Measuring the impact of resource consumption accounting on cost reduction and improving sustainable competitive advantage A case study in Najaf Governorate Water Directorate

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Abstract :
This research aims to apply the concepts of the resource consumption accounting on cost reduction and improving sustainable competitive advantage in Najaf Governorate Water DirectorateAnd statement of the exploited and unexploited costs which the traditional cost accounting system was unable to identify. included the research methodology Discussion of relevant literature and concepts about how consumption accounting uses resources to measure and reduce the operational cost experienced by the product, pure water and water (RO) provide appropriate informationto the managementTo make the necessary decisions to enhance customer satisfaction and improve sustainable competitive advantage.
The most important search resultsResource consumption accounting must be appliedInstead of using traditional systemsIn calculating the operational cost that the product passes through pure water and water(RO) This adversely affects the profit marginIn theNajaf Governorate Water DirectorateThus the cost is reducedand improving sustainable competitive advantage.
The research study has foundThat resource consumptionaccountingAnalysis of production cost into exploited production activities and unexploited production activitiesIt can be excluded in order to reduce the operational costs of the product's net water and water(RO)And work to create sustainable competitive advantage with lower cost and better quality.
Keywords : Resource Consumption Accounting, Cost Reduction, Sustainable Competitive Advantage, value maximization, Eliminate sources of waste and loss in cost activities.

Introduction :

Developments in recent years in all economic, social and technological aspects have made the traditional cost accounting system currentlyapplied Najaf Governorate Water DirectorateInsufficient to handle the cost of operational operationsIt became necessary to implement A new accounting system that analyzes cost activities that add value and can be exploited, and excludes or improves cost activities that do not add value and cannot be exploited.

The research study dealt withThe importance of resource consumption accountingin cost reductionDetermine the value of exploited materials and exclude unexploited materials in order to reach a sustainable competitive advantageAt the lowest cost and best qualityIn contrast to the traditional systems and theories.

Problem and Purpose:

The problem of researchThe accounting system applied the in Najaf Governorate Water DirectorateBased on traditional systems and theories in calculating the total cost of the product net water and water(RO)This adversely affects productive cost and sustainable competitive advantageWith the units adopting economical resource consumption accountingIt has the effect of measuring and determining the cost of activities exploitedAnd excluding or improving the cost of untapped activities in order to reach a sustainable competitive advantageat least costAndbest qualityThe use of resource consumption accountingKey to progress and overcome traditional accounting problemsWhich is based on the total cost of the productIt is also considered as a comprehensive and integrated strategic approachIt is based on the policy of improving value and eliminating sources of waste and loss in the activities of unutilized costs efficiently and effectively in order to achieve sustainable competitive advantage.

1. Literature review:

This section discusses the resource consumption accounting And cost reduction and sustainable competitive advantage improvement

1.1 Resource Consumption Accounting Concept :

The ResourceConsumption Accounting Concept was introduced in 2002 as one of the cost measurement tools that have emerged in the United States and many European countries, as The Resource Consumption Accounting Concept is based on the cost distribution Productivity according to resource consumption, and accounts are made as amount centred(Okutmus,2015:47). in order to include costs associated with each type of resource Produceand to know the relationship between each Produce.(Kadhim& Abdulzahra,2020:3). also defined Resource Consumption Accounting as the introduction to managemention by means of optimal used of economic unity resources while not adding unused resources to products through the application of chirality

principle in the process of allocating the cost of consumed resources product on cost targets, whether being product or services in order to from in reducing costs and increasing both production and profitability in an increasingly (Abdullah& Kadhim,2019:2). It was also defined as Resource Consumption Accounting is a management accounting approach based on creating reliable information to minimize costs and maximize revenues to enhance the product capability of the business, aiming greater success in a highly competitive marketing. At the lowest costing and the best quality (Ahmed & Moosa,2011:755). Through the focus of Resource Consumption Accounting In the field of cost reduction and sustainable competitive advantage improvement can provided three types of information for decision making, namely (Michael &Maleen, 2009:45):

A. costing allocated to cost objects: enables management tomanage product cost by changing quantities of organization outputs andcosts associated with idle resources product are allocated to cost objects. Clear insight is obtained into the causal relationships among resources within the organization modeled, in both an operation view resource quantities product and their associated costs.
B. links between resource pools and cost pools: management can reduce production costs by reducing or eliminating non valuation added activities. This entrance provides linkages information between resources pools and cost pools. enables management to improve the performance eliminate non value-added activities product.
C. quantities of idle resource and their associated costing In light entrance of the Resource Consumption Accounting The concept of sustainable competitive advantage is based into three categories (Allah,2018:86):
    - Productive- The resource is product or provided the services it was designed to accomplish.
    - Non-productive- The resources is engaged in maintenance, set-up, planned standby, waste (poor-quality production), training, and necessary administrative activated (other than their primary work); broken down or ill; on paid vacation, and the like.
    - Idle: The resource is not employed in its primary activity because there is simply no work to do due to lack of demand or designed in excess capacity beyond current demand. This category also includes time that management decides or law/contractual agreements require that no work be done.

