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APPLY VALUE STREAM COSTING AND TIME-DRIVEN RESOURCE-CONSUMPTION TO REDUCE COSTS AND ENHANCE COMPETITIVENESS IN THE CEMENT INDUSTRY

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ABSTRACT
The aim of the research is to employ modern administrative techniques as a system that maintains competitive advantage, through accurate measurement of costs and achieving the highest control over resources and efficient utilization of resources. The Iraqi General Company for Cement / Kufa Cement Factory, the application of the two technologies together leads to a reduction in costs and an enhancement of the competitive advantage. For the purpose of applying the two techniques, a number of conclusions were reached, the most important of which are: that employing the techniques of value flow costs and accounting for the consumption of time-oriented resources contributes to reducing costs. It combines the advantages of (TDABC) technology, (GPK) technology, and the advantages of value costing technology, to make informed decisions strategy to support the competitive advantage and the results of the research concluded that the ability of these technologies to identify and distribute costs in an easier and less complicated way and reduce losses and waste of effort and time, to achieve better control over costs and contribute to achieving a competitive advantage.
KEYWORDS:*Value Stream Costs (VSC), Time-Oriented Resource Consumption Accounting (TDRCA), Cost Reduction.*

I. INTRODUCTION

that the significant changes in the business environment and the challenges as a result of progress Accelerating technology , increasing competition and global opening of markets The problem of the research is that traditional systems have become unable to provide useful information to help those units reduce costs and in particular to meet the new requirements that allow them to continue in that environment and achieve competitive advantage, and therefore the research problem can be formulated in the following questions. Does the use of value flow costing techniques and time-oriented resource consumption accounting help in overcoming the criticisms and problems faced by traditional costing systems? Is the use of the techniques of value flow costs and time-oriented resource consumption accounting a real addition that contributes to the optimal allocation of costs, the rationalization of resources and the optimal utilization of idle energy? The research aims to demonstrate the possibility of employing the techniques and techniques of value flow costs and accounting for the consumption of time-directed resources in the field of managing cost reduction and enhancing competitiveness. The importance of the research is evident from the importance of the role in employing the technology of value flow costs and accounting for the consumption of time-directed resources in reducing costs and highlighting the importance of employing the above two technologies in the field of raising the operational efficiency of economic units and achieving optimal investment of resources to enable them to achieve competitive advantage. The research is based on the main hypothesis that the following: The employment between the techniques of value flow costs and accounting for the consumption of time-directed resources leads to the provision of information that would contribute to reducing costs in the economic unit of the research sample and in a manner that suits the requirements of the contemporary business environment.

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II. LITERATURE REVIEW

The First axis: the theoretical framework of the technology of value flow costs

First: The concept of value flow costs

The technology of value flow costs represents a new method aimed at supporting the creation of value for customers by tracking the actual expenses on the value stream instead of allocating them to products, services and departments and seeks to reduce arbitrary allocation of costs by reducing the allocation process using loading rates, as value flow costs are calculated periodically and all elements of direct and indirect costs are determined, as the costs that fall within the value stream are costs Directly, costs that do not fall within the value stream range are not included in the calculation of the cost of the value stream (Kapanowski.2017:25). (Hutchinson.2018:183) argues that value flow costing technology is the flow of materials and information that a product takes from receiving a production order until it becomes a final product, and is a tool aimed at showing the links between material flow and information about the product or processes, and forms the basis for the moment of implementation and is used to distinguish between activities that add value and activities that do not add value. (Bojana.2016:12) pointed out that value flow costing technology is all activities that must be undertaken to reach the desired value from customers, including obtaining customer orders, production, storage, delivery, supply, and product design.

Therefore, it can be said to the researchers that the technology of value stream costs, provides temporary information that contributes to controlling operations in the event of performance exceedance, and then the possibility of taking corrective actions quickly without waiting for the end of the month to study the reports of deviations, as is the case with traditional cost systems, the technology of value stream costs is characterized by the ability to identify cause and effect relationships between costs and activities, and therefore it is a simplified technique for collecting and managing costs, where costs, financial data and reporting are collected. About them in the form of a summary of each value stream, not for each individual product or production order (weekly, biweekly, monthly) with the aim of managing continuous improvement processes and showing the returns and costs associated with them, based on tracking processes through value stream costs. From the researcher's point of view, value flow costing technology is defined as a set of processes for the production of products or services and starting from the starting point to receive customer orders or produce a new product to deliver the product or service to the customer.

Second: Types of Value Stream Costs

1. Value stream for customer order processing: This type of value stream highlights the current products of existing customers, and starts from the receipt, transportation and transfer of raw materials from the time of receipt of the purchase order from the customer to the delivery of the final product, and is characterized as the most important and used value stream (Hansen.2009:564).
2. Value flow to develop new products: This type of value flows focuses on developing new and modern products and making a qualitative leap to gain new customers and this is what the economic unit aspires to, and this type includes product design, process engineering, marketing ..... Etc. (Hansen.2009:564).
3. Sales and marketing value stream: This type of value stream focuses on attracting existing customers to new products and attracting new customers to existing products (Guan et al,2009:406).
4. Physical flow of resources: It is the process of the flow of various resources within the economic unit, including productive and non-productive resources and idle resources.
5. Information flow: divides the information flow in the manufacturing environment.
6. Cash flow: includes cash flow from outside the economic unit to inside the process of selling goods and from inside the unit to outside the process of purchasing production requirements and disbursing wages, and both the flow of resources and information helps management, engineers and suppliers to make decisions by identifying the loss and its sources (Donatelli&Harris,2003:1).
7.

Third: Division of Value Stream Costs:

Cost divisions according to the value flow costs technique differ from traditional cost systems and it is customary that value flow costs are measured on a weekly basis, where costs are distributed to value streams directly in order to exclude indirect costs, but sometimes there are costs that are not related to a specific value stream, these costs are not distributed to value streams, but are treated as support costs for value streams and are included in a separate column in the income statement of flows Value (Al-Mashharawi,2015:73).

