturing, management and marketing by excluding unnecessary elements in Costs (Morgan, 2014: 20).

Cost reduction was defined as that planned method that aims to improve efficiency through the optimal use of cost elements and speed in completing operations, or increase production in a way that leads to a reduction in the cost of the productive unit without affecting its quality or functionality (Al-Razanji and Alwan, 2004: 14).).

Cost reduction was defined by the butcher as “a positive plan designed to improve efficiency by excluding waste or waste in production, increasing efficiency in all fields, and using advanced means to reduce this waste, and this is done through achieving real and continuous savings in the unit cost of manufactured goods or The service provided without affecting its suitability for the required use.” (Al-Ta’i et al., 2015: 14).

Cost reduction should be a real reduction, i.e. achieve savings, and any unnecessary activity and causes of defects and errors are excluded because it will be a burden on the economic unit. Reducing costs while not affecting the quality of the product will be the best method to maintain the competitive position of the economic unit. Reducing the cost by one of the following alternatives: (Kotler & Gray, 2007: 214).

1. Increasing the quantity of outputs while keeping the quantity of inputs constant.
2. Increasing the quantity of outputs by a rate higher than the rate of increase in inputs.
3. The quantity of inputs decreases while the quantity of outputs remains constant.
4. Decrease in the quantity of inputs by a percentage higher than the percentage of decrease in the quantity of outputs.
5. Increasing the quantity of outputs and decreasing the amount of inputs.

2-4 Reducing external failure costs and improving product value by analyzing quality costs based on activities:

It is possible to reduce the costs of external failure and improve the value of the product by analyzing the costs of quality on the basis of activities by following two approaches, which are the traditional approach and the modern approach. These two entries can be clarified through the following: (Al-Daradkeh, 2011: 76).

1. The traditional approach: If it is necessary to raise the level of quality through the type of raw materials used, the level of technology, the level of skill of the workers required, the time required for production, the type of machines used, or the examination system, all of this would raise the cost Production and thus costs are exchanged for quality.
2. The modern approach: This approach is defined by the Japanese experience, which focuses on efforts that focus on pre-production (purchasing, supply, design, engineering) and on production, which leads to good quality with a clear reduction in examination and re-work activities, and the accompanying significant reduction. in costs.

Control maps can be used to know the extent to which these operations are under control. If they are identical to what was previously planned, it means that the operations are under control. Therefore, they help workers to take preventive measures in a timely manner in order to avoid errors or defects in the economic unit during the period (Al-Naimi, 2015: 549). .

It is also possible to use the hexagonal diffraction, which presages that it is a process or strategy that enables the economic unit to improve significantly in terms of its basic operations and structure through designing and monitoring daily business activities so that waste and resource consumption are reduced while at the same time meeting the needs of customers (Dilworth, 2012: 216).).

The third topic: the applied side of the research

3-1 An introductory profile of the General Company for Food Products:

The company was established in 2016 after the merger of the General Company for Vegetable Oil Industry and the General Company for Dairy Products. It is one of the formations of the Iraqi Ministry of Industry and Minerals. It specializes in the production of solid fats, liquid oils, soaps, detergents, cosmetics and dairy of all kinds. The company aims to contribute to supporting the national economy in the field of manufacturing food products. To achieve the highest level of growth in work and production and to adopt the principle of economic calculation and its efficiency in investing public funds and their effectiveness in achieving the goals of the state and raising the levels of performance of the national economy in order to achieve the goals of development plans, The Board of Directors of the company shall draw and develop the production, administrative, economic, organizational and technical policies and

plans necessary for the conduct of its activity, the achievement of its objectives, the supervision and follow-up of its implementation, and it shall exercise all the rights and powers related to that.