1.2 Principles of the Resource Consumption Accounting:

There are principles for the entrance of accounting for consumption You must take into consideration when applied In order to reduce costs and measure sustainable competitive advantage These principles are as follows:

A. Causality: This principle demands that resources flows and their associated costing be modeled to reflect cause-and-effect relationships, eliminating arbitrary allocations between resources pools. Causality demands resources flows and their costing be modeled from resource to. consumers (support and direct) through the value chain on a strict cause and effect basis. If a resource pool does not required output from another resources pool. it will not incur any costs from that resources pool. This means final production and services will not reflect the fall cost defined by generally accepted accounting principles The relevancefor a purely(Ahmed & Moosa,2011:761)

B. Responsiveness : The principles of ensures the compliance with the principles of causality in modeling the resources consumption with main focus on costs behavior. Responsiveness governs the fixed and proportional costing relationship between resources pools. The divisibility of costs achieved by applying the principles of causality and responsiveness supports an extremely wide range of decision and planning scenarios(Inanlou.et.al, 2014: 200)

C. Work: The principle of works is not a universal principle likes causality and responsiveness but is necessary, because sometimes tracing resources flows between cost objects does not yield sufficient information for managerial decisions. It is necessary, in some cases periodically and in some cases continuously, to know what activity is executed in the resource consumption between resource pools (White,2009:70).

1.3 Sustainable Competitive Advantage Concept:

In the recent years, the theory of sustainable competitive advantages has emerged as one of the most promising theoretical framework in the management literature especially in the field of strategic management. is used to describe a superior performers attributes and resource that are unable to be duplicated or imitated by its currents or potential competitors poised to enters an industry (Foon& Nair,2010:65). also defined can be expressed as a specific way of using the resource available and other precise activities to keep the firms separate from its competitors as well as to keep it active and growing(Juszczak& Singh,2016:3) also Sustainable competitive advantage is based on three factors: the sized of the targets market, greater access to resource and customers, and restrictions on the powers of the competitors. Usually a firm can create the sustainable competitive advantage whose managers apply its strategy based on characteristics that cannot be easily copied (Hakkak& Ghodsi,2015:300) On this basis, the sustainable competitive advantage dependson three strategies (Jef et. al.,2015:86).

A. Costs strategy: which is to process the values chain in most efficient way, in order to produced products or services with the lowest prices without jeopardizing the quality.

B. Differentiation strategy: which is to produce a unique products or services,

compare to its competitors, such as better quality, simpler way to operate, better look, in other words the company should have the ability to be creative and innovative.

C. The focus strategy: is also known as a 'niche' strategy. this focus strategy consist of two main variants namely:

- Cost focus where a firm seeks a cost advantage in its target segment.
- Differentiation focus which a firm seeks differentiation in its target segment.

1.4 Cost reductionAnd Measuring sustainable competitive advantage:

A. Cost reduction: is the easiest and most certain way or increase profits in the short term. It can also be a major driver of long - term growth, if handledproperly. Because costs reduction is entirely within thecontrol of the company. Simply determines an area for costs reduction andimplement it. It is completely unlike the uncertainty of trying to increaserevenue, where one must be concerned about pricing, margins, the actionsof competitors, and governmental regulation. Cost reduction is the simplest road to increased profitability and enhanced cash flow(Bragg,2010:7). Nowadays, the product costs should be determined prior to production, in order to develop and identify superior strategy that will lead to a sustainable competitive advantage for the firm. It is necessary to consider all the product's costs at its entire life cycle to have a view of costs. Therefore cost systems evaluation in manufacturing firms has a special importance, because these systems are related to pricing systems, profit margins, corporate values and shareholder wealth(Abbas & Wagdi,2014:1). Resource Consumption Accounting focus on reducing cost product and improving the sustainable competitive advantage through the following (Al Rawi& Hafiz ,2018:33)

- Division of all sections (Resource target activities) into productive and service sections, then each productive and assistant section will be divided into resource pools or cost centers on an Consumption activity basis. The target activities input of each resource pool is determined on a quantitative basis.
- Classificationofactivities Resource target into productive and unproductive activities.
- Calculation the costs of overall inputs Productivity at their initial quality incurred by each pool and the secondary costs transferred to a pool from Resource target activities .
- Identification of output cost drives and cost allocation ratio for the other resource pools or final cost placements From the following equation:
- Fragmentation of the cost of inputs target for each resource pool into fixed and variable e elements based on response principle.
- Determination cost of cost position according to real benefit of the resource.