Fourth: The importance of determining value stream costs

(Salah & Zaki,2013: 90), (Al-Rubaie,2016:76) indicate that there are many points that illustrate the importance of value flow costs, including:

1. Facilitate the calculation process by loading resources directly to the value stream, as the technique of accounting for resource consumption in light of the value stream divides the economic unit into value streams that include each flow a group of resources.
2. Reducing cost centers to collect these costs at the level of each value stream by dividing the costs into costs of materials, wages, maintenance and support costs, while reducing costs by eliminating waste and idle energy costs based on continuous improvement.
3. Ease of allocation and control of indirect industrial costs, as unrelated costs are not allocated according to value flow technology on value streams.
4. Provide weekly or monthly reports so that the value stream team can improve the work.
5. Resource consumption accounting technology supports decision-making based on resource flow cost modeling throughout the unit, as resources are collected using homogeneous work groups and the associated resources and costs are determined for each cost pool, and this model is based on the quantitative flows of the resources used.
6. Value stream cost information is collected quickly and simply because it is direct and relevant to the performance of the functions of value stream managers, and through this information value stream managers can control costs, which helps them find ways to reduce costs and then achieve customer satisfaction and achieve competitive advantage.

Fifth: Benefits of Value **Flow Cost Technology**

(Al-Rubaie,2016:73), (Al-Mashharawi,2015:73), (Muhammad,2019:145) indicate that there are several benefits of the value stream that can be included as follows:

1. Integrates resource flow costs and information through the quantitative presentation of flowing resources.
2. Production control is associated with scheduling functions such as production planning, forecasting the volume of demand for production, monitoring and scheduling staffing, which helps to determine the costs of resource flows for managers to use the costs of value streams to control and reduce costs, which reflect the events of each stage of production.
3. Link manufacturing processes, supply chains and information flow in distribution channels.
4. Provides information on the cost and revenue of the value stream in an easy, fast, clear and understandable way from different users of the information.
5. You provide the right information at the right time, usually weekly, and this helps managers to use the costs of value streams to control and reduce costs, which reflect recent events.

Therefore, it can be said to the researcher that the benefits achieved by value flow costs help them to provide appropriate and timely information, because their weekly reports can identify places of loss and waste and determine the amount of idle energy for all stages of work, which helps them to make continuous improvements during the manufacturing process.

The Second axis: and accounting for the consumption of time-directed resources

First: The emergence of resource consumption accounting technology

(Weber&Clinton,2004:21) refers to the emergence of resource consumption accounting (RCA) technology in 2000 through the integration of German costing technology (GPK) and activity-based costing technology (ABC), where these economic units resorted to developing a new technology for cost accounting and management due to the deficit of imitation methods. In providing the administration with the necessary information that helps it manage its resources through the flexible standard costing technology, which is a development of the German costing technology (GPK development of German cost accounting technology was a response to the financial accounting technique, which was unable to provide the management with the necessary information it needs to carry out its functions, as this development of the German cost technology was provided after the World War through (Plut Shaman proposed this development as an alternative to activity-based costing technology, and this technique was applied by German companies (Rumwiede.9:2007).

Second: The concept and definition of resource consumption accounting

The technique of accounting for resource consumption RCA is one of the contemporary techniques for cost management, which seeks to provide appropriate information on how to optimize the use of available resources and employ idle energy in a way that contributes to increasing productivity and reducing costs for the product or service and thus increasing the profits of the economic unit and strengthening its competitive position, and given the importance of resource consumption accounting technology, it has been addressed by many researchers and those interested in their research and studies, but they did not agree on a specific and comprehensive concept of this technique and received many definitions (Alrawi&Alhafiz.30:2018) is one of the contemporary management accounting techniques that are applied on the basis of the integration of German cost accounting systems and activity-based cost accounting and came to assist management in the decision-making process in

order to improve the use of resources by reducing costs and maximizing revenues while maintaining the survival and sustainability of the economic unit in light of competitive markets.

Therefore, it can be said to the researchers that resource consumption accounting is an accounting technique that gives a future view of resource consumption in order to achieve the interests, desires and needs of customers according to the resource needs of activities, with a focus on the need for optimal use of resources, to achieve the effectiveness and efficiency of energy management, which provides appropriate information on how to effectively and optimally use available resources and use idle energy to help increase productivity and reduce product costs, thus increasing the company's profits to enhance its competitive position.

Third: Objectives of the Resource Consumption Accounting Technology

The main objective of adopting resource consumption accounting technology is to improve the use of the resources of the economic unit and to reduce production costs and meet the requirements of customers, and thus support the competitive position of the economic unit, and there is a set of important objectives mentioned in the accounting literature for resource consumption accounting technology represented in the following:

1. It provides basic information about the resources of the economic unit, including: identifying the available resources, the relationship between the various resources of the economic unit, the relationship between resources and activities, the costs of available resources, and how to make optimal use of the available resources (Muhammad Ali, 2013: 164).
2. Achieving the various basic control concepts, as by controlling the sources of cost creation, preventive control is achieved by tracking the quantities of resources used and unused for the purpose of harmonizing the supply of materials and the demand for them, in which subsequent and simultaneous control is embodied, which helps the process of rationalizing resource consumption (Abkar,2014:164).
3. Harmony in its application with the target cost technology by targeting cost reduction at the product planning stage by excluding unused resources related to surplus and idle energy while rationalizing the energy used (Okutmus,2015:47).
4. Provide real cost data to base their determination on theoretical energy and not practical energy (Al-Hussein,2016:27).
5. Providing an integrated framework for the resources within the economic unit from the perspective of the available ones, the interrelations between them, and how to achieve the optimal and efficient use of these available resources (Al-Hussein,2016:27).

