

# Accounting For Throughput And Its Role In Restructuring Costs And Allocating Them To Products

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## Abstract

The ability of companies to develop their cost systems represents their ability to keep pace with the technological development of the industrial environment, which requires the use of modern techniques and methods. The research aims to identify and use the most important modern developments in the manufacturing environment, represented in the accounting for throughput entrance, to show its impact on the cost system, and to evaluate the extent to which accounting for throughput provides the appropriate information and help it determine how to rationalize industrial costs and identify obstacles. The research problem centered on the question: Does accounting for throughput provide the necessary information to rationalize the cost structure in the contemporary manufacturing environment?

Based on the foregoing, the research hypothesis is that the integration of accounting for throughput will determine the costs that guide operational decisions and increase their quality.

This research has been applied in a private sector company in northern Iraq, it is the Rogano Company for Insulating Glass and aluminum, as the necessary data were extracted to build and test the suitability of the information generated in rationalizing a package of operational decisions that are repetitive in almost every industrial unit.

**Keywords:** Accounting For Throughput, Restructuring Costs.

## Introduction:

The great developments in the modern era in the industrial aspect and the emergence of many developments that would directly affect the production process one of the most important of these variables is the technological development as well as the development in the method of the industry itself, which depends in an integrated manner on mechanization and the lack of reliance on the human element. The very high dependence on mechanization led to a decrease in the variable cost, as a result of reliance on mechanization in manufacturing, the cost of products decreased significantly as a result of the decrease in the cost of direct labor, and in light of all this, the traditional cost and management accounting systems do not meet the requirements of the modern industrial environment. It became necessary to bring about fundamental changes in the cost and management accounting systems in line with the throughput of goals in the modern era.

Accounting for throughput has emerged, which is one of the most important philosophies in modern management accounting that focuses on revenue and cost management and is linked to a set of concepts and foundations aimed at helping management to determine the difficulties it faces in achieving its goals and overcoming them, which leads to raising the efficiency of operational processes, and then maximizing the profitability of the company.

## Research Methodology

### First: The research problem and its questions

Make changes to develop methods of profitability planning, production and sales in order to fit with the technological development, which is characterized by the ability to innovate in the provision of new high-tech products, as well as the development in the industry style, which depends heavily on mechanization and the lack of labor and companies' efforts to

innovate using their expertise and creativity to attract the largest number of consumers.

Therefore, the research problem can be determined by answering the following question

Does the throughput accounting approach achieve rationalization of the cost structure in the light of the contemporary business environment?

### **Secondly: Research objectives**

The research aims to achieve the following:

1. A statement of the concepts on which accounting for throughput was based and an assessment of its effectiveness in rationalizing the cost structure in the light of the contemporary business environment.
2. The appropriateness of accounting for throughput as a tool to rationalize the cost structure in industrial companies to identify the most important obstacles in the application and analyze it.
3. Statement of the importance of accounting for throughput, rationalizing the cost structure in Rogano Company for Insulating Glass and Aluminum. (Research Sample)

### **Third: The research hypothesis**

The research is based on a major hypothesis that:

((Relying on the method of accounting for throughput contributes to increasing the accuracy of allocating costs to products compared to the traditional method of costs)).

### **Fourth: Research importance**

The importance of the research appears from the use of modern methods in modern industrial companies, which is represented by the throughput accounting approach, which provides financial and non-financial information for the industrial environment in order to enable the administration to evaluate the performance of companies in line with recent developments and developments, and to focus on the concept of throughput accounting in determining costs to contribute in a way Active in rationalizing management decisions.

### **Fifth: Society and research sample**

The research community is a selected sample of modern industrial companies. The spatial

boundaries of the study are represented in Rogano Insulating Glass and Aluminum Company and the data available from it, after it was selected for a number of reasons. The researcher relied on the data available from the Rogano insulating glass and aluminum company that pertain to the year 2018 as it is recent data and close to the research period and reflects the current reality of the company.

### **The first topic: a theoretical introduction to accounting for throughput**

#### **First: Throughput Accounting**

The contemporary business environment has witnessed many technological and environmental changes, which had a direct impact on the production process and increased competition between industrial companies. It also had the companies' adoption of modern industrial methods, which had a great impact on the determinants of the efficiency of cost systems and management accounting.

It also led to the emergence of many criticisms about traditional management accounting and costing systems, which focus on the inadequacy of these systems with the basic features of the modern industrial environment. This called for the need to bring about fundamental changes in the management accounting and costing systems used in order to fit those systems with the characteristics of the modern industrial environment and tools or means for developing costing and management accounting systems, including the theory of constraints, from which the concept of Throughput Accounting emerged later. . (Sorour, 2008: 142)

The writings about accounting for throughput coincided with the emergence of criticism from the accounting community about the inadequacy of the current accounting systems, as it emphasized the urgent need to introduce and develop systems and use new standards that fit industrial and technological development and fit the intensity of competition between organizations within the industrial environment.

#### **Second: The emergence of the concept of throughput**

Recent developments have led to the emergence of several modern terms that have appeared to keep pace with changes in the industrial environment and in an effort to solve problems that the traditional accounting system

has not been able to solve, the most important of which is the term (Throughput) that appeared for the first time in Goldratt's writings in The mid-seventies within the field of management sciences. Goldratt developed one of the computer programs related to production scheduling, and this program was called (Optimized Production Technology) (Chalabi, 2013: 39).

Most of the writings have focused on the element of time needed to achieve throughput, which indicates a close relationship between them, referring to the ability that represents time units of throughput, and the rate of throughput is measured in units of time (hour or minute).