3-2 Analysis of quality costs based on activities in the General Company for Food Products to reduce failure costs and improve product value:

Although the financial affairs department in the company includes a division specialized in cost accounts, it does not calculate quality costs separately from the rest of the costs, but rather it is combined with the costs of other service departments because the standard accounting system guide applied in the company does not contain accounts called quality costs. Therefore, the costs of quality will be determined and measured and disclosed in the General Company for Food Products in order to help reduce the costs of failure and improve the value of the product, as shown through the following:

First: the costs of prevention:

Prevention costs in the General Company for Food Products consist of a set of paragraphs, namely quality planning, product design, quality system development, quality training, information costs, preventive maintenance costs, internal quality auditing, and other costs of prevention. The costs of prevention can be clarified through the following table:

Table (1): Prevention costs in the General Company for Food Products for the period (2019-2021)

| No. | Details | 2019 | 2020 | 2021 |
|-----|------------------------------|----------|----------|----------|
| 1 | Quality planning | 2317442 | 2467911 | 2100126 |
| 2 | Product design | 1423908 | 1820670 | 2725119 |
| 3 | Developing quality systems | 3423500 | 4132767 | 5455907 |
| 4 | Quality training | 5200750 | 3220113 | 6877000 |
| 5 | Information costs | 1314098 | 1250676 | 1533200 |
| 6 | Preventive maintenance costs | 565718 | 655145 | 875323 |
| 7 | Internal quality audit | 875672 | 945125 | 453000 |
| 8 | Other prevention costs | 1120653 | 1300256 | 1217825 |
| | Total | 16241741 | 15792663 | 21237500 |

Source: Prepared by the researcher based on company data.

Through the above table, it is noted that the costs of prevention in the General Company for Food Products for the years 2019, 2020, and 2021 were (16,241,741), (15,792,663), (21,237,500) dinars, respectively, and this indicates the company's interest in prevention activities.

Second: Evaluation costs:

The evaluation costs in the General Company for Food Products consist of a group of items, which are examination and testing of raw materials, during production and after its completion, and all maintenance, calibration, and wear and tear of examination and testing equipment, in addition to examination and test reports and other costs of evaluation, as shown in the following table:

Table (2): Evaluation costs in the General Company for Food Products for the period (2019-2021)

| No. | Details | 2019 | 2020 | 2021 |
|-----|---|----------|----------|----------|
| 1 | Inspection and testing of raw materials | 1738082 | 1850933 | 1575095 |
| 2 | Inspection and testing during production | 1067931 | 1365503 | 2043839 |
| 3 | Examination and final examination | 2567625 | 3099575 | 4091930 |
| 4 | Maintenance of inspection and test equipment | 3900563 | 2415085 | 5157750 |
| 5 | Calibration of inspection and testing equipment | 985574 | 938007 | 1149900 |
| 6 | Exhaustion of inspection and testing equipment | 424289 | 491359 | 656492 |
| 7 | Inspection and test reports | 656754 | 708844 | 339750 |
| 8 | Other appraisal costs | 840490 | 975192 | 913369 |
| | Total | 12181308 | 11844498 | 15928125 |

Source: Prepared by the researcher based on company data.

Through the above table, it is noted that the evaluation costs in the General Company for Food Products for the years 2019, 2020, 2021 were (12,181,308), (11,844,498), (15,928,125) dinars, respectively, which indicates the company's interest in evaluation activities, and the reason is due to the high costs of evaluation. In general, in the research sample company over the three years, especially the significant increase in the amount of salaries and wages.

Third: The costs of internal failure:

The costs of internal failure in the General Company for Food Products during the research years consist of a set of paragraphs, which are scrap, re-manufacture, examination, failure, and failure analysis, as shown in the following table:

Table (3): The costs of internal failure in the General Company for Food Products for the period (2019-2021)

| No. | Details | 2019 | 2020 | 2021 |
|-----|------------------|---------|---------|---------|
| 1 | Scrap | 1042849 | 1110560 | 945057 |
| 2 | Remake | 640759 | 819302 | 1226304 |
| 3 | Re-examination | 1540575 | 1859745 | 2455158 |
| 4 | Failure analysis | 2340338 | 1449051 | 3094650 |
| | Total | 5564521 | 5238658 | 7721169 |

Source: Prepared by the researcher based on company data.

