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Applying the Value Chain Analysis Technique and Its Role in Reducing Production Costs

**An applied Study in Al Diwaniyah Tires
Factory**

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Abstract:

The research aims to use the technique of value chain analysis in the field of reducing the costs borne by the economic unit by excluding activities that do not add value and in which the costs are wasted. Relevant to the topic of the research, as for the completion of the practical and applied side, the researchers relied on the inductive approach in analyzing the value chain activities in Diwaniyah Tire Factory of the General Company for Rubber Industries and Tires, by relying on the financial , cost data and personal interviews conducted with department officials and activities in the factory. To many conclusions, the most important of which is that the use of the value chain analysis technique leads to a reduction in total production costs by 394865745 dinars.

Keywords: value chain analysis, Rubber industries , reduction of cost of tires production

Introduction

The Iraqi industrial sector in general, especially in the recent period, is facing great challenges and intense competition from imported products in addition to technological developments in the areas of modern production systems, cost-effective technologies and applied administrative methods, which made this sector exposed to a suffocating crisis that overthrew many industries , eliminated them completely and the remaining ones are almost it can survive and compete, so it has become an obligation and duty for those in charge of this sector and departments of economic units to apply modern cost-effective techniques, especially the technique of value chain analysis, because of its important role in reducing production costs.

Whereas, the value chain analysis technique aims to identify activities that do not add value in preparation for excluding them and activities that add value in preparation for maximizing them and depending on the information available along the value chain, as well as creating integration and joint coordination between these activities in order to create value for the customer and achieve a competitive advantage, and from In order to achieve the purpose of the research, it has been divided into four parts, the first includes the methodology of the research And previous studies. As for the knowledge pillars of the value chain, they were discussed in the second, while the third dealt with the use of the value chain analysis technique to reduce the costs of the Diwaniyah tire factory. As for the conclusions and recommendations, they were mentioned in the part. The fourth and last.

Research Methodolog And previous studiesy

1- Research Methodolog: The methodology represents the researcher's line of work in completing his research by defining the research problem, the objectives of the research, the importance of the research, the research hypothesis as follows:

The research Problem :

The rapid technological developments and changes in the modern manufacturing environment and the accompanying changes in the tastes and demands of customers were matched by developments in cost management techniques, especially at the strategic level, and the economic units 'orientation towards customers' requirements and satisfying their desires through products that converge and conform to their desires and tastes. The traditional methods and tools of cost accounting are unable to meet these challenges, so it has become imperative for economic units to adopt modern technologies in cost management, including the technique of value chain analysis, so researchers can express the research problem through the following intellectual questions:

- Can the economic unit of the research sample apply the technique of value chain analysis?
- What is the role of the value chain analysis technique in reducing product costs for the economic unit of the research sample?

The Research Objectives:

The research aims in general to find solutions to the questions of the research problem by reviewing the theoretical aspects and the cognitive foundations of the value chain analysis technique, and the possibility of applying this technology in the factory research sample by transferring the subject to the application and practical reality in the factory The research sample to produce results that the unit and the rest of the economic units can benefit from in the field of cost reduction..

The importance of research:

The importance of the research stems from the importance of applying modern strategic cost management techniques, especially the value chain analysis technique, because of its great role in helping Iraqi economic units in the field of cost reduction, to advance industrial reality and compete with imported products.

The Research hypothesis:

The main hypothesis of the research was formulated as follows:

There is a possibility to apply the technique of value chain analysis in the factory, the research sample, and that this application leads to the exclusion of activities and working individuals who are not adding to the value and thus reduce production costs.

The limitation of the research

The research was conducted in Diwaniyah tire factory, and for the year 2017

2- Previous studies: Through this paragraph, we review some previous studies related to the current research, which the researchers were able to obtain.