The researcher believes that the linguistically Throughput term is to overcome obstacles and challenges and the emergence of tangible results, so that the production process is completed, regardless of the necessary stages completely and according to the desired controls of quality, time and others. The completion of the sale process properly and the possibility of collecting funds as a result of the sales achieved represent the throughput of the company.

### **Third: The concept of accountability for throughput**

There have been several attempts to define the concept of accounting for throughput, it was from (Yoshikawa et al) point of view that it is: "A homogeneous accounting approach with the production philosophy JIT) at a specific time, assuming basically that the manager has a specific set of available resources represented in (capital and buildings). Equipment and labor) and are used to purchase raw materials and convert them into a complete product that is sold to generate sales revenue" (Al-Jammal, 159: 2007).

According to the accounting view of the throughput is throughput costing, direct raw materials are a storable cost. They are the cost associated with purchase, conversion, manufacturing, and other industrial expenses, which transform these materials into a final salable product and generate sales revenue, while the rest of the costs of that period (assuming that those operations were made in the short term) are costs Fixed as not related to the production process, the cost of internal direct materials in the production currency is only variable costs (Horngren, et.al; 2011: 335).

The proponents of accountability for throughput have adopted a set of basic concepts which they have adopted in the application of this approach, and those concepts are:

#### **1- Throughput Rate**

Rapid-and-high quality refers to the efficiency and effectiveness of performance towards the main objective of the company, which is to increase sales and maximize profitability, since the improvement and increase of throughput entails many benefits such as speedy implementation of customer orders, stock reduction and production cost reduction , according to the accounting approach for throughput, the throughput rate can be seen as a measure of the speed of money turnover in the company or the amount of sales per unit time (that is, from the beginning of the production process to the completion of manufacturing and completion of the product, whether this time adds value or not to the product), which adds Value helps company management identify activities that take longer and cost more, and the activities that hinder the natural flow of production instead of being limited only to the actual operating rates that may hide the efficiency of using the total time as one of the important resources and the level of quality performance in the production process (Salim, 223: 2001).

#### **2- Throughput Margin**

Proponents of accounting for throughput believe that the company's margin of throughput results from the value chain that it added to direct materials by converting them to a sold product, and then it is calculated by the difference between the sales value and the cost of these materials only, assuming that direct materials are the only variable cost element and the rest of the other cost elements, including Direct wages represent fixed costs elements in the short term (Momana, 2004: 70).

And then the approach to accounting for throughput is built until maximizing sales is the only way and entrance through which the company can maximize the margin of throughput and then maximize the total profits of the company, and then the approach to accounting for throughput is built not to focus on the volume of production, but to shift attention to sales as a basis for measuring And evaluation of the efficiency and effectiveness of the company's management in exploiting the

resources available in the company in general and the restricted resources in particular, on the one hand, on the other hand, the approach to accounting for throughput is based on taking into account the sales revenue and the cost of materials for the products sold only when calculating the throughput margin and does not include the transfer cost (Jawad, 2009: 54)

According to the approach to accounting for throughput, the products are not arranged according to their profitability on the basis of the contribution surplus of the traditional unit,

but with what the use of the scarce resource achieves from this profit on the one hand, and on the other hand, the approach to accounting for throughput is built on an attempt to link the throughput of each product with what deplete it from the cost of the restricted resource so that the products can be arranged according to their relative profitability, with the aim of rationalizing management decisions related to choosing the optimal product assortment, as follows:

related to choosing the optimal product assortment, as follows:

$$\text{Margin percentage of throughput for any product} = \frac{\text{Margin of achievement per hour of operation in the restricted resource}}{\text{Cost per operating hour on the restricted resource}}$$

Whereas:

$$\text{Margin of throughput per hour of operation in the restricted resource} = \frac{\text{Selling price - raw material cost}}{\text{Product uptime in the restricted resource}}$$

$$\text{Cost per operating hour on the restricted resource} = \frac{\text{Total manufacturing costs for the product}}{\text{Product uptime in the restricted resource}}$$

In order to identify the efficiency of the company's operational processes and judge the extent of its profitability or not, then create a general ratio to disclose the relationship between the company's total margin of throughput and the total manufacturing costs, and it is calculated as follows: (Salem 224: 2001)

$$\text{Overall margin of throughput ratio} = \frac{\text{Overall margin of throughput}}{\text{Total manufacturing costs}}$$

So that if the general throughput margin is greater than one. This indicates the feasibility of carrying out operational operations and the ability to achieve profits (and vice versa).

### 3- The costs

The concept of costs under the approach to accounting for throughput classifies the elements of costs to suit the modern manufacturing environment

The materials involved in the industrial process are considered as variable costs only and are excluded. As for the rest of the costs, they are considered fixed costs.

The costs of the operational process of manufacturing units, which also include labor wages during the short term, are fixed costs and can be determined in advance, and they are called the total cost of the factory (Al-Chalabi 2013: 35)

Therefore, the concept of accounting for throughput considers all the elements of costs that are not affected by the volume of production or by the difference in the

production mix in the short term as fixed costs and it is called the operating cost, so it is charged over the period and is not allocated or distributed among the products. Thus, only direct materials are the variable costs.