Fourth: Mechanisms for **activating** the **technique of accounting for the consumption of time-directed resources (TDRCA**)

(Yilmaz&Ceran.2017:139) indicate that the time-driven resource consumption accounting technology (TDRCA) or symbolized by (RCA11), and this technology is the second generation of resource consumption accounting (RCA), which is the updated and developed version of the consumption accounting technology Resources that represent its second generation by focusing on activities by changing it from multiple cost vectors to a single cost vector (time vector) as a measure of cost, and the time-oriented resource consumption accounting (TDRCA) technique is cost integration based on time-oriented activity (TDABC). with the German cost system (GPK) in order to overcome the disadvantages of resource consumption accounting (RCA) to address fixed costs and convert them into consumed and variable energy through activities that contribute to generating these outputs and trying to create the relationship between resources and the outputs of the resource pool by creating an artificial change in fixed costs, that Measuring the cost according to a quantitative perspective of energy leads to the possibility of separating the idle energy, to achieve a more accurate measurement on the other hand. This technology deals with energy and resources directly to reduce costs by making the best use of available resources.

noted (Al-Hibari,2019:11) The time-oriented resource consumption accounting technique (TDRCA) is a new development of RCA, which integrates the time-driven approach that is the basis of TDABC and the methodology for activity analysis of RCA, and has enhanced this development in technology to the ability of TDRCA technology to manage and analyze resources through a dual view of resource consumption. Resources are consumed through a clear causal relationship between the outputs and inputs in each resource pool. In the absence of such causation, the time-driven approach It creates an indirect relationship between inputs and outputs by directing activities as consumers of fixed resource capacity. Directing time-driven activities as a measure of capacity artificially changes the fixed costs that root cause analysis treats as period costs. This, in turn, provides more accurate data on the resources consumed and the drivers of consumption, and opens up a

wide scope for cost reduction based on the production capacity consumed depending on the production capacity mechanism.

Fifth: Comparison between RCA and TDRCA

(Union et al.2020:158) suggest that a range of differences between the two consumption accounting techniques can be identified. TDRCA time-oriented resources and RCA resource consumption accounting as follows:

Table (1) Comparison of TDRCA Time Directed Resource Consumption Accounting and RCA Resource Consumption Accounting

NO	TDRCA	RCA
1	Resulting from TDABC and GPK integration).	Resulting from input integration (ABC) and GPK
2	Relies on flexible time guides	Depends on different and inflexible cost vectors
3	Be less complicated and expensive	Be more complicated and expensive
4	Measuring the idle energy of resources and activities together	Measure idle energy of resources only
5	The cost behavior in this portal is variable	The cost behavior in this portal is constant or proportionally variable

Source: Prepared by the researchers

It can be said to the researchers that the technique of accounting for the consumption of time-directed resources TDRCA represents a new approach capable of allocating costs based on activities and their ability to identify idle resources, which can be determined according to the level of activity based on the volume of outputs and the level of each resource or group of homogeneous resources by moving from the analysis of the capacity of total resources to the analysis of individual resources by the complete exclusion of capabilities if not Resources are mandatory or by directing the costs of these capacities away from the final cost purposes and using the reverse allocation method, and flexible time guides.

Sixth: Advantages of applying the technique of accounting for the consumption of time-directed resources (TD-RCA)

(Wunion et al.2020: 158) point out that the time-oriented **resource consumption accounting technique (TDRCA**) is characterized by:

1. Provide more accurate cost information because the level of detail of this cost information depends on the diversity of final cost objectives such as products or services, especially in light of the intense competition of business organizations, and the cost approach used to provide information affects the accuracy and reliability of cost information and leads to the proposal of waste waste disposal initiatives and make the product or service at a lower cost.
2. The technique of accounting for the consumption of time-directed resources (TDRCA) is superior to the theory of constraints (TOC) represented as an administrative approach to the specific constraints and the search for ways to solve them by reducing the waiting times resulting from the restrictions by identifying and scheduling scarce resources for activities and removing all bottlenecks of the production process in the economic unit.
3. Time-directed resource consumption accounting technology helps in preparing reports for all administrative levels by providing detailed information at the operational and strategic level that represents real information about the time of completion that this entry provides information on product costs more objectively compared to other cost entrances by excluding idle resources from product costs and working on preparing reports on exploited energy and idle energy.
4. The ability of time-oriented resource consumption accounting technology to integrate with information technology, such as the enterprise resource planning (ERP) system, which plays a key role in providing various information on costs, time guides, resources, activities, etc. focusing on the concept of the value chain, identifying value-added and non-value-added activities, and assisting in the implementation of the entry-level approach. Contemporary cost, such as resource consumption accounting technology directed from time to time, ERP represents an integrated, comprehensive and centralized source of information on the management of all major business activities and functions such as purchasing, manufacturing, selling and resource management in various business organizations.
5. Non-allocation of fixed costs when causal relationships cannot be established.

It can also be said to the researchers that the technique of accounting for the consumption of time-directed resources (TDRCA) has many advantages that distinguish it over other cost inputs by excluding idle energy, improving production efficiency, reducing costs, addressing fixed and proportional costs, using flexible cost guides (time guide), and overcoming the complexity that accompanies the application of resource consumption accounting technology (RCA).

Seventh: Requirements for the application of time-oriented resource consumption accounting technology (TD-RCA)

(Wunion et al.2020: 255) point out that for the application of time-directed resource consumption accounting (TDRCA) technology, some important requirements must be met for its application, the most important of which are:

1. Inventory and identification of the resources of the economic unit that are spent, such as salaries, wages, materials, etc.
2. Determine resource cost complexes in homogeneous aggregates such as work cost aggregator and material cost aggregator.
3. Use the available practical energy in determining time-oriented cost rates.
4. Determine the resource pools in homogeneous aggregates and according to the nature of the work of the economic unit.
5. Use time unit cost rates to determine the resources consumed by activities from these pools.
6. Identify activities that consume resource pools using time guides. 7. Use time-guide cost rates to allocate the costs of time-directed activities to the final cost goals of the product 8. Determine the final cost of products or services.