- Calculation of unused energy of the resource pools and take remedy action

The concept of Resource Consumption Accounting focus on Energy Productivity identification meets the Target in that the purpose of identifying activities is to create value for the customer, and therefore the determination of activities to include only activities that add value to the customer running an operation lean means that an organization stimulates productivity and quality The specified time

B. Measuring sustainable competitive advantage:

Measuring sustainable competitive advantage is the increased rate of attractiveness a firm offers compared to competitors from customers' viewpoints (Hosseini, et.al. 2018:2) The key concept behind the Four Sources Of Measuring sustainable competitive advantage (Hawkes& River, 2017:1) :

- Market Potential - through customer value
- Operational Scalability – through business processes and organizational structure
- Business Sustainability – through investing ahead of the curve in leadership developmentand innovation to control risks and create strength
- Financial Performance – through value focus and complexity reduction

2. Results and discussion:

A case study in the Najaf Governorate Water Directorate

The Najaf Governorate Water Directorate was established in 1979. It is one of the most important formations of the Ministry of Municipalities, Construction and Public Housing, as its importance lies in what it produces and distributes from its products of pure water and water (RO) to meet the needs of consumers of water. It provides its production services to more than one and a half million people. 24 hours a day. Table No. (1) shows data on the actual production capacity, the available production capacity, and the total cost during the year 2022:

Table No. (1)The actual and available production capacity and the total cost

The Details	Actual Energy	Available Energy
Pure water output capacity	16640350	25321500
Water output capacity (RO)	5416450	8564600
Supportive, Administrative And Marketing Production Capacity	22056800	33548200
The total cost of water	57201822397	

Source: Relying on cost calculations and production department

Note that the Directorate of Water of Najaf Governorate does not rely on the metering system to calculate the amount of consumption because the standards are not available for all homes or other sectors and throughout the governorate. It also relies on the total method in determining the cost of the product, as it divides the annual costs

according to the entire quantity of production without extracting or separating the cost of each product separately according to the exploited activities of each product, which led to high production costs and weak sustainable competitive advantage, as shown in the following table:

Table (2) The Cost Of Sustainable Competitive Advantage According To Traditional Accounting

pure water				(RO)Water		
The Details	price	actual energy	Actual sales value	price	actual energy	Actual sales value
The Sales	1800	16640350	29952630000	4000	5416450	16249350000
variable costs			20592656063			34321093438
Profit margin			9359973937			(12655293438)
Fixed costs			13728437375			22880728959
The net loss of sustainable competitive advantage			(4368463438)			(35536022397)

Source: Relying on cost calculations and production department

As a prelude to reducing the cost of operational processes that the producer of pure water and water (RO) passes through, and improving the sustainable competitive advantage, the use of resource consumption accounting is required in order to determine the cost of exploited materials and exclude or improve the cost of unexploited materials through the following steps:

First: Determining productive activities on the basis of resource consumption accounting:

According to the concept of resource consumption accounting, the production activities that the producer of pure water and water (RO) passes through, as they include:

A. The main activities: those activities that are directly related to the production and design of the product, as it includes four productive activities in the process of producing pure water, namely:(Action stations, sedimentation basins, filters and filters, chlorine stations)As for the main activities in the process of manufacturing water (RO), it includes seven production activities, namely(:Action stations, sedimentation basins, filters and filters, chlorine stations, pressure stage, membrane phase, sodium hypochloride phase)

B. Supporting production activities: Those activities that perform the production and design service of the product, as it includes three activities in the process of manufacturing pure water and water (RO), namely:(electrical power, mechanical power, maintenance)

C. Administrative and marketing activities: Those activities that perform administrative services and marketing it to the Directorate of Water in Najaf Governorate and better deliver its product to the customer.