### 4- The stock

Within the concept of the approach to accounting for throughput, profit is an inverse function for all activities in the time needed to manufacture what the market needs, and this in turn means that profitability is commensurate with the level of stock in the system. As the response time (manufacturing time) is the same as a function of the entire stock, meaning that Any increase in the stock over the required limit leads to an increase in the time required for manufacturing ((Abdulaziz, 79:2011)) The traditional concept was to keep the stock as a

kind of safety (safety stock between operations, stock in process and stock of raw materials)

This is to improve the efficiency of resource use, as well as a safety stock between the market and the factory so that the company can face the impact of market fluctuations, but this led to a high cost as a result of keeping this stock with the many problems and risks associated with keeping the stock (Hussain, 2003: 197-198)

Under the approach to accounting for throughput, a distinction must be made between two types of in-process storage. There is an in-process production storage that does not correspond to an increase in the output sold and does not contribute to the company's profits when all available resources are operating at full capacity.

The other type is warehousing, which corresponds to an increase in sold output and leads to profit. It is the temporary storage that occurs in front of suffocating materials, on the basis of which the energies of non-suffocated resources are occupied in harmony with suffocated resources (Al-Nuaimi, 2004, 33).

#### **Fourth: The relationship between accounting for throughput and its role in rationalizing the cost structure in the light of the contemporary business environment**

When the administration makes a comparison between alternatives, it needs multiple data regarding the costs involved in each available alternative, the selling prices resulting from it, the profit achieved, and the financing needed to obtain it.

Cost data is the main focus of the differentiation process, in making management decisions it is necessary to determine the costs associated with these decisions, and these costs are called the (Relevant Cost) (Salman, 119: 2010).

The economic changes of the new world order have forced many companies to reconsider the role played by cost accounting in order to develop it in line with the new industrial environment, given that traditional cost systems were designed primarily in an industrial environment where manual labor was an expensive matter.

Therefore, it represented the greatest part of production costs, and was used as a basis for charging other industrial costs, as they are related to the unit of the product.

With the increasing use of the mechanism in production, the size of the work element changed in its traditional sense, so it became necessary to reclassify the cost structure, as the importance of classifying the cost elements to variable and fixed or to direct and indirect for a number of reasons has diminished.

In addition to the assumptions on which it is based, the main philosophy on which it is based is that maximizing sales is the only way to maximize the company's overall throughput is to focus on its weaknesses and work on strengthening and exploiting it; In order to achieve it, some philosophical and practical changes must be made:

- A. cost restructuring
- B. Combine financial and non-financial metrics
- C. The role of time and sales
- D. stock Management

Many writers and researchers have included the approach to accounting for throughput as one of the main methods of determining costs (total cost method, variable costing method, throughput costing), and despite the great convergence between the last two approaches, the throughput approach is strict in counting what is variable and What is a fixed component of costs.

According to this approach, all the costs incurred by the company are relatively fixed, except for the direct raw materials costs involved in manufacturing the product. They are the only cost component that changes with the change in the volume of production, meaning that the direct materials are delivery costs that contribute to maximizing the throughput, and all other costs are non-completion costs that do not contribute. In maximizing throughput, it falls within the classification called Goldratt the term operating expenses.

In addition, this perspective suits a company that relies heavily on mechanization in relation to manual labor or wages that are paid on a piece-by-piece basis. The costs of mechanization have actually been incurred regardless of the amount of production, so it can be considered as period costs rather than product costs. (Abdulaziz, 2011:83)

#### **Fifth: Using the throughput accounting approach as a tool to rationalize pricing decisions:**

Pricing decisions are among the most important and difficult decisions for the company because of their impact on all aspects of activity, and then on many short and long-term financial aspects. There are many traditional approaches, whether accounting and economic, in addition to some modern approaches that the management can rely on to make appropriate pricing decisions.

By comparing the sales price that was reached according to the accounting approach for throughput at the current price, it can be determined which products should be reduced in price and which ones were underpriced, this method helps the administration to give a clearer picture that helps it in developing a complete strategy for pricing its products, and in controlling production scheduling operations, which is reflected on the profitability of the company by focusing on the most profitable products and trying to push them to the markets and focus on them in the advertising and marketing operations.

The approach to accounting for throughput attempts to maximize the margin of throughput generated in the enrollment stage, considering that this constraint is the main determinant of the throughput margin in the short term, while working to raise this constraint and trying to break it by increasing the available energy in it, thus moving from that point to the next point. In the energy level, and by repeating this process, the restriction is transferred from one point to another until it reaches a point outside the scope of the company.

It is represented in the ability of markets to absorb products in the presence of global competition, and here begins the role of marketing departments in dividing the market into sectors and attempts to promote products in each sector, with the use of attractive price policies in an attempt to reach the largest possible market share, thus, the company's management has developed a long-term strategy to obtain the largest possible return over the life of the company, and the approach to accounting for throughput in the process of rationalizing management decisions provides the company with new indicators that enable it to take any management decision related to the production process, (Abdulaziz, 2011: 145) .

**The second topic: Cost and its measurement according to the**

### **traditional costing system followed in Rogano Insulating Glass and Aluminum Company (research sample)**

#### **The costing system followed**

The Rogano Company for Insulating Glass and Aluminum has adopted the functional classification of the cost elements as in the unified accounting system. The costs have been classified into production costs, production services, marketing costs, and management costs. Accordingly, the company divides cost centers with respect to each classification, and the company's cost system is based on Classifying production costs according to their relationship to products into direct and indirect costs in measuring manufacturing costs for the areas produced from their products, as follows:

#### **A. Direct materials:**

The company's direct materials cost is easy to measure and allocate in total to the produced areas, which determines the cost rate per meter. The company's planning and follow-up department estimates the quantity needed to manufacture the products before starting manufacturing, in terms of quantities, types and colors of glass and the rest of the materials of accessories, doubles and other supplies.

