

The role of the costing system based on time-oriented activity in achieving a competitive advantage (applied research in the General Company for Electrical and Electronic Industries / Heaters Factory)

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Abstract

The research aims to study the costing system based on time-oriented activity (TD-ABC) and explain its role in achieving a competitive advantage in the General Company for Electrical Industries / Heaters Factory, through the optimal exploitation of resources and identification of idle energy . And in order to achieve the goal of the research, the TD-ABC system was applied in the company (the heaters factory), the deductive approach was adopted in the theoretical aspect, as well as the inductive approach and the analytical descriptive approach in the applied aspect of the research. The results of the research concluded that the use of the TD-ABC system provides a future vision of how to optimally utilize resources by rationalizing consumption and excluding idle energy from the cost of the product, which leads to a reduction in its cost and the possibility of using it in production.

Introduction

The large and rapid developments witnessed by the world in general and Iraq in particular, the most prominent of which are the technological developments and the resulting information revolution, economic developments and the spread of multinational companies, which cast a shadow on the manufacturing systems that relied On automation to a large extent, as most operations became in industrial economic units starting with research and development, design, production, marketing and distribution, advanced technological methods were adopted. Therefore, these units had to reconsider traditional cost systems and adopt modern administrative systems and techniques that enable them to provide high quality products at low costs to face intense competition and to ensure survival, continuity and survival in the market, and in order to face the The shortcomings of the traditional systems, many modern cost systems and techniques emerged since the eighties of the twentieth century and its aftermath (costs based on activity, costs based on operations and specifications etc.) The most prominent of these systems is the costing system based on time-oriented activity. It is used in the measurement and management of idle energy and works on the optimal exploitation of resources, thus achieving a competitive advantage. This is achieved by reducing c osts by not charging idle energy costs to production.

The first axis: - Studies Antecedent and research methodology

First: previous studies

- ✓ Study by Iacob & Constantin, 2015 : Aimed to develop and design System accident helps Administration in account its costs in the form of More justice From traditional systems and clarification for the concept System the cost on me Basis Activity router by time . The most prominent result is that the transformation From System the cost on me Basis Activity to me

System the cost on me Basis Activity router in time Prepare a step important in Management section the health the public From During look to me Advantages that achieve it Which that TD-ABC provides informations minute and the same Link About The patients in Clinics , possibility take decisions Effective to improve Activities operational , as well About to provide Opportunities to analyze profitability for every Services medical , information that Complete get on her From this the system help in Manufacture decisions investment.

- ✓ Al-Obaidi study , 2017: It aimed to measure Cost Products in Shade System the cost on me Basis Activity ABC system TD-ABC costs on me Basis Activity router in time, and conduct Comparison between the two systems and select their effect in decisions pricing . I found that System TD-ABC considered more objectivity and fit environment Industry modern, so Takes costs energy Exploited on me output and excludes energy idle ,As well as About its importance in proces Pricing for products in a way Relevance help Unit Economic in Governorate on me customers current and attract customers Renew.
- ✓ Maria&Ferreira, 2017 study : Aimed at knowing Bezel Relevance Application System TD-ABC in units Economic Producer and extent its potential in Solution problems Processes Productivity, About road design model experimental for TD-ABC . Its most notable result was that System costs TD-ABC Compatible environment production . and that able on me deal with fluctuations Processes productivity . and on Face selection Can for equations the time absorb mission different . As well as About that Application System TD-ABC he is less complicated in units Economic Productivity From systems that preceded him for being He approves on me Wave One and he time.
- ✓ Alubaidy & Hadi , 2019 study : I aimed to find out Concepts and importance highlighted Properties and features own by order traditional And (ABC) and (TD-ABC) and comparison between systems To determine Which systems contribute in Continuation and glorify profitability for the unit Theme search. The most notable results were System TD-ABC FASTEST and the easiest in Application comparison by order Traditional and ABC Where you require These systems are time long for application, As well as About Use equations the time to customize costs Resources that lead to to me Personalization objective for costs comparison by systems above .

Second: Research Methodology

A. Research problem: The Iraqi industrial economic units face many problems that resulted in their inability to compete for several reasons, including the invasion of imported products at competitive prices and quality, high production costs, obsolescence of some production machines and equipment compared to technological development in manufacturing systems and others, This makes it imperative for these units to reconsider production methods and the cost system and to adopt modern systems and technologies to enable them to face this competition. Therefore, the research problem can be formulated in the following question- :

1. Are the elements for implementing the TD-ABC costing system available in the Iraqi environment?
2. Does the TD-ABC application contribute In achieving a competitive advantage for the economic unit.

B. The aim of the research: The research aims to 1- A statement pilings Cognitive SystemTD-ABC
2- Statement Role TD-ABC in Achieving a competitive advantage.