III. Practical framework

Application of Value Stream Cost Techniques and Time-Oriented Resource Consumption Accounting to Reduce Costs and Enhance Competitiveness in the Cement Industry

First: An introductory overview of the General Company for Iraqi Cement / Southern Assistants / Kufa Cement Factory

The General Company for Southern Cement was established according to Ministerial Decree No. 2963 on 20/6/1995 and is considered a southern collaborator of the General Company for Iraqi Cement and the company began its work on 1/7/1995 with a capital of (871,500,000) dinars, the company's capital was increased in 1999 to (1,471,500,000) dinars, and the company accumulated reserves of (120,849,887,000) dinars since its inception through the following:

1. The retained share of profits accumulated within the general reserve account.
2. Amounts transferred from the accounts of the National Development Plan during the past years.
3. The sums accumulated for rehabilitation purposes are deducted from the profits at the rate of 4000 dinars per ton.

Second: Reasons for choosing Kufa Cement Plant: The reason for choosing Kufa Cement Plant (in question) is the Iraqi General Company for Cement / Southern Assistants as a sample to reach the field study, for several reasons, the most important of which are:

1. The cement industry depends heavily on machines and machines, and direct labor does not enter into it except in some specific parts and areas represented by supervision, installation, operation and maintenance of machines, as well as some operations that require manual handling between operations or stages, which provides the possibility of determining and calculate the completion time required for production.
2. Increasing competition for the cement product in the Iraqi markets, as there are two important competitors, namely (Car Cement Investment Factory, and the Iraqi Pioneers Company and its strategic partner (Lafarge, France).

Third: Applying the technique of value flow costs and accounting for the consumption of time-directed resources as a framework for employing them in reducing costs in the Kufa cement plant (research sample)

After identifying in the previous section the technique of accounting for time-directed resource consumption (TDRCA) according to the steps that passed through its application and as part of the procedures of the employment approach between this technology and the technique (VSC), in which the resistant cement product was reduced, this section will address the rest of the procedures of the employment approach between the two technologies by applying the technique (VSC) According to the steps included in this technique and its procedures, the technique was addressed in the theoretical aspect of the research to be applied in the Kufa

cement plant (research sample) with the aim of tracking the technology of value flow costs (VSC) for the cement product starting from (material costs Ore, personnel costs, machinery depreciation, maintenance services and related production costs such as designs, engineering, sales, customer relations, and any other expenses related to value stream costs), where workers' wages are distributed to each value stream depending on real time, and costs that do not cause any value stream cannot be reduced, Because most of the work is related to value streams from here we get the unit cost of the product by collecting the results of the total value flow costs technique on the number of products sold and this reflects the actual costs of production and delivery and at the level of each value stream, and through the value flow costs technique (VSC) Calculate the average actual cost of the product by dividing the total value flow costs by the number of units that have been sold, and this is an incentive for the company to activate marketing, which leads to an increase in customer demand for the product, under the value flow costs technology, the economic unit is divided into a number of value streams and each value stream includes individuals working from the starting point related to the design of a new product and the receipt of the customer's order to the delivery of the For a product or service to the customer, and this naturally requires a gradual change in the organizational structure of the economic unit from sections to value flows through value streams and each value stream is responsible for producing a certain number of products or services that aim to add value, maintain the flow and remove idle energy, and the value stream can be represented by an economic unit Large integrated within the unit and costs are reduced by getting rid of idle energy and technical information is characterized by value flow costs as actual, updated, understandable, accurate and timely, in addition to that it provides financial and non-financial performance measures on a weekly basis in order to ensure the efficient exploitation of resources and reduce the costs of the cement product by the amount of costs associated with it while promoting the goal of optimal utilization of those resources as this goal is one of the most important objectives of the application of the two technologies to reduce the costs of the cement product only The following :

First: Cost stages according to the technology of value flow costs in the Kufa cement plant

These stages are one of the most important stages of applying the technology of value flow costs (VSC), as these stages include identifying resources related to the production process, and this requires collecting data and information and studying the practical reality of production in the laboratory (research sample), because the data and information will be the basis for what will come from subsequent steps to apply this technology, so Kufa Cement Factory is one of the laboratories of the General Company for Iraqi Cement / Southern Assistants, and this plant produces Resistant cement bagged and fell, and the plant suffers from many problems It is represented by the appointment of large numbers of employees throughout the company and in the Kufa cement plant in particular, excessively and unplanned due to political events has led to an increase in the number of employees than the required limit, causing :

1. The high cost of salaries and cash wages borne by the factory within the cost structure as a result of the significant increase in the number of employees, as the number of employees reached (1,284) employees and (723) workers, which is a large number of actual needs against the design number capable of operating the plant in all stages of production and service with (575) workers.
2. The high cost of raw materials that were supplied to the plant and were not operated on to become a final product, which led to the loading of this account large amounts that were supposed to be classified within the inventory led to high production costs.
3. Distribution of surplus workers in the production stages within the factory randomly.
4. Low level of performance of employees due to lack of training courses, which affected their productivity.
5.

The stages in which the manufacture of the cement product passes according to the technology of value flow costs (VSC) into seven stages and each stage contains each stage on a number of large machines specialized in crushing and grinding stone and transporting it to the idler for cement production, as the machines are assembled in these stages according to specialization, as well as these stages include manual stages according to the requirements of the production process, which are as follows:

First stage: Quarries and Crushers

This stage is one of the basic stages, and it is the first stage for the supply of basic raw materials for the plant to be the process of manufacturing resistant cement, as these quarries are located in Najaf province in the Najaf Sea region, in which the material is located. The raw material of limestone is considered the basic raw material for the production of cement, where the quality of the material in it is cleared of calcium carbonate within the range (80% - 87%) and the raw limestone is extracted by crushers and excavators and used in the drilling process and the extraction of raw limestone, these machines and large equipment for grinding limestone in a

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mill located near the conveyor line with a capacity of (1 * 450 tons / hour) to reach the crushing of limestone to small size to enable Easy transport via rubber conveyor line .