Measuring the cost of glass or the area used of glass to produce one square meter of glass cannot be measured separately, but the glass consumed during a certain period (monthly and yearly) is calculated and the quantities used of glass during that period as well as the glass produced during that period and by dividing the area of the consumed glass On the area of the product glass the rate of the required quantity of raw glass to be consumed to produce one meter is known, as well as the percentage of damage and if there are abnormal rates of damage, the natural damage rate approved by the company does not exceed 10% of the consumed glass, for example

#### **B. Direct wages**

The Accounts Division is responsible for measuring the share of each product from the monthly wages of direct workers, and these wages are divided by the production volume of square meters to determine the share of each square meter of those costs.

#### **C. Indirect industrial costs**

Production costs consist of a group of different elements that include materials, wages, and

other expenses. Cost accounting is focused on compiling data related to cost elements and following their flow between the different activity centers of the unit. Its interest is also focused on categorizing these costs in multiple ways that vary according to the goal of each tab.

Classifying the elements of costs according to their relationship to the units of activity is one of the most important and most widely used methods for measuring and determining the cost of the unit produced.

The importance of accounting for indirect costs appears in the following:

1- Indirect industrial costs consist of many elements of common or common costs (rent, driving forces,...) that have no direct relationship between them and the units of production.

2- Indirect industrial costs consist of many elements that change to varying degrees with the change in the volume of production or the level of activity

**(The periodic cost and revenue report as presented in Rogano Company for Insulating Glass and Aluminum as on 31/12/2018) Table (1)**

| The details   | Sales details |              |                |             |                              |        | the total amounts |
|---|---------------|--------------|----------------|-------------|------------------------------|--------|-------------------|
|   | Double        | Installation | sporadic glass | accessories | material that have been sold | Total  |                   |
| Average selling price per square meter                    | 38.78         | 50.57        | 24.6           |             |                              |        |                   |
| Quantity sold square meter                                | 2903          | 3431         | 13090          |             |                              |        |                   |
| Total sales amount  | 112580        | 173526       | 322011         | 19174       | 97209                        |        | 724500            |
| Cost details  |               |              |                |             |                              |        |                   |
| Direct material   | 10607         | 25848        | 33102          | 3414        | 11389                        | 84360  |                   |
| Direct wages  | 11734         | 17589        | 26361          | 1450        | 2900                         | 60034  |                   |
| Indirect industrial costs                                 | 31875         | 49125        | 91173          | 5431        | 27520                        | 205124 |                   |
| Management expenses                                       | 6560          | 10112        | 18765          | 1117        | 5665                         | 42219  |                   |
| Marketing expenses  | 1247          | 1923         | 3568           | 212         | 1070                         | 8020   |                   |
| Total cost  | 62023         | 104597       | 172969         | 11624       | 48544                        |        | <u>399757</u>     |
| cost per square meter                                     | 21.36         | 30.48        | 13.21          |             |                              |        |                   |
| profitability per square meter                            | 17.42         | 20.09        | 11.39          |             |                              |        |                   |
| Sort products according to profitability per square meter | B             | A            | C              |             |                              |        |                   |
| Earnings before interests                                 | 50557         | 68929        | 149042         | 7550        | 48665                        |        | 324743            |
| Loan interest   |               |              |                |             |                              |        | <u>300000</u>     |
| net profit (loss)   |               |              |                |             |                              |        | 24743             |



### The third topic: measuring costs and revenues according to the accounting approach for throughput

The throughput time has been determined for the production stages and the production capacities available in the company to facilitate the preparation of reports according to the accounting approach for throughput and its impact on management decisions.

The cost according to the accounting approach for throughput consists of two parts, namely:-

- 1- The cost of raw materials used to make sales
- 2- Total costs incurred by each product, which include all costs except for the cost of raw materials.

The cost of production is determined by summing the production costs for each product, which is determined by subtracting the cost of the raw materials used in the production process for the

quantities sold and for each product. The researcher would like to point out the equations that must be applied to reach the product costs for each product according to the accounting approach for throughput.

Total production costs = sum (X) (total cost of sales of sales of each product - cost of raw materials for units sold of the product)

Since (X) is the number of products that are (3) products

After that, the total value of the throughput time (of the quantity sold) for each product is extracted. The total value of the throughput time for each model = product quantity x selling price per square meter x time required to complete the square meter, and by dividing the result of the equation by the total value of the total time for throughput of all products is obtained On the percentage that represents the share of each product in the total production cost.

**Table (2) Throughput value calculation table**

| The details  | Selling price | Time needed to complete | Production quantity | Throughput value |
|--------------|---------------|-------------------------|---------------------|------------------|
| Double       | 38.78         | 15.54                   | 2903                | 1749467          |
| Installation | 50.75         | 24.28                   | 3431                | 4227713          |
| sporadic     | 24.6          | 14.01                   | 13090               | 4511416          |

- The selling price represents the actual price and is considered the sales rate for each type, resulting from dividing the total sales amount of the product by the number of meters sold of the product.
- The time required for production represents the total time required to produce one square meter. The installation product uses all production stages, so its production requires (24.28 minutes) per square meter, while the double product exhausts the production stages except for the installation stage, which requires the production of one square meter of the double product (15.54 minutes), while the duplex

product Ordinary glass (sporadic) requires its production to go through all production stages except for the installation and double stages, which requires production of one square meter (14.01 minutes) of time.

