STRATEGIC COST ANALYSIS USING VALUE ANALYSIS TECHNIQUE AND ITS ROLE IN IMPROVING PRODUCT QUALITY AND ACHIEVING COMPETITIVE ADVANTAGE: APPLIED STUDY

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INTRODUCTION :

The most notable of these changes are the advancements in science and technology, the revolution in information and communications, globalization, the shifts in political, economic, and social systems, the growing level of competition among these units, and shifts in consumer preferences, needs, and behaviors. These changes have created challenges and pressures for the economic units operating in the business environment in general and the manufacturing environment in particular. Economic units have to pay attention to and concentrate on the strategic approach to cost management through their modern cost and administrative approaches in order to be able to face these demands and challenges and adjust to them. The value analysis methodology is the most crucial of these methods since it uses a unique approach to function analysis to raise the product's value. Value analysis is seen as a product design process that involves creating goods with the lowest possible cost and functional performance that meets client expectations. Therefore, it is a technique that focuses on evaluating the product's function as a crucial objective that aims to increase its value while lowering the cost of its life cycle needed to carry out the required activities.

CHAPTER ONE: RESEARCH METHODOLOGY

1-1- Research problem :

In addition to the lack of flexibility in responding to customer needs and desires, the economic units faced a number of challenges and difficulties, the most significant of which were the growing intensity of competition between units, high costs, low-quality products, and an increase in operating time. The value analysis technique is the most crucial of the numerous administrative cost techniques that might assist in resolving issues. Thus, the following queries can be used to define a research problem: How interested are managers in Iraqi industrial economic units in modern cost and administrative methods, particularly the value analysis method? Does it also help? How can the value analysis technique be applied to strategic cost analysis to enhance product quality and gain a competitive edge?.

1-2- Research objectives :

In order to improve each of the cost, quality, time, and flexibility indicators, the research will examine the fundamentals of strategic cost analysis using value analysis, product quality, and competitive advantage techniques. It will also explain the significance of value analysis techniques in light of the recent variables and developments that accompany the modern business environment.

1-3- The importance of the research :

The significance of the factors the study examined is what gives it its significance. In order to eliminate features that do not offer value from the perspective of the client, the value analysis technique focuses on enhancing the project's or product's performance and dissecting it from its constituent parts to its functions. Regarding the competitive advantage, it is the way in which the economic unit differs from its rivals in any way.

1-4- Research hypothesis :

The research is based on the following basic hypothesis: Strategic cost analysis using value analysis technique can help improve product quality and achieve competitive advantage.

1-5- Research methodology :

The descriptive analytical approach was used to accomplish the research goals, drawing on Arabic and foreign books and periodicals, university theses and dissertations, and the Internet. A collection of statistical tools was also used to examine the information gathered from the questionnaire and interviews with employees of the research sample company.

1-6- Research community and sample :

The research community is represented by Iraqi industrial companies, while the research sample is represented by the public company. For rubber and tire industries This is based on data for the year 2022, and the focus was on two products, which are: The tire size is 24/1200 and the tire size is 20/1200 .

THE SECOND SECTION: THE THEORETICAL ASPECT OF THE RESEARCH

2-1- Concept Strategic cost analysis using value analysis technique :

Strategic cost analysis using value analysis technique is the process of developing cost information that helps managers make strategic choices with an eye to maximizing the use of strategic resources in the future. Strategic cost analysis examines the relationships between the cost of providing a product or service and the value provided . This method is called value analysis . Mostafaeipour,et.al,2021:205) .

This idea was introduced by the US Department of Defense in 1954 in an effort to cut expenses during the design stage. Value analysis is a product design activity that involves creating goods with functional performance that meets consumer expectations but at a cheaper cost (Tazegu & Kaygin, 2014:89). Value analysis is the methodical use of established methods to ascertain the purpose of a good or service, according to the American Society for Value Engineering, or SAVE (Jariri & Zegordi, 2008:406).

stated value analysis (Wang & Li) as a tool that focuses on examining the function of the product as a primary objective that aims to increase its value while lowering the cost of its life cycle needed to carry out the required functions and assessing them to give the function a degree of quality and dependability at the lowest feasible cost (Wang & Li, 2013:714).