Second: Determining cost vectors on the basis of resource consumption accounting:

After the production, support, administrative and marketing activities that the product passes through have been determined, pure water and water (RO) according to resource consumption accounting, cost drivers will be determined for each activity based on the utilization rate and according to the following equation:

Utilization ratio = actual production capacity / available production capacity …….(1)
Percentage of productive activities using pure water = 16640350 / 26624560 = 0.6….(2)
Percentage of water utilization by productive activities(RO) 5416450 /8124675= 0.7 =…(3)
Percentage of utilization of the supporting, administrative and marketing activities of pure water and water (RO)=22056800/34749235=0.6……(4)

Actually, on this basis, cost vectors will be determined for each activity according to the following table:

Table (3) Cost Drivers Pure Water And Ro Water

No.	Productive Activities	Variable Costs			Fixed Costs	Unit Of Measure
		Direct Materials	Direct Wages	Indirect Industrial Costs		
First	Pure Water Production Activities					
1	Pull Stations	0.096	0.138	0.162	0.204	Cubic Meter
2	Sedimentation Basins	0.102	0.126	0.144	0.228	Kg
3	Filters And Filters	0.09	0.162	0.15	0.198	Cubic Meter
4	Chlorine Stations	0.108	0.168	0.144	0.18	Kg
	Water Production Activities (Ro)					
5	Pressure Stage	0.119	0.161	0.182	0.238	Cubic Meter
6	Membrane Stage	0.133	0.147	0.168	0.252	Units
7	Sodium Hypochloride Phase	0.112	0.189	0.168	0.231	Liter
Second	Support Activities For Pure Water And (Ro)					
1	The Electrical Energy	0.102	0.138	0.156	0.204	Kilowatt
2	Mechanical Energy	0.114	0.126	0.144	0.216	Kilowatt
3	Maintenance	0.09	0.162	0.15	0.198	Times Maintenance
Third	Administrative And Marketing Activities					
1	Administrative	0.096	0.162	0.144	0.198	Number Of Employees
2	Marketing	0.108	0.168	0.144	0.18	Number Of Employees

Source: Relying on cost calculations and production department

Third: Determine the actual cost of each activity on the basis of resource consumption accounting:

After extracting the cost vector of the production, support, administrative and marketing activities, the exploited production cost and the unexploited cost will be determined according to resource consumption accounting for each activity according to the following equation:

Actual cost based on resource consumption accounting = cost wave for each activity * total cost of production……..(5)

Table (4) Exploited production cost according to resource consumption accounting

No.	Productive Activities	Variable Costs			Fixed Costs	Total cost
		Direct Materials	Direct Wages	Indirect Industrial Costs		
First	Pure Water Production Activities					
1	Pull Stations	659690653.7	948305314.7	1113227978	1401842639	4123066586
2	Sedimentation Basins	759331429.6	937997648.3	1071997312	1697329078	4466655468
3	Filters And Filters	721536652.5	1298765975	1202561088	1587380636	4810244350
4	Chlorine Stations	673502926.8	1047671219	898003902.4	1122504878	3741682927
The total cost of pure water		2814061663	4232740157	4285790280	5809057231	17141649331
	Water Production Activities (Ro)					
5	Pressure Stage	681451282.9	921963500.4	1042219609	1362902566	4008536958
6	Membrane Stage	685459819.9	757613485.1	865843983	1298765975	3607683263
7	Sodium Hypochloride Phase	513092730.7	865843983	769639096	1058253757	3206829567
Total cost of water (RO)		1880003834	2545420969	2677702688	3719922297	10823049788
Second	Support Activities For Pure Water And (Ro)					
1	The Electrical Energy	408870769.8	553178100.3	625331765.5	817741539.5	2405122175
2	Mechanical Energy	391691325.7	432921991.5	494767990.3	742151985.4	2061533293
3	Maintenance	257691661.6.5	463844990.9	429486102.7	566921655.6	1717944411
The total cost of supporting activities		1058253757	1449945083	1549585859	2126815181	6184599879
Third	Administrative And Marketing Activities					
1	Administrative	164922663.4	278306994.5	247383995.1	340152993.3	1030766646
2	Marketing	116820219.9	199281551.6	164922663.4	206153329.3	687177764.3
Administrative and marketing cost group		281742883.4	477588546.2	412306658.6	546306322.6	1717944411
The total cost		6034062137	8705694754	8925385486	12202101031	35867243408