- The quantity of production is the actual sales of the products extracted from the sales lists.
- As for the value of throughput for each product, it is the product of the sales price multiplied by the time required for throughput by the quantity of production and for each product

**Table (3) Throughput rate calculating table**

| The details  | Total costs | The cost of raw materials | Operating cost | throughput rate | Product share |
|--------------|-------------|---------------------------|----------------|-----------------|---------------|
| Double       | 51416       | 10607                     | 45040.55       | 0.1668          | 55648         |
| Installation | 78749       | 25848                     | 108843.7       | 0.4031          | 134692        |

|          |        |       |          |        |        |
|----------|--------|-------|----------|--------|--------|
| Sporadic | 139867 | 33102 | 116147.7 | 0.4301 | 149250 |
| Total    | 270032 | 69557 | 270032   | 1.0000 | 339589 |

- Total costs represent operating costs according to the traditional costing method.

- The cost of raw materials depends on the direct materials involved in the production process and does not change from the traditional method of costs.

- The operating cost of each product is extracted from the total costs of the product

minus the direct materials involved in producing the product.

- The percentage of throughput is extracted from dividing the throughput of the product by the value of the total throughput of the products.

**Table (4) Cost report according to the accounting approach for throughput**

| <b>The details</b>   | <b>The double</b> | <b>installation</b> | <b>Sporadic glass</b> |
|--|-------------------|---------------------|-----------------------|
| <b>selling price</b>   | <b>38.78</b>      | <b>50.57</b>        | <b>24.6</b>           |
| <b>Sold Quantity</b>   | <b>2903</b>       | <b>3431</b>         | <b>13090</b>          |
| <b>direct material</b>   | <b>10607</b>      | <b>25848</b>        | <b>33102</b>          |
| <b>throughput time value percentage</b>  | <b>0.1668</b>     | <b>0.4031</b>       | <b>0.4301</b>         |
| <b>The share of each product in the total factory cost</b>   | <b>45040</b>      | <b>108844</b>       | <b>116148</b>         |
| <b>Factory cost Fixed costs per meter</b>  | <b>15.51</b>      | <b>31.72</b>        | <b>8.87</b>           |
| <b>total cost of sales</b>   | <b>55647</b>      | <b>134692</b>       | <b>149250</b>         |
| <b>The cost per square meter according to the accounting entry for throughput</b>                  | <b>19.17</b>      | <b>39.26</b>        | <b>11.40</b>          |
| <b>Cost per square meter for conventional system</b>   | <b>21.36</b>      | <b>30.48</b>        | <b>13.21</b>          |
| <b>Profitability per square meter according to the accounting approach for throughput</b>          | <b>19.61</b>      | <b>11.31</b>        | <b>13.20</b>          |
| <b>Profitability per square meter for the traditional system</b>                                   | <b>17.42</b>      | <b>20.09</b>        | <b>11.39</b>          |
| <b>Arranging the profitability of products according to the accounting approach for throughput</b> | <b>A</b>          | <b>c</b>            | <b>B</b>              |

- The selling price, sold quantity, and direct materials are considered actual data transmitted from Table No. (1)

- The percentage of the value of the time of throughput and the share of each product from the total cost of the factory were extracted in Table No. (3)

- Factory cost the fixed costs per meter according to the accounting entry for the throughput is the product of dividing the share of the product from the total factory

cost by the number of meters sold and for each product.

- The total cost of sales according to the accounting entry for throughput is the sum of direct materials plus the share of each product of direct materials.

- The cost per square meter according to the accounting for throughput is the result of dividing the total cost according to the input by the number of meters sold.

- The cost per meter and the profitability per meter for the traditional system are shown in Table No. (1)
- Profitability of each product according to the entrance to accounting for the throughput is the selling price of the product per meter minus the cost of one meter according to the entrance to the accounting for the throughput.
- It also notes the difference in preference for products after applying the accounting approach for throughput. The product that achieves higher profitability according to the approach to accounting for throughput is the double product according to the traditional system followed in the company is the installation product.

It is noted that the method of measuring costs according to the accounting for the throughput, the share of each product from the total cost of the factory differs from what it is according to the system followed in the company due to the difference in the time of throughput for each product, and then the cost of each product differs from the costs calculated according to the system followed in the company

The difference in the information available about the products pushes the management to take decisions that lead to a reduction in the time of throughput and then reduce the cost to reach the goal of maximizing the return of internal operations (throughput).

#### **The fifth topic: the application of the accounting approach for throughput**

#### **and its role in determining product costs and profit expectations**

The information provided by the throughput accounting portal about the costs necessary for management and calculating the fixed costs of products and for each stage, which represent within this concept energy costs, and comparing them with the available energy costs, we arrive at the unused energy costs, and thus the management can reconsider towards the directions of production capacity.

The main purpose of calculating the throughput time is to identify the share of each unit sold in production expenses, Products that have a larger production rate incur more expenses according to a certain percentage that depends on the selling price, the quantity of sales and the time of throughput, so that these three variables are decided, all of which leads to a change in the system's output of information, which is the management data for making appropriate decisions.