Studying	Researcher's name	Study Title
Local Studies	(Alzubeidi, 2015)	Designing a proposed accounting model for the integration between the value chain and the supply chain to enhance the value of the stakeholders in the economic unit.
	(AlBayati, 2016)	The effect of integration between value analysis and the value chain in reducing costs.
	(Khadir, 2017)	Defining municipality project management activities using the value chain model.
Arabic Studies	(Noor, 2015)	The role of management accounting using the value chain method in achieving strategic goals.
	(Ali, 2017)	The role of the two methods of value chain analysis and on-time production in support of competitiveness.
	(Obaida, 2019)	The value chain and its role in improving the performance of the institution.
Foreign studies	(Cletus & Emma, 2011)	An Empirical Investigation of Value-Chain Analysis and Competitive Advantage in the Nigerian Manufacturing Industry.
	(Ahmed & Others, ۲۰۱۴)	Implications for Food Security in the Middle East and North Africa.
	(Hailegiorgis, 2017)	Value Chain Analysis of Onion in Dugda District, Oromia Region, Ethiopia.

The current research agreed with some previous studies on the necessity to exclude unnecessary activities that do not add value, as the current research agreed with the study (Noor, 2015) through the use of the value chain analysis technique in achieving the strategic goals of the economic unit, the most important of which is to reduce production costs. While the current research differed from previous studies in that it gave great importance to the technique of value chain analysis to exclude unnecessary costs by excluding working individuals who are not the hosts of the value as far as the researchers know.

The technique of value chain analysis – Theoretical background

there are many definitions of the value chain analysis technique by writers and researchers that differ from one researcher to another, but all of them fall into one meaning, which is the identification of activities that add value and activities that do not add value, the table below shows some of these definitions:

Table (1)

Definitions of the value chain analysis technique

No.	Reference	Definition
1	(Wild & Shaw, 2010 :18)	They are sequential and sequential activities through which value is added to products and services, thus achieving customer satisfaction.
2	(Blocher,2010 :12)	An analysis tool used by industrial units to determine the steps required to produce a commodity or provide a service that enhances

		the competitive position.
3	(Drury ,2012 :564)	An interconnected set of activities along the value chain in order to create value for the customer, from the sources of obtaining the raw materials to the arrival of the product to the final consumer.
4	(Horngren, 2012:28)	A series of successive functions and activities of the industrial unit through which value is added to the products and services provided to the customer by the industrial unit
5	(Soror 2019:175)	A systematic method for distinguishing value-adding activities in order to maximize them within a reasonable cost to achieve a competitive advantage.

From what was mentioned above, we can say that the value chain analysis technique is a set of interrelationships along the value chain through which the main activities are identified and the supporting activities that add value (are maximized) and which do not add value (are excluded), starting from the stage of research and development. Down to after-sales services, where activities are maximized within the reasonable cost in exchange for achieving customer satisfaction and excluding activities that do not add value to the customer, as well as reducing activities that have a waste of cost, and this is achieved through feedback along the value chain.

The importance of the value chain analysis technique lies in the following (Abdel-Qader, 2019: 36) (Al-Thahabi & Saeed 2017: 36)

1- Helping the economic unit to perform its functions efficiently: The use of the value chain analysis technique helps the economic unit's management to carry out the planning function and determine the value-adding activities, and this leads to the provision of a high quality product that meets the customers' desires .

2- Improving relations with suppliers: The analysis of the value chain leads to knowing the obstacles facing the economic unit, including the poor quality of the raw materials received from suppliers. Therefore, the management of the economic unit should deal with suppliers who have a good reputation.

3- Reducing costs: through analyzing the value chain, the activities in which the cost is wasted and working to reduce them are identified, in addition to identifying the value-adding activities and maximizing them within the reasonable cost.

4- Enhancing the competitive advantage: the economic units must pay attention to their products, identify strengths and weaknesses, as well as improve the internal relations of the economic unit, and this leads to the creation of value for the customer and the strengthening of the competitive position. There are two groups of activities within the value chain that the economic unit undertakes. The first group consists of the main activities because they are directly related to the products or services provided by the economic unit to the customer. The second group is the supportive activities without which the economic unit cannot carry out the main activities. As follows (Jung, 2014: 134-135).

The first group: the main activities

This group consists of six activities, from research and development to after-sales services, and these activities are responsible for adding value to the customer through the product produced or the service provided as follows:

1- Research and development activities: It is intended to develop ideas for designing products and providing services, as research and development activities affect strategic planning by discovering and creating a new product that gives the economic unit new opportunities in competition that competitors do not know (Rashid and Yaqoub, 2015: 47).