Second Stage: Rubber Conveyor Line

The second stage is the stage of transporting limestone raw material from the stage of quarries and crushers by the rubber conveyor line, which transports limestone, which is more than (23) km from the Kufa cement plant, and the remains of crushed limestone are transported through the rubber conveyor line, which has an actual length of (22.5) km to reach them to the warehouses for limestone, which has a capacity of about (150,000) tons, but in the event of a power outage, limestone is transferred to The factory through transport trucks .

The third stage: Exit Mud Ponds and Unidan Ore Mills

The third stage is the stage of mixing the basic components of the cement product, where the clay material is mixed with water, provided that the percentage of water is not less than (47%) in basins with a capacity of 4000 cubic meters (31.5 m diameter * 5.6 depth), which number (2), and at this stage the first raw material for the production of wet cement is formed, the mixture is transferred to the unidan ore mills, For the purpose of forming cement putty, which consists of a group of raw materials and as shown in Table (2), and these mills number (4) mills with a capacity of (140 tons / hour) and is (diameter 3.5 m, 11.6 length) .

Table (2) Proportions of cement paste formation for Kufa cement plant (research sample)

NO	Type of raw material	Resistant Portland cement
1	Limestone	73%
2	Mud	15%
3	Sand	7%
4	Sponge iron ore	2%
Production semi-factory clinker		97%
5	Gypsum	3%
	Cement End Product	100%

Source: Prepared by the researchers

Fourth stage: oven mix basins

The fourth stage, the stage in which the raw materials must be provided for the production of cement in full, where the raw materials consist of five raw materials and gypsum is added to them in the final stage of the product and according to its composition and the type of product required of resistant cement, as these five materials consist of:

Article I: It is the limestone material that is obtained from sea quarries in Najaf

Article II: It is an ordinary clay material obtained from the quarries of AL-DAHISIYA

Article III: It is the soil material obtained from the Kifl quarries mixed with water to form the initial ionic material obtained in the previous stage, during which the cement paste was collected in barrels with a capacity of 8300 m 3. Diameter 40 m × depth 7.1 m) Barrel number (4) drums.

Article IV: It is sponge iron ore and here the ingredients are concentrated and tested their way before entering the furnace to obtain the product of the required quality for the purpose of packaging and marketing.

Fifth stage rotary uniax furnaces

The fifth stage is the most important stage in the formation of the resistant cement product by mixing the raw materials with each other and entering the furnaces to form the mixture (putty), and then the cement putty material is transferred to tanks for mixing and entering the furnace, and after examination and confirmation, the putty material is introduced into the rotary furnaces, where the length of the furnace is (175) m, And a diameter of (5.75 / 5.25) m, and the furnaces are lined from the inside with fireworks so that the putty is placed in the furnace at a high temperature of up to (1450-1700) inside the furnace, with the speed of rotation of raw materials (1-2) rpm, in a longitudinal axis system, and the raw material moves from the upper end towards the lower end of the furnace, then followed by the drying process of the material and the removal of steam from it, and then calcination, then burning to form (clinker) semi-final product of the cement product .

Sixth stage cement mills

The sixth stage is the reaction stage of the molten clinker, which is ready to be able to interact with oxygen and interact with clinker particles, which makes it appear more fragile when grinding clinker parts, and gypsum is added that gives it a degree of delay in hardening after mixing it with water and the mixture is ground again to achieve the final cement within the mill clinker mills and the final cement is sent to the silos for storing resistant

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cement, and at this stage resistant cement can be marketed Unpacked (Fill) to the local markets through trucks designated for transport before passing through the last stage, which is the packaging stage.

Seventh Stage: Packaging

The seventh stage is the last stage of resistant cement, where at this stage the resistant cement is packed in paper bags, the weight of which is (50) kg, and one ton of cement consists of (20) bags, to prepare it for marketing to local markets, as the design capacity for packing resistant cement for the plant is (100 tons / hour) and this stage includes (6) lines.

Calculating the costs of the proposed value flow of Kufa cement plant (research sample)

The Kufa cement plant (research sample) produces one product, so the value flow costs of the product are relatively similar and they consume almost the same resources and that the mixture produced is relatively constant, in this case the cost of the product is calculated from the value flow costs through the following::

Total Cost Rate per Unit = Total Value Flow Costs During the Period / Number of Units Shipped to Customers During the Period

It is clear from the above equation that the average total cost per unit represents the sum of the total costs expended to produce products (very similar) in the value stream during the period divided by the number of units sold to customers during that period, and this period represents a period of one week, as the value stream costs are numbers And other reports on it on a weekly basis, and it is noted that the average total cost per unit depends on the number of units sold to customers instead of relying on the actual produced units during the week in order to motivate managers to reduce inventory, but in the event that the number of units produced is more than the number of units sold , the rate of total costs per unit will increase because the production costs related to the produced and unsold units will be added to the numerator, as the value stream costs represent a summary of the total costs of the value streams during the week, and according to this method, there is very little allocation of indirect industrial costs, as not all The costs spent by the economic unit are allocated to the costs of the value streams, and the costs that are specific to the value streams only The costs from which the value streams benefit are allocated to the value stream costs, the facilities costs and the external costs from which the value streams benefit, and each value stream costs are allocated on the basis of area or on the basis of time for each value stream. The value stream is prepared on a weekly basis, so the actual data for the Kufa Cement Factory will be selected for the month of July (2021), and the costs for this month will be divided into four weeks in order to prepare the weekly resistant cement costs as in the following table:

Table (3) The costs of the expenses of the Kufa cement factory for the month of July 2021 according to the traditional method

Account Number	Account Name	Monthly Amount 100%	Cost per ton per month (Cement)	Monthly amount ÷ 4 weekly	Cost per ton ÷4 weekly
31	Salaries and wages	2,419,836,669	46,359	604,959,167	11,590
321	Raw materials and raw materials	1,131,746,444	21,682	282,936,611	5,420
322	Fuels & Oils	502,506,462	9,627	125,626,615	2,407
323	Backup tools	530,158,503	10,157	132,539,626	2,539
324	Packaging Materials	414,474,000	-	103,618,500	-
325	Miscellaneous	35,605,736	682	8,901,434	171
326	Staff Equipment	5,945,731	114	1,486,433	28
327	Water & Electricity	386,263,582	7,400	96,565,896	1,850
331	Maintenance Services	252,267,564	4,833	63,066,891	1,208
332	Research & Consulting Services	-	-	-	-
333	Advertising, printing and hospitality	4,370,000	84	1,092,500	21
334	Transfer, dispatches and contacts	110,457,998	2,116	27,614,500	529
335	Lease of fixed assets	91,402,590	1,751	22,850,648	438

336	Miscellaneous service expenses	25,366,146	486	6,341,537	121
36	Interest and Rents of Land	-	-	-	-
37	Disappearing	450,101,378	8,623	112,525,345	2,156
38	Transfer expenses	219,000	4	54,750	1
39	Other expenses	-	-	-	-
Total		6,360,721,802	113,918	1,590,180,451	28,479

Source: Prepared by the researchers based on the Cost Division

It is clear from Table (3) that the actual direct costs pertaining to the Kufa Cement Factory are represented by commodity requirements in the costs expended on raw materials spent on production, in addition to fuel, oils, spare tools, supplies, supplies and equipment for workers, in addition to fuel, oils, spare tools, supplies, supplies, various staff supplies, stationery, water and electricity And these costs are distributed to the value stream costs according to the benefit from the value stream costs from these activities, as if it is on a time basis by the individuals working in those activities to serve the value stream, but in the absence of a benefit from the value stream for these activities, in this case no The costs of these activities are allocated to the value stream, as these costs are treated as overhead costs. Kufa Cement Company, a large amount of costs will be reduced because there is a large proportion of external costs related to servicing activities It is allocated to the Kufa Cement Factory, although there is no causal relationship between productivity and those activities, as the value flow costing technique is used to reduce and remove idle energy from most of the operations related to production control, materials and production costs.

To achieve the purpose of the research, a set of basic steps will be followed to calculate costs according to the technique of value stream costs that have been presented in Figure ( ), which will be implemented sequentially in the applied side of this section of this chapter as follows:

The first step: - Determine the costs of raw materials necessary for the flow of value in a cement product

The first step is to calculate the material costs of value flows on the basis of the actual materials used by the value flow costs technology, and the actual materials used by the value flow costs technology can be calculated on the basis of the actual materials purchased or the actual materials used by the value flow costs from the stock of raw materials to determine the materials necessary to carry out the activities related to a cement product. The application of the technology of value flow costs for the resources used in the production process during the research period for the year (2021), according to the data obtained from the Cost and Pricing Accounts Division in the company on the time limits of the research, which is the fiscal year (2021), and the following table shows the size of the costs that were spent in the Kufa cement plant as shown in the following table:

Table (4) The cost of raw materials for the production of tons of resistant cement and fil

Raw material	Quantity of raw materials for (tons)	Price per ton of raw materials	Amount In dinars
Limestone	990425	1500	1,485,637,500
Clay dust	201380	2000	402,760,000
Silica sand	64799	3500	226,796,500
Iron ore	27821	106918	3,307,916,900
Total Costs	**1,284,425**	**113918**	**5,423,110,900**

Source: Prepared by the authors using the reports of the Cost Division and the Production Section

The previous table (4) shows that the total expenditure of value flow costs for raw materials related to a product of resistant cement and fil during the year 2021 is (5,423,110,900) ID including multiple types of those materials In addition, the company always seeks to use these materials very efficiently to achieve the desired outputs from the application of value flow costs technology, so the focus on raw materials during the week according to the following equation:

Total cost of raw materials used in the course of the value flow during the week = total production during the week of cement x cost per ton

Total cost of **raw materials used for value flow costs during the week = total production during the week of cement x cost per ton**

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Total cost of raw materials used for value flow costs = 113,918 x 13,476
Total cost of raw materials used for value flow costs per week = 1,535,187,448

Second Step: - Determine the costs of the wages of the necessary manpower with a cement product
The second step is represented by the costs of salaries and wages for the workforce in the Kufa Cement Factory, and it is represented by the total salaries, wages and benefits paid to workers during one month who work within the costs of the value streams of the product. Supportive within value stream costs, which are production planning, customer services, sales, marketing, accounting, quality assurance and design engineering, according to the value stream costing technique as there is no distinction between direct and indirect wages, as salaries and wages disbursed within the value stream are considered direct wages regardless If it is paid to individuals working in production activities or supporting activities at value flow costs, where the Kufa Cement Factory consists of a group of manpower in the administrative departments, production departments, and service departments, as the latest statistics for the number of employees who are permanent owners of the plant reached (1284) employees And (723) workers divided into a group of departments and divisions, as shown in the table (5), noting that the mullahs The design staff capable of operating the design laboratory for the factory are (55) administrative staff, and (520) working staff.