Fixed costs have been determined according to the accounting entry for throughput, which is the total costs of the factory, so they must be distributed over the production stages to determine the energy deviation according to each stage and each product for the fiscal year in question, and it was distributed using the time required to produce one square meter for each product and for each Basically a stage for distribution, which was calculated based on the following tables:

**Table (5) Distribution of fixed costs per square meter for the cut off stage**

| The details    | Fixed costs           | Total time     | Time used                 | Cutting time ratio | The cutting stage share |
|----------------|-----------------------|----------------|---------------------------|--------------------|-------------------------|
|                |                       | for all stages | in the process of cutting | to the total time  | of fixed costs          |
|                | dinars / square meter | a minute       | a minute                  | %                  | Dinar                   |
| The double     | 15510                 | 15.45          | 0.14                      | 0.015              | 228                     |
| Installation   | 31720                 | 24.28          | 0.14                      | 0.010              | 303                     |
| Sporadic glass | 8870                  | 14.01          | 0.14                      | 0.017              | 148                     |

**Table (6) Distribution of fixed costs per square meter for twirl phase**

| The details | Fixed costs | Total time     | Time used               | Twirl time percentage | The twirl stage share |
|-------------|-------------|----------------|-------------------------|-----------------------|-----------------------|
|             |             | for all stages | in the twirling process | to the total time     | of fixed costs        |

|                | dinars /<br>square meter | a minute | a minute | %     | Dinar |
|----------------|--------------------------|----------|----------|-------|-------|
| The double     | 15510                    | 15.54    | 0.53     | 0.056 | 862   |
| Installation   | 31720                    | 24.28    | 0.53     | 0.036 | 1145  |
| Sporadic glass | 8870                     | 14.01    | 0.53     | 0.063 | 559   |

**Table (7) Distribution of fixed costs per square meter for the washing stage**

| The details    | Fixed costs              | Total time     | Time used                    | Washing time<br>ratio | The washing<br>stage share |
|----------------|--------------------------|----------------|------------------------------|-----------------------|----------------------------|
|                |                          | for all stages | in the<br>washing<br>process | to the total<br>time  | of fixed costs             |
|                | dinars /<br>square meter | a minute       | a minute                     | %                     | Dinar                      |
| The double     | 15510                    | 15.54          | 0.53                         | 0.056                 | 862                        |
| Installation   | 31720                    | 24.28          | 0.53                         | 0.036                 | 1145                       |
| Sporadic glass | 8870                     | 14.01          | 0.53                         | 0.063                 | 559                        |

**Table No. (8) Distribution of fixed costs per square meter for the Tempering phase**

| The details       | Fixed costs              | Total time     | Time used                      | Tempering<br>time ratio | The<br>tempering<br>stage share |
|-------------------|--------------------------|----------------|--------------------------------|-------------------------|---------------------------------|
|                   |                          | for all stages | in the<br>tempering<br>process | to the total<br>time    | of fixed costs                  |
|                   | dinars /<br>square meter | a minute       | a minute                       | %                       | Dinar                           |
| The double        | 15510                    | 15.54          | 2.25                           | 0.152                   | 2357                            |
| Installation      | 31720                    | 24.28          | 2.25                           | 0.099                   | 3133                            |
| Sporadic<br>glass | 8870                     | 14.01          | 2.25                           | 0.172                   | 1529                            |

**Table (9) Distribution of fixed costs per square meter for the sandblasting stage**

| The details    | Fixed<br>costs              | Total<br>time     | Time used                         | Sandblasting<br>time ratio | The sandblasting<br>stage share |
|----------------|-----------------------------|-------------------|-----------------------------------|----------------------------|---------------------------------|
|                |                             | for all<br>stages | in the<br>sandblasting<br>process | to the total time          | of fixed costs                  |
|                | dinars /<br>square<br>meter | a minute          | a minute                          | %                          | Dinar                           |
| The double     | 15510                       | 15.54             | 9.36                              | 0.604                      | 9365                            |
| Installation   | 31720                       | 24.28             | 9.36                              | 0.392                      | 12446                           |
| Sporadic glass | 8870                        | 14.01             | 9.36                              | 0.685                      | 6075                            |

**Table (10) Distribution of fixed costs per square meter for the double stage**

| The details | Fixed<br>costs | Total time        | Time used                   | Double time<br>ratio | The double<br>stage share |
|-------------|----------------|-------------------|-----------------------------|----------------------|---------------------------|
|             |                | for all<br>stages | in the process<br>of double | to the total<br>time | of fixed costs            |

|                | dinars /<br>square<br>meter | a minute | a minute | %     | Dinar |
|----------------|-----------------------------|----------|----------|-------|-------|
| The double     | 15510                       | 15.54    | 1.53     | 0.118 | 1836  |
| Installation   | 31720                       | 24.28    | 1.53     | 0.077 | 2442  |
| Sporadic glass | 8870                        | 14.01    | 0        | 0.000 | 0     |

**Table (11) Distribution of costs per square meter for the installation phase**

| The details    | Fixed costs                 | Total time     | Time used                      | Installation time ratio | The installation stage share |
|----------------|-----------------------------|----------------|--------------------------------|-------------------------|------------------------------|
|                |                             | for all stages | In the process of installation | to the total time       | of fixed costs               |
|                | dinars /<br>square<br>meter | a minute       | a minute                       | %                       | Dinar                        |
| The double     | 15510                       | 15.54          | 0                              | 0.000                   | 0                            |
| Installation   | 31720                       | 24.28          | 8.34                           | 0.350                   | 11106                        |
| Sporadic glass | 8870                        | 14.01          | 0                              | 0.000                   | 0                            |

**Table (12) Planned costs for the production of square meters**

| The details                  | The double | Installation | Sporadic glass |
|------------------------------|------------|--------------|----------------|
| Cutting                      | 228        | 303          | 148            |
| Twirl and digging            | 862        | 1145         | 559            |
| Washing                      | 862        | 1145         | 559            |
| Tempering                    | 2357       | 3133         | 1529           |
| Sandblasting                 | 9365       | 12446        | 6075           |
| The double                   | 1836       | 2442         |                |
| Installation                 |            | 11106        |                |
| Square meter production cost | 15510      | 31720        | 8870           |