2- Design activities: are those activities that are related to planning to design a product superior to similar competitors' products, and in cooperation and coordination with the research and development stage and activities supporting the implementation of production processes in a more efficient and effective manner (Jones and Hull, 2008: 198).

3- Manufacturing activities: These activities are called internal supplies related to the receipt of raw materials and operations (inspection, storage, control and distribution of inputs), which are used in the production process to produce the good or provide service, and these activities are also known as operational processes (Yusuf, 2009: 5) .

4- Marketing activities: It is a group of activities through which consumers are contacted for the purpose of introducing them to the products and services provided by the economic unit, as well as encouraging them to acquire them (Kazem, 2008: 115). Marketing is also known as a group of activities related to the delivery of the product. The ultimate customer (Chan, 2007: 82).

5- Distribution activities: These activities are also called external supplies related to the operations of delivery, processing and scheduling through which products or services are supplied and shipped to customers (Dess, 2014, 75).

6- Customer service: These are the services that start after the sale that can help increase the value from the customer's point of view. It also includes the commercial conditions and aspects (quality, delivery, complaints settlement procedures, communication services before and after sales (Acharyulu, 2015): 49)

Group Two: Supportive (chore) activities

It consists of the following activities:

1- **An infrastructure:** It is a set of interrelated elements that serve the needs of the economic unit, as it includes the sections (accounting, finance, legal, planning, public affairs, quality assurance, public administration) (Rathee & Rajain, 2013, 2).

2- **The human resources:** Through human resources, the economic unit can follow several methods through which it is possible to obtain skilled and experienced people to perform various activities of the economic unit that can add value to the product (Hill & Jones, 2009: 86)

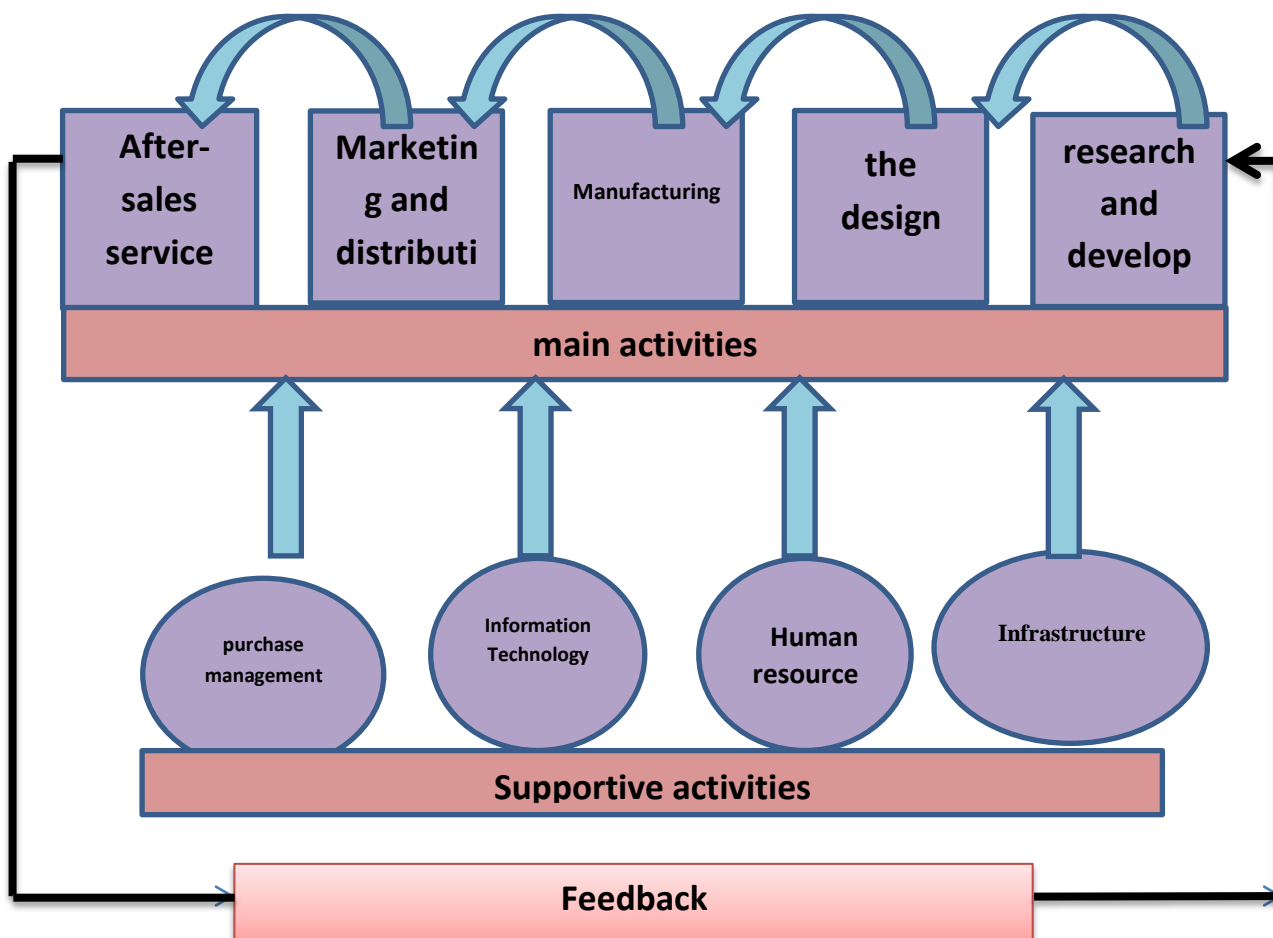
3- Information technology: It is a group of activities through which the product or service provided is studied and developed, as all value-adding activities include the use of technological methods along the value chain (Al-Maamouri, 7: 2007).