2-2- Objectives Strategic cost analysis using value analysis technique :

that Strategic cost analysis using value analysis technique It seeks to achieve a set of objectives in the economic unit, which are as follows :

1.   Using the creative thinking technique and avoiding restricted thinking to provide the product or service's functional performance at the lowest feasible cost (Mostafaeipour, et.al, 2021: 206).

2.   Finding and evaluating functions and eliminating those that don't contribute value. This will result in lower expenses and higher value (Wang & Li, 2013: 714).

3.   Pay attention to the idea of value for the consumer and strike a balance between the product or service's functional performance, acceptable cost, and quality (Elkelety, 2006:411).

4.   Helping managers distinguish between activities that add value and their costs and those that do not add value (Horngren, 2012: 464).

As a result, it is evident from the aforementioned points that value analysis goals align with the demands of the contemporary, cutthroat corporate climate, which allows for growth, survival, and progress.

2-3- The concept and importance of competitive advantage :

Competitive advantage is the distinctive position that an organization creates in the market, which enables it to consistently outperform its competitors. It is also a unique set of resources and capabilities that provide superior value to customers and cannot be easily replicated by others (Steiner, 2018: 330) .

Competitive advantage is a positive indicator of the organization's superiority over competitors, as it allows achieving high performance rates, which enables it to obtain a larger market share in the market than competing organizations, thus increasing sales volume and profits on the one hand, and more satisfied customers with various services. (Stevenson,2015:465) .

Competitive advantage is also the criterion that determines the success of organizations and motivates employees to continue working and developing it. It allows achieving high performance rates, which enables it to obtain a larger market share in the market than competing organizations, and thus an increase in the volume of sales and profits on the one hand and less exposure to attacks from competitors on the other hand. (Rashed, 2018:90) .

The importance of competitive advantage lies in setting the basic rules that will achieve optimal investment and maximum utilization of the organization's available resources and identifying its fortes and weaknesses, and then identifying the skills, capabilities and opportunities that can be invested in to enhance its competitive strength in internal and external markets. The organization's leaders' analysis of its competitive position contributes to identifying the aspects that should be focused on developing to bridge the existing gap (Kotler & Armstrong, 2019:155) .

2-4- The relationship between strategic cost analysis using value analysis technique, improving product quality and achieving competitive advantage :

that Strategic cost analysis using value analysis technique can help improve product quality and achieve competitive advantage, as there are four dimensions of competitive advantage: lower cost, high quality, time and flexibility, and they can be explained through the following :

1. Lower cost: In order to gain a competitive edge, the benefit of lower costs arises when all forms of loss or waste in time and resources are minimized or reduced by directing materials, wages, and indirect industrial costs to obtain a noticeable reduction in the cost of one unit of the product or service. Additionally, investment costs are reduced and made below the industry average (Hicks,2020:133) .

2. High quality: If the features and capabilities of the product fulfill their intended purposes, the quality factor can be a competitive advantage that can satisfy customers' needs and expectations. Although the economic unit may benefit from lower costs, the quality of its products might not meet the needs of the consumer. Economic units that employ quality as a competitive advantage must meet certain requirements, such as defining quality from the perspective of the client and including its fundamental desirable attributes in the product (Gerhard,2015:224) .

3. Customer response time: In the modern manufacturing environment, customer response time is determined by the time that adds value and is known as the manufacturing and delivery cycle time to the customer. It includes the time of receiving the order from the customer, the time of manufacturing operations, and the time of delivering the final product to the customer, after excluding the time that does not add value (waiting time, inspection time, handling time, storage time) to reduce the cycle time by improving the efficiency of the manufacturing cycle. Economic entities now vie for time as a competitive advantage in order to get the biggest investment opportunity and to develop and launch products faster than their rivals. Time is therefore seen as a crucial component for boosting the economic unit's revenues ahead of others in terms of taking advantage of market chances (Clark,2019:147) .

4. Flexibility: The concept of flexibility has three dimensions. The first has to do with how quickly certain client requests are handled. The second has to do with the adaptability of changing up the assortment of goods or services that consumers want. The third has to do with size flexibility (Barfield,et.al.,2016:78) .