Through the above table, it is noted that the costs of internal failure in the General Company for Food Products for the years 2019, 2020, 2021 were (5564521), (5238658), (7721169) dinars, respectively. In order for the company to reduce the costs of scrap to the lowest possible extent and within the permissible limits in order to reduce the costs of internal failure and thus the costs of total quality, it must search accurately for the reasons leading to the occurrence of internal failure with the need to identify those responsible for it and hold them accountable for their negligence in order to get rid of the lack of Indifference of some working individuals. The

costs of internal failure for the year 2021 were the highest amount compared to previous years, as it is noted that the costs of all its paragraphs increased during this year, and the reason for this is due to the increase in the costs of the laboratory, especially in this year due to the high costs of both materials and parts that are permanently damaged (scrap costs) and others.

Fourth: External Failure Costs:

The costs of external failure in the General Company for Food Products consist of a group of paragraphs, which are sales returns, warranty costs, communication with customers, and treatment of defective products delivered to customers. Which occurs when the product does not meet the specifications after it has been shipped to customers. These costs are customer support, transportation costs, process engineering, maintenance costs, legal claims, and the costs of external failure in the General Company for Food Products can be clarified through the following table:

Table (4): External failure costs in the General Company for Food Products for the period (2019-2021)

| No. | Details | 2019 | 2020 | 2021 |
|-----|----------------------------------|---------|---------|---------|
| 1 | Sales returns | 591344 | 562804 | 689940 |
| 2 | Warranty costs | 254573 | 294815 | 393895 |
| 3 | Customer contact | 394052 | 425306 | 203850 |
| 4 | Dealing with defective customers | 504294 | 585115 | 548021 |
| | Total | 1744263 | 1868040 | 1835706 |

Source: Prepared by the researcher based on company data.

Through the above table, it is noted that the costs of external failure in the General Company for Food Products for the years 2019, 2020, 2021 were (1744263), (1868040), (1835706) dinars, knowing that all these costs were obtained after the products were delivered to customers within years. specific search.

After identifying the four types of quality costs, the total quality costs in the General Company for Food Products can be clarified through the following table:

Table (5): Total quality costs in the General Company for Food Products for the period (2019-2021)

| No. | Details | 2019 | 2020 | 2021 |
|-----|------------------------|----------|----------|----------|
| 1 | Prevention costs | 16241741 | 15792663 | 21237500 |
| 2 | Appraisal costs | 12181308 | 11844498 | 15928125 |
| 3 | Internal failure costs | 5564521 | 5238658 | 7721169 |
| 4 | External failure costs | 1744263 | 1868040 | 1835706 |
| | Total | 35731833 | 34743859 | 46722500 |

Source: Prepared by the researcher based on company data.

Through the above table, it is noted that the total quality costs in the General Company for Food Products for the years 2019, 2020, 2021 were (35,731,833), (34,743,859), (46,722,500) dinars, respectively.

And after determining the total quality costs in the General Company for Food Products with its four categories of prevention and evaluation costs, internal failure and external failure for the years 2019, 2020, 2021, which were shown in the table above, and through this table, some observations can be made, as follows:

1. Prevention costs recorded the highest ratio to quality costs compared to other quality costs. The reason for this increase is due to the administration's interest in prevention activities.
2. The costs of external failure were recorded as the lowest relative to the costs of quality, followed by the costs of internal failure, due to the company's attempt to reduce failure as little as possible.
3. Increasing spending on prevention and evaluation costs can help reduce the costs of internal failure and external failure in the research sample company.