4- Procurement management: It is part of the activities supporting each of the main activities adding value, which are called the links that express the relationship between the performance of a certain activity and the performance of another activity, and it is also called logistical support (Faber & Scholten, 2015: 18).

The following figure shows the complementary relationship between the main activities and the activities supporting the technique of value chain analysis

Figure (1)

The complementary relationship between the main activities and the supporting activities



The figure was prepared by the researchers

It is clear from the above figure that there is a kind of interconnection between the main activities and the supporting activities, as the latter is an essential part of the value chain, without which the economic unit cannot carry out the main activities, thus all parties participate in working with each other for the purpose of reducing costs and improving the quality of the product as a prelude. To achieve and enhance the competitive advantage.

The value chain analysis technique aims to analyze the functions and components of the product, to determine the non-value-adding activities (they are excluded and this achieves cost savings) and the value-adding activities (they are maximized within the reasonable cost), (Al-Bayati, 2016: 258).

The role of value chain analysis technology activities in reducing costs can also be clarified through the following:

- 1- **The research and development:** Through the research and development stage, solutions and mechanisms are proposed to reduce the amount of waste in cost related to the production process along the value chain (Ganda, 2018: 1).
- 2- **The Design:** The design activities analyze the product life cycle to find out how the production processes perform as well as the packaging and transportation operations. The design activities also reduce costs by designing products in an acceptable manner that meets the customer's desire without over-designing (Kung & Huang, 2012: 114).
- 3- **Manufacturing:** The manufacturing process starts from the stage of the acquisition of raw materials at an affordable price, and the manufacturing process is not only satisfied with the acquisition of raw materials, but rather the use of the place and good machines that work without any defect, which reduces their maintenance costs (Arsene, 2018: 3)
- 4- **Marketing and distribution:** Marketing plays a major role in informing customers of the nature of the products of the economic unit, as well as reducing the costs of introducing the product through the use of modern electronic means that lead to increasing the sales of the economic unit and maximizing profitability (Abzari, 2013; 645-646)
- 5- **After-sales services:** These services lead to an increase in customer satisfaction, such as maintenance services and an introduction to how to use the product and other services that in turn achieve a competitive advantage.