THE THIRD TOPIC: THE PRACTICAL ASPECT OF THE RESEARCH

3-1- An introductory note about the research sample (the General Company for Rubber and Tire Industries):

In 1974, the General Company for Rubber and Tire Industries was founded, which is an economic unit affiliated to the Ministry of Industry and Minerals in Iraq, in light of its letter numbered (M/HS) based on the provisions of (the second paragraph of Article Four) of Law (90) of 1970 as amended, and its nominal capital was (15,000,000) fifteen million Iraqi dinars, and in 1988 the company's capital was increased to (160,000,000) one hundred and sixty million Iraqi dinars only in light of the major expansions that occurred in the company and the increase in the design capacity to (834,900) tires annually, It increased in 1988 to reach (203,000,000) and in 1999 the capital reached

(2,203,000,000). Its headquarters were in the city of Diwaniyah in Al-Qadisiyah Governorate, and the production capacity was (300,000) tires per year and (300,000) tubes per year to include large, medium and salon load tires . The operational procedure began in the second half of 1978. The bicycle tire factory was attached to it and was separated from it on (1/1/1996). Thus, the General Company for Rubber Industries remained consisting of the Diwaniyah tire factory only. On (1/1/2016), the Diwaniyah and Babylon tire factories located in Najaf were merged and its official name became (the General Company for Rubber Industries and Tires).

3-2- Strategic cost analysis using value analysis technique to improve product quality and achieve competitive advantage in the General Company for Rubber and Tire Industries :

In this paragraph Strategic cost analysis using Application of value analysis technique in General Company for Rubber and Tire Industries Given that the factory suffers from high costs due to its use of old technologies and systems in calculating them, and that the value analysis technique is carried out in several stages: collecting information, functional analysis, creativity, presenting ideas, then evaluating ideas, estimating costs, and finally making a decision, we can explain the steps through the following : -

First: Collecting information :

Following the determination that the tire size, 24/1200, and frame size, 20/1200, are the most expensive products, Following that, details about this product will be gathered from within the factory, including work procedures, the number of hours worked by the machines used in its production, the number of employees involved in each department's production process and their pay, as well as details about the frame's specifications and price of each component.

Second: Functional analysis :

This stage is the cornerstone of the value analysis technique because it focuses on the functions that customers need. In order to perform the functional analysis of the frame product, the size of the 24/1200 frame size 20/1200 A set of steps should be taken, as follows :

1- Determine the components and functions of the 24/1200 tire and the 20/1200 tire and determine their cost :

The frame consists of size 24/1200 frame size 20/1200 It consists of five parts (tread, side line, coated wires, under tread, inner layer). These parts include a group of components or raw materials that enter into the tire production process. 24/1200 frame size 20/1200 , and these components and their primary and secondary functions for the product can be explained through the following table :

Table (1)

Frame components and functions size 24/1200 frame size 20/1200

No.	the components		Jobs		
	Component Name	code Component	Job Description	Job Code	Classification (Primary or secondary)
1	rubber SPR 1500	C1	Fixes the wheel, increasing friction with the ground,	F1	Basic
2	natural rubber	C2	It increases the frictional cohesion between the wheels.	F2	Basic
3	Carbon FEF	C3	Reinforced filler material .	F3	Basic
4	Carbon SRF	C4	Reinforced filler material .	F4	Basic
5	Carbon lSAF	C5	Reinforced filler material .	F5	Basic
6	Carbon GPF	C6	Reinforced filler material .	F6	Basic
7	Deuterex oil	C7	Increases flexibility .	F7	Basic
8	Furex oil	C8	A liquid plasticizer that increases flexibility .	F8	Basic
9	Zinc oxide	C9	It works as a vulcanizing and activating material for tires .	F9	Basic

10	Stearic acid	C10	Binding, antioxidant and vulcanizing agents .	F10	Basic
11	Anox	C11	It works as a rust resistant .	F11	Basic
12	IPPD	C12	Anti-ozone material .	F12	Basic
13	Retarder	C13	Inhibitor to slow down the speed of movement	F13	Basic
14	Rinacit	C14	It works as a digestive substance .	F14	Basic
15	CBS	C15	It acts as an accelerant for the reaction	F15	Basic
16	IT MBTS	C16	It acts as an accelerant for the reaction	F16	Basic
17	OBTS	C17	It acts as an accelerant for the reaction	F17	Basic
18	IT MBT	C18	It acts as an accelerant for the reaction	F18	Basic
19	Millican	C19	Measure the amount of charge of an electron	F19	Basic
20	Banoub	C20	Reinforced material for bedrock .	F20	Basic
21	Iron wires	C21	Connecting and strengthening the frame parts	F21	Basic
22	Score	C22	It works as an adhesive .	F22	
23	NY 1420(75)	C23	Reinforced fabric for frame structure .	F23	Basic
24	NY 1420(100)	C24	Reinforced fabric for frame structure .	F24	Basic
25	Resocinol	C25	Rubber permeable adhesive .	F25	Basic
26	Reclaim rubber	C26	Extend the life of the car frame .	F26	Basic
27	paraffin wax	C27	It works as an antioxidant .	F27	Basic
28	Sulfur	C28	They act as vulcanizing materials .	F28	Basic
29	Calcium carbonate	C29	Gives rigidity and strength, enhanced heat resistance and bending strength .	F29	High school
30	Hexacuted	C30	Prevents tire cracking .	F30	Basic