Table (5) Manpower in Kufa Cement Factory

	Sections	**Productivity**		Sections	**SOA**
t	**Department Name**	**Number of Employees**	**t**	**Department Name**	**Number of Employees**
1	Stone quarries	107	1	The administration and its people	180
2	Raw material mills	101	2	Power Station	109
3	Rubber Conveyor	78	3	Investment Division	5
4	Ovens Department	143	4	Marketing Division	15
5	Clinker mills	71	5	Production Management	52
			6	Packing	53
			7	Quality	16
			8	Quality Control	37
			9	Commercial Affairs	16
			10	Technical Affairs	58
			11	Electricity Maintenance	47
			12	Mechanical Maintenance	166
			13	Stores	28
Total					**1284**

Source: Prepared by the authors using the reports of the Cost Division and the Production Section
The above table shows (5) the number of manpower in the Kufa Cement Factory, where the salaries and wages disbursed to the workers in the Kufa Cement Plant for the month of July (2021) amounted to (2,419,836,669) dinars, and thus the average weekly salary of the Kufa Cement Plant during the month of July is (604,959,167) dinars per week, i.e. (2,419,836,669 ÷ 4) The number of workers of the Kufa Cement Plant is (2007) workers, so the average monthly salary for each worker for the month of July = (2,419,836,669 dinars ÷ 2007 workers) = (1,205,698) dinars, The proposed number of workers for the design capacity of the cement plant is (575) workers Since the average monthly salary for each worker in the Kufa cement plant is 1,205,698 dinars, the average weekly salary for each worker = (1,205,698 dinars ÷ 4 weeks) = (301,425) dinars, so the total weekly salary = 301,425 dinars × 2007 workers = 604,959,167 dinars

Third Step: - Determine the costs of machines and machines necessary for a cement product
The cost of using machines is the depreciation of machines within the value stream costs, which is the cost of maintenance and spare tools for those machines, the cost of fuel and oils needed to maintain machinery, the costs of water used for cooling, and the costs of machines within the value stream.

Depreciation of machinery and equipment within value stream costs
By reviewing the books and records of the Kufa Cement Factory, it was found that the cost of depreciation of machines within the costs of the value flow amounted to () dinars for a year, and the following is the calculation of the depreciation of the machines:

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Costs of depreciation of machines within the value stream during the week = total consumption during the year of the plant ÷ number of weeks

Total depreciation costs of machines within the value stream during the week = 450,101,378 ÷ **30 weeks**

Total depreciation costs within the value stream during the week = 15,003379

Fuel and powertrain costs

Fuel and motive costs for the fiscal year 2021 for the month of July amounted to (502,506,462 dinars), meaning that the fuel and motive costs related to the week are calculated as follows:

Cost of fuel and motive forces per week = 205,506,462 / 4 week

Cost of fuel and motive forces per week = 125,626,615

Cost of spare tools: The cost of spare tools for the month amounted to (530,158,503)

Cost of spare tools per week = 530,158,503 / 4 weeks

Cost of spare tools per week = 132,539,625

Maintenance cost: The cost of maintenance for the period of costs amounted to (263316.006) dinars, meaning that the maintenance costs that belong to the week are as follows:

Maintenance cost per week = 252,267,564 / 4 week

Maintenance cost per week = 63,066,891

Table (6) Total depreciation costs of machines

Cost of depreciation of machines	
Machinery Consumption Equipment	15,003379
Fuel and powertrain costs	125,626,615
Cost of spare tools	132,539,625
Maintenance cost	63,066,891
Total Costs	336,236,510

Source: Prepared by the researchers based on the Cost Division

Fourth Step: - Cost of facilities

The costs of support and facilities related to the costs of the value stream (rent, extinction, costs of public utilities, maintenance, security and protection services, costs of using auxiliary machines for production machines, cost of water used in production and cooling processes, laboratory expenses, rent of buildings) and since there are no rents for buildings or land for the plant related to the costs of the value stream, it is not charged to the costs of any value flow of rent and the cost of facilities is divided as follows: :

A. Costs of using auxiliary supplies and machines for production machines

The work of value flow costs requires the use of some supplies and auxiliary machines for production machines, namely (thermal bricks) to restore furnaces and mills due to the high temperature of the furnaces to produce molten clinker required by the resistant cement industry, as well as the costs of water used in production and cooling processes, and thus the costs of using these supplies are calculated on a weekly basis that concern the costs of value flow, The cost of auxiliary machines for production machines is the cost of (grinding balls) which consist of large steel balls for grinding stone.

B. Costs of support operations assisted with value stream costs

The costs are mainly represented in the laboratory expenses that arise from periodic tests of the quality of samples in the production stages of value flow costs, where the weekly cost of these operations is calculated as follows: :

Table (7) Total cost of facilities

Cost of facilities		
Details	**Monthly costs**	**Weekly Costs**
Packaging Materials	414,474,000	103,618,500
Miscellaneous	35,605,736	8,901,434
Staff Equipment	5,945,731	1,486,433
Water & Electricity	386,263,582	96,565,896
Advertising, printing and hospitality	4,370,000	1,092,500
Transfer, dispatches and contacts	110,457,998	27,614,500
Lease of fixed assets	91,402,590	22,850,648
Total Costs	**1,048,519,637**	**262,129,911**

Source: Prepared by the researchers

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Step Five: - Other Costs

It is represented by the remaining costs related to production services and costs Administrative and marketing costs for the resistant cement industry and indirect costs, where their value for this period is (25,585,146) dinars, so it is possible to calculate other weekly indirect costs related to value flow costs as follows:

Other indirect costs related to value flow costs = 25,585,146 ÷ 4 weeks

Other indirect costs related to value flow costs = 6,396,287

From the above, value flow costs can be summarized according to the Value Flow Cost (VSC) technique through the following table:

Table (7) Total value flow costs of the Kufa Cement Plant weekly

NO	Details	Amount
1	Raw material costs	1,535,187,448
2	Manpower wage costs	604,959,167
3	Machinery & Machinery Costs	336,236,510
4	Cost of facilities	262,129,911
5	Other costs	6,396,287
Total Value Stream Costs		**2,744,909,323**