Using the value chain analysis technique to reduce the costs of the Diwaniyah tire factory

The Diwaniyah Tires Factory produces tires in different sizes, as it is one of the main pillars of the national economy, and it occupies a distinct place among the company's factories, despite this, it has suffered from a significant decline in production levels, as production has become much less than the levels of design and available energy, as shown In Table No. (2), Where the factory produces two types of products (frame size 20-1200, frame size 24-1200), and in past years production has become irregular and this is due to what was left by the events of (2003) that the country witnessed, which led to major changes at the market level,

And the entry of many competitive products of low prices and quality, with no taxation of the imported product, weak funding by the state, as well as high production costs, which made production progressing towards deterioration, and the following table shows the production capacities of the factory, the research sample

**Table (2)
Production capacities of the factory products (for the period from 2014 to 2017)**

Year	The designing capacity	The available energy	The planned production	The Actual production	Ratio of verified to (%)		
					The designing capacity	The available energy	The planned production
2014	88920	17500	9000	0	%0	%0	%0

2015	88920	17500	9000	0	%0	%0	%0
2016	88920	17500	9000	3155	%3.5	%18	%35
2017	88920	17500	9000	4929	%5.5	%28	%55

The schedule was prepared based on the records and statements of the Planning and Follow-up Department in the Diwaniyah Tire Factory

It is evident from the above table that the years (2014) and (2015) did not achieve production due to the lack of raw materials, and the years (2016) and (2017) witnessed a significant decline in production levels compared to the designed, available and planned capacity for those years, due to poor The ability to provide the raw materials needed for production, as well as the frequent holidays in production machines as a result of stoppage in previous years. through the field experience conducted by the researchers in the factory, the research sample, and by looking at the details of the organizational structure and the framework of work in it, in addition to the actual data of cost behavior during the previous years, especially in the year 2017, and the production mechanism in the factory, it was found that the factory produces only two products, which are the framework Size (20-1200) and tire size (24-1200), noting that the number of tires produced during the year 2017 is 2551 tire size (20-1200), and 2378 tire size (24-1200), and the practical part of the research will be conducted on a single product. Only the tire size is (20-1200), and as follows:

Actual total cost of tire size (20-1200)

The actual costs for the tire size (20-1200) can be calculated from the table below

Table (3)
Actual total cost of tire size (20-1200)

Details	Amount
Manufacture cost	295771
Marketing costs	1586
Administrative costs	16144
Total tire cost	313501
X Number of tires	2551
Total costs	799741051

The table was prepared based on the cost balance of the research sample in the factory

Third: Analysis of the value chain technology activities in the factory and the targeted reduction

After determining the actual cost, we determine the value chain activities in Al Diwaniyah Tire Factory as follows:

1- The Main activities

It includes a group of activities as follows

A- Research, development and design activities (41 affiliates)

B- Manufacturing activities: These activities include a group of departments (preparation, formation, construction, installation, industrial services and maintenance), (the number of its members is 394 affiliated).

C- The Marketing, distribution and after-sales services activities (25 affiliates)

Special application and reduction of tire size (20-1200)

Through the statements of the salaries of the activities or departments in the factory, the research sample showed that the number of individuals working in these activities is (460) and it is noticeable that the number of actual workers who carry out their work on a daily basis is much less than this number, and this was concluded through actual coexistence. In the factory, it was also found that these workers do not have the motivation and insistence to study the nature of the market and the needs of the market and work to develop the factory product by conducting studies on that, and as in the tables No. (4) and (5), which show the costs of the activities that host the value and the non-value adding. .

It is also evident to the researchers that these activities suffer from a significant increase in direct costs, as salaries and wages constitute (83%) of the total costs, and this indicates the presence of large numbers of workers who do not provide actual service and they are just a burden added to the costs of production, and through the study The field and the actual coexistence that the researcher undertook during the research period, and also through inquiring from the specialists in the factory it became clear that these activities can be managed by (382) workers as a maximum, and this indicates a large slack in the numbers of workers in this section, and for the purpose of reducing costs in this section According to the value chain, we can determine the number of workers who add value to this section for the number of workers who do not add value, and it is noticeable that most of the yen workers do not add an actual value. They have offices, equipment and allocations, and this is an additional burden for the total costs of production, and this can be explained through the following table .