**Table (13) Income statement according to the throughput accounting entry for the year 2018**

| The details   | Sales details |              |                |                          |                              | The total amounts |
|---|---------------|--------------|----------------|--------------------------|------------------------------|-------------------|
|   | Double        | Installation | Sporadic glass | Installation accessories | Material that have been sold |                   |
| Average selling price per square meter                    | 38.78         | 50.57        | 24.6           |                          |                              |                   |
| Quantity sold square meter                                | 2903          | 3431         | 13090          |                          |                              |                   |
| Total sales amount  | 112580        | 173526       | 322011         | 19174                    | 97209                        | 724500            |
| Cost details  |               |              |                |                          |                              |                   |
| direct material   | 10607         | 25848        | 33102          | 3414                     | 11389                        | 84360             |
| margin of throughput                                      | 101973        | 147678       | 288909         | 15760                    | 85820                        |                   |
| operating expenses  | 45040         | 108844       | 116148         |                          |                              | 270032            |
| direct wages  |               |              |                | 1450                     | 2900                         | 4350              |
| Indirect industrial costs                                 |               |              |                | 5431                     | 27520                        | 32951             |
| Management expenses                                       |               |              |                | 1117                     | 5665                         | 6782              |
| Marketing expenses  |               |              |                | 212                      | 1070                         | 1282              |
| Total cost  | 55647         | 134692       | 149250         | 27384                    | 134364                       |                   |
| cost per square meter                                     | 19.17         | 39.26        | 11.40          |                          |                              |                   |
| profitability per square meter                            | 19.61         | 11.31        | 13.20          |                          |                              |                   |
| Sort products according to profitability per square meter | A             | C            | B              |                          |                              |                   |
| Profit before interest                                    |               |              |                |                          |                              | 324743            |
| Loan interest   |               |              |                |                          |                              | 300000            |
| net profit (loss)   |               |              |                |                          |                              | 24743             |

Table No. (13) Shows the details of revenues and expenses according to the accounting entry for throughput, and it noted that the throughput margin is the amount of sales minus the cost of direct materials.

Operating expenses are the total expenses minus the cost of raw materials and for each product.

### **The effect of applying the accounting approach for throughput in determining the accuracy of the cost of products and profit expectations**

Decisions to determine the appropriate production mix for production and profit expectations depend on the contribution margin achieved for each product under the traditional system (contribution margin =

selling price - unit variable cost). But under the approach to accounting for throughput, the production mix is determined based on the margin of throughput achieved from the products, so the products that achieve the best throughput using the least amount of resources are preferred. The method of dealing with wages changes and is counted among the fixed costs. This gives more importance for the company to study the effects of energy on the product when making decisions, planning profitability, and determining the best selection of products among the available options. What determine the size of the possible throughput the energies of the production stages available to the economic unit as a whole, and then the products are determined according to the return for each exhausted hour of work hours because it determines the rate of production

$$\text{Throughput Margin Value} = \text{Sales Value} - \text{Direct Material Cost of Sales}$$

### **Managing the company's stock**

Accounting for throughput assumes that the company achieves throughput when the process of selling the products is achieved. The finished products or in operation remain as stock representing additional costs to the company, as it did not contribute to achieving any return to the company and thus it reduces the overall throughput.

It has been pointed out that the system followed in the company is to sell according to the customer's request. The goods that are produced are sold before the completion of the production process. There is no need to inventory the goods under operation and the finished goods because they are considered the property of the customers, but it was clarified that there is a stock of raw materials necessary not to disrupt the work of production lines, these are the raw materials it entails storage expenses as well as losses as a result of the obsolescence of materials and the inability to manufacture them after a while as a result of temperature fluctuations and humidity, which leads to a change in the color of the glass and thus the impossibility of marketing it.

As well as some materials that the company was unable to market due to changing customer tastes and the quantities that were acquired in an unthought-of manner and not commensurate with the customers' demands. The company bears the expenses of storing and transporting the raw materials only. As for the finished goods, they are delivered directly to the customers. Delivery is often made on the day the production itself is completed or in the form of meals if the required quantities are large. The company does not have warehouses to store goods under operation. The operations carried out by the operational process are consecutive operations until production is completed.

### **Production management process Rogano insulating glass and Aluminum Company**

The company is concerned with the quality of the machines and available equipment and their production capacities, as well as the level and quality of the raw materials used in the production process, and the company was able to offer a distinct production in terms of quality, but there are

untapped surplus capacities that result in incurring additional costs and are not matched by products sold to reduce the costs incurred by the square meter, which is borne by the company, and since the company depends on the customer's demand, it must develop its marketing performance and what is called horizontal expansion, and horizontal expansion is the search for new marketing outlets to increase its sales.

This matter has not been achieved for the company, as the company is closer to being a captive company.