And after the total quality costs were determined and measured in the General Company for Food Products, they had to be disclosed in separate reports so that the benefits derived from them could be benefited from by making comparisons with the previous period or periods and indicating the percentage of change in them. This also helps in making a budget for the total quality costs for the period. coming.

In this regard, reference must be made to the benefits that Iraqi industrial companies in general and the General Company for Food Products in particular may obtain as a result of preparing a comprehensive quality cost report, including its four categories, which are prevention costs, evaluation costs, internal failure, and external failure. These benefits are as follows:

1. Identify the ratio of total quality costs to net sales, which can be compared with the standard rate set by quality experts, amounting to 2.5%.
2. Identifying the ratio of each item to the costs of the same type, as well as the ratio to net sales in order to assist in making decisions regarding increasing or decreasing any of them.
3. Identifying the ratio of prevention and evaluation costs, internal failure and external failure to quality costs to assist in making the necessary decisions to invest in prevention activities in order to reduce both evaluation costs and costs of failure of both internal and external types.
4. Assisting in making comparisons between the current and previous period by identifying the movement of these costs from one period to another and noting the increase or decrease therein.
5. Assisting in drawing up an annual, semi-annual, quarterly or monthly budget for total quality costs in order to identify the extent to which the plans have been achieved.

Thus, it can be said that applying the TQM technique and calculating quality costs and disclosing them in separate reports can help direct the attention of management to take appropriate measures and decisions in order to reduce costs and achieve competitive advantage, as competitive advantage can be achieved in its four dimensions. With regard to the cost dimension, quality is inexpensive And that is through reducing the defective defect and the associated costs, and through the quality dimension, so it helps in improving the quality of each of the processes and products, and with regard to the time dimension, Reducing the defective, scrap, rework and re-examination will help reduce the time of manufacturing operations as a

result of getting rid of many activities that do not add value. Finally, flexibility can be achieved through standardization and quality control processes that can help simplify and standardize procedures and processes.

The fourth topic: conclusions and recommendations

4-1 Conclusions:

The research reached the following conclusions:

1. Quality improvement is an essential component of total quality management, as improved quality leads to lower costs by reducing errors, non-recurrence, and reducing production time. Analyzing quality costs based on activities can help reduce failure costs and improve product value.
2. Total quality management is an application of quality principles to achieve all goals in order to satisfy customers, as it is assumed that high quality levels are followed through the participation and commitment of the management and the employee in rationalizing work by providing what the customer expects.
3. The issue of costs and their reduction is one of the important and urgent issues, as it is based on the steady increase in the use of the cost factor and the intensification of various aspects of competition, which in its final form affects the level of return achieved by the establishment.
4. Poor quality leads to an increase in certain types of costs that the economic unit bears exclusively, and those costs related to defective units include the cost of reproduction.
5. Analyzing the costs of quality on the basis of activities can help reduce the costs of failure and improve the value of the product in a way that helps in adapting to the changes and developments accompanying the contemporary business environment.

4-2 Recommendations:

The research recommends the following:

1. the company and with the competition that the company faces, and to provide special financial allocations for quality activities, and this leads to helping the company work according to improving quality and thus reducing costs.
2. Encouraging the senior management of the employees to attend training courses related to improving the quality of the product, and to take the necessary measures to eliminate quality problems and prevent their recurrence, by knowing the causes and treating them as soon as possible.
3. Educate the employees of the company by motivating the employees financially and morally, especially in the production departments, in order to provide high-quality products that conform to the required specifications.
4. Coordinating with the departments of the company specialized in examining the product, which is the department of quality control in the labor department in a way that includes reducing deviations and discrepancies in the product, and increasing financial allocations for quality training activities and the exploitation of available resources.
5. Emphasizing the importance of using the tools of total quality management in clarifying the importance of using each of the tools and determining the cost loss for each unit of

the defective production units, and the flow chart, so the costs of the purchased and manufactured raw materials and the final cost of the product can be identified through which the high costs can be identified and an attempt to reduce them.

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