Source: Approval of cost accounts and production department

It is noted from the table above that the production cost that has been exploited according to resource consumption accounting has a value of (35867243408) and the production capacity that can be manufactured has a value of (16640350). The consumption accounting system has an effect in measuring and reducing the production

cost that can be exploited and excluding the cost that cannot (RO) Exploiting it with the aim of reaching the sustainable competitive advantage that the product passes through, pure water and water. The following table shows the unexploited cost of each activity according to the equation:

Unused cost = total cost of water - cost based on resource consumption accounting…..(6)

table (5) Unexploited cost

No.	Productive Activities	total cost	Cost based resource consumption accounting	Unutilized costs
First	Pure Water Production Activities			
1	Pull Stations	4123066586	4123066586	2748711057
2	Sedimentation Basins	4466655468	4466655468	2977770312
3	Filters And Filters	4810244350	4810244350	3206829567
4	Chlorine Stations	3741682927	3741682927	2494455284
The total cost of pure water		28569415551	17141649331	11427766220
	Water Production Activities (Ro)			
5	Pressure Stage	5726481369	4008536958	1717944411
6	Membrane Stage	5153833232	3607683263	1546149969
7	Sodium Hypochloride Phase	4581185095	3206829567	1374355528
Total cost of water (RO)		15461499696	10823049788	4638449908
Second	Support Activities For Pure Water And (Ro)			
1	The Electrical Energy	4008536958	2405122175	1603414783
2	Mechanical Energy	3435888822	2061533293	1374355529
3	Maintenance	2863240685	1717944411	1145296274
The total cost of supporting activities		10307666465	6184599879	4123066586
Third	Administrative And Marketing Activities			
1	Administrative	1717944411	1030766646	687177764.3
2	Marketing	1145296274	687177764.3	458118509.5
Administrative and marketing cost group		2863240685	1717944411	1145296274
The total cost		57201822397	35867243408	21334578989

Source: Approval of cost accounts and production department

Fourth: Determine the sustainable competitive advantage:

After the exploited cost activities were identified and the unexploited cost activities were excluded according to resource consumption accounting in order to reduce the cost, develop and build the quality of the product and satisfy the customer efficiently and effectively, in contrast to the traditional systems and theories (Ro) applied in the Najaf Water Directorate in order to reach a sustainable competitive advantage For the product of pure water and water in an integrated form, as in the following table:

Table No. (6)The cost of sustainable competitive advantage according to resource consumption accounting

pure water				(RO)Water		
The Details	price	Sales quantity	Sales value	price	Sales quantity	Sales value
Sales	1800	16640350	29952630000	4000	5416450	21665800000
variable costs				variable costs		
Direct material			3728386037			2736112798
Direct wages			5957178398			4165442548
indirect manufacturing costs			5859427361			4316049008
total variable costs			15544991795			11217604354
Profit margin			14407638205			10448195646
Fixed costs			7781257414			5790045312
Administrative and marketing costs			1030766646			687177764.3
Net profit sustainable competitive advantage			5595614144			3970972569

Source: Approval of cost accounts and production department

CONCLUSION AND DISCUSSION

The Najaf Governorate Water Directorate must abandon the traditional system and theories and the total cost method in calculating the production costs of pure water and water (Ro), as it is not sufficient with the requirements of reducing the production cost and the flow of information necessary for management to make decisions to achieve customer satisfaction and improve sustainable competitive advantage in the contemporary business environment. Since the accounting of resource consumption in the Directorate of Water in Najaf Governorate achieves the most important results, the most important of which is identifying the exploited activities and the unexploited activities, and then linking the production cost to its causes, in addition to reducing the cost and eliminating sources of waste and loss in materials, and focusing on strategies to improve sustainable competitive advantage and optimal use of production capacity While ensuring product quality and thus increasing exploitation rates and exploited value based on available energy.

Based on the results and discussion of the research study, the recommendations that can be taken by the Directorate of Water in Najaf Governorate can be summarized to reduce the cost and improve the sustainable competitive advantage in light of the quality of the product that satisfies the customer by adopting resource consumption accounting as a basis for determining the exploited cost activities and excluding the unexploited cost activities in order to Reducing the production cost experienced by the producer of

pure water and water (Ro), and on the one hand, focusing on as an integrated strategic input based on improving the sustainable competitive advantage at the lowest cost, and the best quality by employing idle energy or unexploited surplus in cost activities, which contributes to increasing energy Productivity and improving competitive advantage by creating value and enhancing the customer's desire for the product Pure water and water (Ro),This will contribute to improving the profitability of the Najaf Water Directorate and preserving the exploitation of productive resources at the lowest cost and quality, while ensuring the quality of the product in all aspects of production activities in an optimal manner.

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