### **The effect of the throughput accounting approach on cost structure decisions**

#### **A. Energy restructuring decisions**

The information and reports on the fixed costs of products provided by accounting for throughput will enable the administration to determine which of the products has the priority in production and marketing and which achieves the greatest amount of throughput for the company and to reconsider the marketing and production trends according to the new data according to the throughput accounting entry. The fixed costs of the entrance accounting for the throughput per square meter have been determined in Table No. (14) And the distribution of fixed costs on the production stages has been clarified through tables from (15) to (21) to clarify the deviation of energy according to each stage. The fixed costs have been distributed over the production stages According to the time required for production and for each product

**Table No. (14) Differences in product profits and costs per square meter between the accounting approach for throughput and the traditional system**

| The details                        | Entrance to accounting for throughput |              |                | Traditional system |              |                |
|------------------------------------|---------------------------------------|--------------|----------------|--------------------|--------------|----------------|
|                                    | The double                            | Installation | Sporadic glass | The double         | Installation | Sporadic glass |
| Selling price                      | 38.78                                 | 50.57        | 24.60          | 38.78              | 50.57        | 24.60          |
| Cost per square meter              | 19.17                                 | 39.26        | 11.40          | 21.36              | 30.48        | 11.40          |
| Profitability per square meter     | 19.61                                 | 11.31        | 13.20          | 17.42              | 20.09        | 11.39          |
| Profitability ranking for products | A                                     | C            | B              | B                  | A            | c              |

he company's orientations, according to the traditional approach, are to prefer the installation product over other products in marketing orientations, as well as to have priority in production in terms of delivery dates, manufacturing and delivery. While the throughput accounting approach shows a new distribution of preference among products, which pushes the company to re-plan the production trends. Under the throughput calculator entrance for a double product, the greater profitability of the product after redistributing costs, that calls for the company to reorganize and direct the production capacity in a manner that suits the priority of the products.

#### **B. In product assortment decisions and profit planning**

According to the approach to accounting for throughput, decisions to determine the optimal products and profitability planning depend on the contribution margin of each product under the traditional approach (selling price per unit - unit variable cost), but in light of the application of throughput accounting, the performance of the system as a whole is determined according to the products that achieve the highest throughput with as few resources as possible, therefore, the accounting for throughput modifies some concepts of cost and the transfer of labor costs from the side of variable costs to the fixed costs. It has become necessary for the company to take



into account the energy factor when making a decision to plan profitability and determine the variety of products because of its impact on this decision, as the limited Energy in the production stages leads to a

limited amount of throughput generated at the level of the company as a whole, and then the products are arranged according to the return for each spent hour of work.

**Margin of throughput value = Sales value - Direct materials cost of sales**

### **C. Marketing decisions**

The marketing effort made by the company depends on marketing the installation product as a product that achieves the highest return for the company, while according to the accounting approach for throughput and by adopting the distribution of the company's fixed costs on the basis of production time, the highest return provided by the double product, followed by the sporadic product, while these two products have They are not included in the company's marketing activity, relying on production time in distributing fixed costs for products is a new classification of products and therefore there are new directions in which the marketing staff of the company must work. Therefore, the application of the accounting for throughput approach effectively contributes to providing appropriate detailed information in rationalizing the cost structure in the Rogano Insulating Glass and Aluminum Company. Therefore, the company's orientations and decisions regarding product assortment, planning its operational operations and marketing orientations will have a new form by adopting this approach and this is what proves Research hypothesis.

### **Fourth topic: conclusions and recommendations**

#### **First: the conclusions**

**This topic includes the conclusions reached by the researcher within the theoretical and applied frameworks of the research, as follow:-**

1. Accounting for throughput includes a set of financial and non-financial measures that show the company's ability to achieve and are easy to apply at any period of time and help management in taking appropriate decisions

2. The method of classifying costs used when applying the throughput accounting approach makes it more suitable for the modern industrial environment, more clarification of the relationships linking the product and cost, and more provision of the appropriate information needed by the administration to take management and operational decisions.
3. The throughput accounting approach is concerned with reducing stock costs and has a significant impact on the company's options, and provides data for operational decision-making.
4. The interest in reducing the time of throughput and researching ways to increase sales will have a positive impact on the overall throughput rate and thus the administration's focus on increasing profitability and providing the appropriate information to the administration.
5. Accounting for throughput provides new metrics, such as the throughput of each product separately, the return on the time of throughput, and the calculation of costs for the time of throughput, all of which provides important and appropriate information for making many decisions.
6. Accounting for throughput with its periodic reports and the assumptions that it adopts is integrated with some modern management basics such as production on time, costs based on activities, and resource needs planning. All of this improves the performance of the company and improves the achieved results.

#### **Second: Recommendations**

In light of the conclusions reached by the research, both theoretical and practical, a set of recommendations can be presented, the most important of which are the following:

1. In light of the continuous developments in the industrial environment, it has become necessary to change the adopted methods that would provide a better understanding and clearer data that would develop the company's strategy to face the continuous economic fluctuations and competition in light of technological development.
2. The application of the accounting approach for throughput would develop from the traditional view of cost structuring and clarify the complex relationships in light of the modern industrial environment. The company a sample of the research must change the policies followed that would develop the management performance of the company.
3. The modern industry environment requires a cost system that fits the changes of the modern strategic vision to manage production capacities in an ideal manner with the aim of maximizing the return of operational processes and reducing costs.
4. The method of accounting for throughput in the presentation of information shows the management in a simplified way the methods of achieving better results for the company, through the use of the margin of throughput during close periods to monitor the performance of the company and present it with analytical tools in the form of simplified periodic reports.
5. The combination of financial and non-financial decisions, which is followed by the throughput accounting approach, would improve the quality of operational decisions. Accounting for throughput depends on many important variables that were not included within the traditional management decision model, which would positively affect the results in the company a sample of the research.
6. The research sample company's quest to maximize throughput requires it to pay attention to reducing operating expenses by monitoring cases of waste of resources within the appropriate range relying on the application of accounting for throughput.

7. Development of performance for sales and marketing, continuous training of the company's staff, a sample of the research that would develop the company's general performance and establish a good mechanism for managing employees and individuals and accepting new employees

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