C. Research importance: stand out Importance search From that units Economic industrial Iraqi need to me re look in its reality Present, And the Approval systems and techniques modern to move up by performing and face it The competition with a goal stay and continue, Such as System costs on me Basis Activity router in time who plays a big role at discount costs Through the optimal exploitation of resources and the separation of idle energy and that I became demand pressing For this units.

D. Research hypothesis: To achieve the research objectives, the following basic hypothesis was formulated: Application System costs on me Basis Activity router in time In achieving a competitive advantage for the economic unit in question.

E. Research Boundaries: They are the spatial boundaries represented by the General Company for Electrical and Electronic Industries - Heaters Factory) located in the Waziriyah Baghdad Governorate . The time limits are represented by data for the year 2021, as it is the latest data available to researchers.

And the. Research Methodology : The deductive method was adopted in preparing the theoretical side, as well as the inductive method and the analytical descriptive method in conducting the applied side of the research.

G. Research variables: The independent variable is the cost system on me Basis Activity router with time, and the dependent variable represented by achieving a competitive advantage in the laboratory, the research sample.

The second axis: The theoretical framework of the costing system based on time-oriented activity

First: the definition of the TD-ABC system

The Time Directed Activity Based Costing (TD-ABC) system is generation Second From System costs on me Basis Activity ABC and he one most important phenomena modern in area Cost accounting and management accounting Led to me Appearance of Revolution in area account the cost aggregate for products and services . Therefore, the definitions of this system have varied according to the opinions of writers and researchers, but they all fall into one destination, as (Yuesti, et.al, 2021:510) defined it as a tool to simplify proces Calculation costs From During Download costs Resources directly on me Goals the cost Building on me Activities that used equations time, so the flow TD-ABC Resembles System Estimation the cost traditional, But he Differs in Logic primary For the time dependent calculation . Galendi defined it as a system of computation costs It was completed develop it to customize costs Resources for products From During control Activities that Complete made in proces production, Uses TD-ABC the time as an engine Unique to use Resources Than Allow rated the cost efficiently and accuracy . In addition to me that, it Can From Investigation savings actual in costs and improve Processes (Galendi , et.al, 2022:174) .

Second: The elements of the TD-ABC system

Since the TD-ABC system is an extension of the activity-based ABC costing system , it consists of its elements in addition to:

- Causes (vectors) of time : are the variables Or the characteristics used to calculate the time taken to perform a specific activity . (Scavenius, 2013; p33)

- time equations : the equations sports From Degree first Complete created to estimate the time Total necessary To implement Activity a certain, with consideration factors that Increase From its time standard . give Equations temporal Flexibility For TD-ABC in Confrontation Changes of manufacture Producer or Submit service in time the appropriate (Tejada, et.al, 2020: 20).

Third: TD-ABC application steps

TD-ABC system is based on six basic steps (Sulistyono, Yuniaristanto, 2021: 79). (Alotaibi, et.al, 2021 :441) (Malmrose, Lydersen, 2021 :5) (Din,et.al, 2019 :774-776) (Arenhart, et.al, 2020 : 323).

- Identification of the various resource groups through which activities are to be carried out.
- Determine the costs related to each group of resource groups: represented by the total direct and indirect costs .
- Estimated time for each process (process energy, activities and resources used)
- Determine the unit cost of each group of resources by dividing the total cost of the group of resources by the practical energy .
- Estimated time required for each transaction (Event) Activity events through the use of time equations.
- By multiplying the unit cost of each event by the time required for each cost objective we get the total costs.

Fourth: The advantages of the TD-ABC system

TD-ABC system has many advantages as it appeared to overcome the disadvantages of the ABC system, so the most prominent advantages can be summarized as follows:

- Manage resource usage better because It takes into account unused energy (idle) and resources that do not add value (Huang, 2016 :6).
- It is used to determine the final accurate cost of products and services and to arrive at the actual profit (Abad, 2016 : 353).
- Estimates more Accuracy cost (efficiency cost) , Efficiency in distribution costs to aim the cost, to improve Use Resources and activities and operations, and more Capacity used and the judiciary on me That that no add Values, Accuracy Larger in distribution costs not direct to target the cost, to improve the operation , in attempt To reduce the time that consume it some Activities (Santos, 2018 :20).
- Supporting operational and strategic decision-making in cost management and human capital management (Fedriasari, Kawahara, 2020 : 146).
- that application TDABC is less complex than the application of other cost estimating systems, as well as quick response to any variables because it requires only two criteria, the unit cost of the activity and the time required to perform a transaction or activity (Elshaer, 2020 : 18).
- TD-ABC is inexpensive and easy to update; Easy to apply, and the system can be easily validated through direct observation of the estimated model of the time unit and the possibility of predicting future demand (Yesti, et.al, 2021 :514)