Source: Prepared by the researchers

It is clear from the above table (7) that the total costs of the flow of value per week amounted to (2,744,909,323) Although the researcher found that the cement plant is in a position to work in a lossless production environment and apply some of its cost principles, but the unit cost of the product is still the basis for determining the price of the product, so the average can be calculated Cost per ton By dividing the total cost according to the value flow cost technique by the number of units sold to the customer according to the value flow cost technique, since this cost provides a more accurate basis for determining product prices than the standard cost, the average cost per ton is (the total cost of raw materials required to produce one ton of cement by the number of units sold to customers as follows: From the foregoing, it is clear that the method of calculating the actual costs of value stream costs is easy and simple according to the value stream costs (VSC) technology. Data, and it can be relied upon in making many administrative decisions related to the product, with the aim of improving operational processes within the value stream costs, and the income statement is calculated accurately at the level of value stream costs and at the level of the plant as a whole as well, as the data is characterized by being dependent on actual cost data Value stream costs and do not depend on any estimated costs, as the actual costs of value stream costs (workers cost, material cost, machinery cost, facilities cost) and any other costs directly related to value stream costs, to give the cost resulting from the application of the flow costing technique Value (VSC) is a more accurate basis for supporting decision-making and performance measurement, and costs are reduced by eliminating idle energy based on continuous improvement that is achieved through Focusing on process performance measures that focus on lost activities that create costs, and get rid of complex methods for allocating indirect industrial costs, as costs not associated with value stream costs are supportive costs for business, and these costs are planned and controlled, and are reduced through the application of Continuous improvement practices, and if supporting costs are allocated to work on the costs of value streams, the only way to reduce these costs is to reduce the allocation ratio, which means an incomplete allocation system instead of focusing on value-adding activities and enhancing customer value.

Through the foregoing, it can be said to two researchers that the costs of the value flow help to reduce costs by excluding costs that are not responsible for the value flow, as all costs related to the value flow are direct costs, and thus the issue of classifying costs into variable costs and fixed costs, as in the technique of accounting for the consumption of time-directed resources is not important for the technology of value flow costs, all costs subject to the control of value flow costs technology are Direct costs on the value flow, regardless of the fact that these costs are variable, fixed or mixed, while the costs that are not subject to the control of the value flow are used to be allocated to the value flow according to a certain basis, such as the number of workers or space, and through that a new classification of costs can be added to the traditional tabs, which is the cost tab according to its relationship to the value flow to direct costs of the value flow.

IV. CONCLUSIONS

1. Cost accounting has evolved in light of the rapid and overlapping changes that occur in the business environment, such as technological development, fierce competition, striving to meet the needs and requirements of the customer, and the management's need for reliable cost information that helps it achieve differentiation from competitors, as well as assistance in planning, control and decision-making.

2. The failure of traditional cost systems to meet the requirements and objectives of management, as they are no longer able to provide accurate data that help management in making decisions as a result of changes and developments that occur in the business environment, most notably the intense competition that resulted from the emergence of modern techniques in the field of cost management that are able to keep pace with These changes and developments, the most important of which is the time-oriented resource consumption accounting (TDRCA) technology.
3. In light of the development of management needs for analytical cost information, cost accounting moved from the stage of actual costs to the stage of estimated costs, then to the stage of standard costs to the stage of strategic cost management, and each stage is an extension of the previous stage, so that economic units do not have to radically transform From one cost system to another, but rather work on developing the current system in light of external changes and management needs.
4. The integration of TDRCA and value stream costs in light of the competitive business environment provides detailed information on the causes of costs at the level of resource pools as well as at the level of activities, which supports differentiated short-term decisions. (TDRCA) classifies costs as fixed and proportional according to the principle of causality, which provides the opportunity to isolate idle energy costs and supports long-term decisions related to resource and energy allocation.
5. The integration of TDRCA and value stream costs is a model of the mutual and complementary relationship between strategic cost management techniques as a result of using the results of value stream costs after removing idle energy to implement the optimal utilization of resources according to TDRCA, As well as taking advantage of the identification of idle energy as a method as an output from the time-oriented resource consumption accounting (TDRCA) technology to be an input to the value stream costing technique and start with the first step to identify idle energy, its disposal and performance evaluation.

V. RECOMMENDATIONS

1. The researcher recommends, responding to changes in the contemporary business environment, it is necessary for the economic units to adopt management techniques for the strategic cost in an integrated manner in light of the competitive business environment, especially the integration between the two techniques of accounting for time-oriented resource consumption and value-flow costs because of the advantages they provide and as illustrated by the proposed integration methodology It is represented in greater accuracy in allocating costs, providing appropriate information for making sound administrative decisions, and a greater ability to plan and control resources. It also contributes to the management of idle / surplus energy, which supports the improvement of company management.
2. The researcher recommends that the economic unit should use the time-oriented resource consumption accounting technique, as it combines the advantages of (TDABC) and (GPK) technology. Therefore, the economic unit should provide the information necessary to make long and short-term decisions, i.e. make strategic decisions to support the competitive advantage. .
3. The researcher recommends that the economic unit should pay attention to the resources available to it for the purpose of optimal utilization by determining the energies of each resource and the amount of unit consumption of its energies to determine its idle energies.
4. The researcher recommends the need to apply the value stream costing technique, because it leads to a reduction in costs related to the product, by excluding costs that are not related to value stream costs and considering them as general costs that appear in the income statement prepared at the level of the economic unit.
5. The researcher recommends that when applying the material flow costs technique, variable costs decreased and at the same time increased production efficiency by achieving inputs less than outputs, as well as achieving technological change by changing the type of fuel in furnaces from black oil to natural gas, which achieves economic efficiency from (0.57-1.67%) This is a high percentage that enhances the factory's competitiveness in the local markets.

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