Table (4)
The costs of major activities adding value and not adding value
to frame size (20-1200)

account name	Total actual activity costs	Activity costs that add value	Activity costs that do not add value
Salaries and wages	1333684682	1107538149	226146533
Marketing costs	4045886	4045886	-----
Administrative costs	26022443	21609942	4412501
Extinction	3832311	3182485	649826
Total	1367585322	1136376462	231208860

The schedule was prepared based on the company's records

Through the above table and after inquiring who is responsible for the activities, it became clear that there are costs that constitute a burden on the production costs of the tire size (20-1200) It can be avoided through the targeted reduction that does not add value, amounting to 231208860 dinars, from the production for the production of (2551) tires.

2- Supportive activities

A- It consists of the following activities A- Infrastructure activities: It includes sections (general manager, stores, transportation, The Legal Department, Control and Audit, Accounts, Quality, Planning and Follow-up), (102 affiliates)

B- **The human resource activities:** It includes sections (administration, guarding, occupational safety, industrial safety, information technology), (the number of its members is 166). And through the interview that was conducted with the person responsible for these activities, in addition to consulting some specialists and frequent visits to the factory The workers who host the value were identified (210) workers out of (268) workers, and their costs can be stated according to the following table:

Table (5)

The costs of supporting activities that host value and not add value to frame size (20-1200)

account name	Total actual activity costs	Activity costs that add value	Activity costs that do not add value
Salaries and wages	739157970	579190947	159967023
Administrative costs	15160902	11879811	3281091
Extinction	1888805	1480034	408771
Total	756207677	592550792	163656885

The schedule was prepared based on the company's records

Where we see through the previous table that the non-value-adding costs that can be avoided are 163656885 dinars, that is, specified according to (58) workers, and in the event that these costs are avoided, the cost of production will decrease by a large amount in addition to their costs from (administrative expenses - furniture - offices -) Devices - equipment - cars - oils ... etc.), and through the field coexistence conducted by the researchers in the factory, the research sample, and by inquiring from the department and activities officials, it becomes clear that all the activities of the factory are activities necessary for the performance of the factory and cannot be completely excluded, but part of them can be excluded By excluding the surplus number of working individuals who are not adding value to the factory and who constitute a burden on the total costs of the plant.

Based on the previously mentioned analyzes and discussions with officials of activities and departments in the Diwaniyah tire factory, we can show the total non-value-adding costs of the factory's products, as in the following table:

Table (6)

Total costs of non-value hosting activities for frame size (20-1200)

Activity title	First: the main activities	Second: Supportive activities	Total costs of non-value-adding activities
Frame size (20-1200)	231208860	163656885	394865745
Total costs before reduction		$313501 \times 2551 = 799741051$ IQD	
Total costs after reduction		$799741051 - 394865745 = 404875306$ IQD	

From the above table, and through the application of the value chain analysis technique, the costs that are not adding value to the value that can be avoided by the factory management and excluded from the production costs were estimated at 394865745 dinars and this is proof of the hypothesis that states that the application of the value chain analysis technique by excluding activities Non-value-adding leads to lower production costs.

Conclusions and recommendations

Conclusions

- 1- The use of the value chain analysis technique leads to reducing the production costs of the research sample factory and achieving production efficiency by eliminating the sources of waste and waste in the raw materials.
- 2- Marketing and distribution activities need more training and development to keep pace with the changes that occur in the market, and after-sales services do not rise to the required level.
- 3- The application of the value chain analysis technique in the Diwaniyah tire factory leads to a reduction in the costs of the main activities by 231208860 dinars
- 4- The application of the value chain analysis technique in the Diwaniyah tire factory leads to a reduction in the costs of supporting activities by 163656885 dinars
- 5- The use of the value chain analysis technique in the factory research sample leads to a reduction of total costs by 394865745 dinars.

Recommendations

- 1- The necessity to reduce the costs of activities that do not add any significant value to the actual performance of the research sample factory.
- 2- The necessity of analyzing the total costs of the factory, the research sample into a main and supportive one. This facilitates the factory management to identify high-cost activities in preparation for their reduction or exclusion.
- 3- The factory management should pay attention to marketing and distribution activities because of their important role in attracting customers' attention towards the factory's products.
- 4- The factory management should conduct the research sample from training the working personnel on how to apply modern cost-effective techniques, especially the value chain analysis technique.
- 5- It is imperative to prepare a multi-functional working group in order to complete the technical steps of value chain analysis.

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