The third axis: the practical aspect

An introduction to the General Company for Electrical and Electronic Industries \ Heaters Factory

company . the public For the electrical and electronic industries . It is one of the formations of the Ministry of Industry and Minerals , and is considered one of the most important industrial sectors in the country due to its manufacture , manufacture and assembly of many products , such as (extinguishing equipment, transformers, water pumps, air cooled engine, refrigeration conditioners , heaters, generators and others)

Because of the importance of the heaters product, it was taken as a sample for practical application, as the factory faces many problems, including the lack of demand for the product, high production costs, poor interest in the marketing aspect, lack of competition , dependence The traditional method of calculating the cost of the product and pricing it, depending on the cost method College + profit margin, and to implement the costing system based on time-oriented activity in the heaters factory, we will do the following steps:

1- Identification of the various resource groups through which activities are to be carried out.

Table (1) Total lab resources for 2021

T	Statement	Amount \ to the nearest thousand dinars
1	salaries	120,255,000
	Certificate allowances	12,853,000
	Position allowances	580,000
	family allowances	12,510,000
	Professional and technical allowances	5,354,000
	Incentive bonus	195,000
	Other allowances	125,000
	Insurance for employees	16,000,000
2	Raw materials and raw materials	8,909,000
3	fuels and oils	20,652,000
	backup tools	2,676,000
	water	1,000,000
	electricity	1,250,000
4	Supplies and errands	6,392,000
	stationery	3,644,000
	Transfer of workers	11,170,000
5	maintenance services	7,020,000
6	Rental of assets and equipment	12,000,000
7	Destruction of buildings, constructions and roads	8,936,000
	Abandonment of machinery and equipment	19,949,000
	Disappearance of transportation media	2,649,000
	The extinction of numbers and templates	865,000
	Furniture and office equipment	4,595,000
	the total	279,579,000

Source: Prepared by researchers based on company records

2- Determine the costs related to each group of resource groups: represented by the total direct and indirect costs.

Table (2) Divide costs into direct and indirect

T	Statement	T. direct	T. indirect
1	salaries	120,255,000	\

2	Certificate allowances	12,853,000	\
3	Position allowances	580,000	\
4	family allowances	12,510,000	\
5	Professional and technical allowances	5,354,000	\
6	Incentive bonus	195,000	\
7	Other allowances	125,000	\
8	Insurance for employees	16,000,000	\
9	Raw materials and raw materials	8,909,000	
10	fuels and oils	\	20,652,000
11	backup tools	\	2,676,000
12	water	\	1,000,000
13	electricity	\	1,250,000
14	Supplies and errands	\	6,392,000
15th	stationery	\	3,644,000
16	Transfer of workers	\	11,170,000
17	maintenance services	\	7,020,000
18	Rental of assets and equipment	\	12,000,000
19	Destruction of buildings, constructions and roads	\	8,936,000
20	Abandonment of machinery and equipment	\	19,949,000
21	Disappearance of transportation media	\	2,649,000
22	The extinction of numbers and templates	\	865,000
23	Furniture and office equipment	\	4,595,000
the total		176,781,000	102,798,000

Source: Created by researchers

3- Estimated time for each process (process energy, activities and resources used)

Table (3) Set time for each activity/minute

T	Stages of production	pressing	welding	turning	Establishments	plastic and the shards	quality control	total \ d
1	Al Qaeda industry	4	4	\	\	\	3	11
2	Tank hull industry	5	30	20	\	\	3	58
3	tank cover industry	10	6	4	\	\	3	23
4	bottom cover industry	8	7	5	\	\	3	23
6	connect the plug	\	5	30	8	\	3	46
7	pipe cutting	\	\	\	10	\	\	10

8	Heater cap industry	13	\	10	\	\	3	26
9	plastic cover industry	\	\	\	\	20	\	20
10	paint	\	\	\	5	\	\	5
11	Final assembly	\	\	\	25	\	10	35
12	Total time for each section	40	52	69	48	20	28	257

Numbers of researchers based on estimates from the Technical Affairs Department

Table (4) Determine the practical energy for each activity

T	Department Name	Number of workers (1)	Daily working time/min (2) ¹	Number of working days per year (3) ²	Operational energy/min (1) * (2) * (3)=(4)
1	pressing	3	360/d	264 days	285,120
2	welding	3	360/d	264 days	285,120
3	lathe	3	360/d	264 days	285,120
4	Establishments	2	360/d	264 days	190,080
5	Plastic + Shells	3	360/d	264 days	285,120
6	quality control	4	360/d	264 days	380,160
Total annual operating capacity					1,710,720

Source: Created by researchers

- 1- hours (6 hours * 60 / min = 360 / min).
- 2- days in a month * 12 months = 264 days).

Determining the unit cost for each group of resources by dividing the total cost of the group of resources by the operational capacity, by dividing the costs of activities by the practical capacity (previous step)

Table (5) activity costs

sequence	Section	Total cost / dinars
1	pressing	58,289,840
2	welding	50,301,160
3	lathe	51,157,800
4	Establishments	30,535,200

5	plastic and shading	34,623,600
6	quality control	54,671,400
7	the total	279,579,000

Source: Prepared by researchers based on costing division data.

Table (6) Calculate the average cost for each activity

sequence	Section	the total cost Dinar	practical energy per section/minute	Average cost of each section dinars/minute
1	pressing	58,289,840	285,120	204
2	welding	50,301,160	285,120	176
3	lathe	51,157,800	285,120	179
4	Establishments	30,535,200	190,080	161
5	plastic and shading	34,623,600	285,120	121
6	quality control	54,671,400	380,160	144
7	the total	279,579,000	1,710,720	985

Source: Prepared by researchers according to Table(5-4)

5 -By multiplying the unit cost of each event by the time required for each cost objective we get the total costs.

Table (7) Actual costs for each activity

T	Section	Average cost per section	energy the Actual	energy cost actual* (2) * (1)= (3)
		1	2	
1	pressing	204	19,008	3,877,632
2	welding	176	24,710	4,348,960
3	lathe	179	32,788	5,869,052
4	Establishments	161	15, 206	2,448,166
5	plastic and shading	121	9,504	1,149,984
6	quality control	144	17,740	2,554,560
7	the total	985	118,956	20,248,354

Source: Prepared by researchers

*energy Actual pressing department = 3 workers * 40 minutes * 60% * * 22 days per month * 12 months.

*The volume of production is 160/264 days per year = 60% of one heater.

And so for the rest of the departments, taking into account the number of workers in each department and the time spent in each department.

Determining idle energy and excluding its cost from the product by comparing the practical energy with the actual energy

Table (8) Determine idle power

T	Section	practical power	Actual power	idle power	unit rate	idle energy cost
1	pressing	285,120	19,008	2 66 , 112	204	54,286,848
2	welding	285,120	24,710	260,410	176	45,832,160
3	lathe	285,120	32,788	252,332	179	45,167,428
4	Foundations and structures	190,080	1 5, 206	174,874	161	28,154,714
5	plastic	285,120	9,504	275,616	121	33,349,536
6	quality control	380,160	17,740	362,420	144	52,188,480
7	the total	1,710,720	118,956	1,591,764	985	258,979,166

Source: Prepared by researchers according to Table (4-7)

Table (9) Product cost comparison under company system and TD-ABC

Product cost / JD		
1	Product cost under company system	279,579,000
2	Product cost under TD-ABC	20,248,354
3	Reduction amount	238,730,812

Source: Prepared by the researcher

Conclusions

1. that to accelerate the changes that witness it the scientist represented by increase The competition for several reasons Of which Developments technology , systems information , developments Organized Manufacturing And the Effects The environment other , all that inevitable on me units Economic finding Techniques and systems talking to manage the cost enable her From The competition and continue in market.
2. The shortcomings of traditional costing systems and their lack of objectivity in measuring costs is one of the most important reasons that led to the emergence of the TD-ABC system.
3. It is considered System TD-ABC better in take decisions Convenience and good for units industrial From systems that preceded him being exclude energy idle not Exploited when Calculation costs And so achieve advantage competitive From During discount cost.
4. based Lab geysers in Management the cost on me systems traditional in pricing the product that From During Determine Cost the product and add margin profit (cost plus) without Taking prices Products The competition own with heater in consideration.
5. Possibility Application costing system on me Basis activities directed in time TD-RCA in lab a sample search in Shade to rise costs the product and more energy idle and lower production.
6. Assist Application System TD-ABC in exploitation optimum for energy and separated to me energy exploited and idle and exclude costs idle and not downloaded on me the product And the this What did not provides it System the company traditional Where reached costs energy the

Actual the user on me according to TD-ABC (20,248,354) Dinar instead of From (279,579,000) calculated according to System the company traditional.

Recommendations

1. The company should reconsider the current traditional cost system adopted in calculating the costs of the heater product, which does not provide real information about the cost of the heater.
2. The application of TD-RCA because it provides appropriate information that helps the company's management in many decisions, including the pricing decision, as it provides information on practical and actual energy while excluding idle energy, and thus contributes to reducing costs without compromising the quality of the product and offering a product at a competitive price.
3. TD-RCA contributes to directing management's attention to how energy is used Unemployed and invested in other areas, as the company can invest unutilized human material resources in the manufacture of spare parts for the heater product and required by customers, or in the manufacture of water tanks as long as the stages of the manufacturing process of these tanks are similar to the stages of manufacturing the internal heater tank.
4. Paying attention to the marketing aspect, preparing market studies to identify competing goods, and what are the customer's requirements and desires so that the company can provide a product that meets the customer's needs at a competitive price.

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