Source : Prepared by the researcher based on data from the factory's commercial department .

And it was used C)) is an abbreviation for the word ((Component Component, and (F) It is an abbreviation for the word (Function) and these abbreviations will be used later. After conducting a personal interview with the technical assistant, technicians and specialized engineers, the components of the frame and their functions were determined. It was also determined that all the functions of the above components are basic except for the calcium carbonate component, whose function is secondary .

Table (2)

Actual cost and functional cost ratio of frame size 24/1200 Frame size 20/1200

No.	Cost elements	Actual cost of frame size 24/1200 (Dinars)	Actual cost of frame size 20/1200 (Dinars)	cost ratio of tire size 24/1200	cost ratio of tire size 20/1200
1	F1	13,059	11,650	4.34%	4.48%
2	F2	111676	95458	37.1	36.7
3	F3	844	730	0.28	0.28
4	F4	8,885	7,073	2.95	2.72

5	F5	7,417	6,440	2.46	2.47
6	F6	858	736	0.28	0.28
7	F7	1,215	1,013	0.4	0.38
8	F8	956	535	0.31	0.2
9	F9	2,749	2,366	0.91	0.91
10	F10	1,170	1,020	0.38	0.39
11	F11	2,762	2,373	0.91	0.91
12	F12	2,649	2,307	0.88	0.88
13	F13	414	316	0.13	0.12
14	F14	506	457	0.16	0.17
15	F15	1,560	1,499	0.51	0.57
16	F16	40	32	0.01	0.01
17	F17	1,414	1,096	0.47	0.42
18	F18	1,586	1,749	0.52	0.67
19	F19	1,399	1,014	0.46	0.39
20	F20	1,487	1,165	0.49	0.44
21	F21	4,778	3,564	1.58	1.37
22	F22	67	52	0.02	0.02
23	F23	16,136	6,725	5.36	2.61
24	F24	48,866	49,951	16.2	19.2
25	F25	682	328	0.22	0.12
26	F26	64	31	0.02	0.01
27	F27	453	395	0.15	0.15
28	F28	439	368	0.14	0.14
29	F29	24	23.8	0.01	0.02
30	F30	169	143	0.05	0.05
	Total direct raw material cost	234,324	200,610		
31	Direct wages cost	41470	37395	13.8	14.2
	Indirect expenses				
32	Industrial	5354	4845	1.81	1.91
33	Marketing and administrative	19648	16916	6.83	6.82
	Total indirect expenses	25002	21761		
	Total cost of the product	300796	259766	100%	100%

Source : Prepared by the researcher based on data from the Cost Division of the factory's Finance Department.

We note from Table (2) that the actual cost of the functions of the frame size 24/1200 It has reached (300796 Dinars), including the cost of direct raw materials (234,324 dinars) and distributed over five sections, where the share of each of the preparation section (199,238 dinars) and the formation section (35,086 dinars), while the construction, installation and inspection sections had zero share of raw materials. As for the cost of wages, it amounted to (41,470 dinars) direct, of which the share of the preparation section was (7,055 Dinar), Formation Department (4821 Dinar), Construction Department (9590 Dinar), Installation Department (11214 Dinars), then the Quality and Inspection Department received its share of (8790). Dinars), while the cost of indirect industrial expenses amounted to (5354 dinars), of which the preparation department's share was (2349 Dinar), Formation Department (774 Dinar), Construction Department (1652 Dinar), Installation Department (144 Dinars), then the Quality and Inspection Department received its share of (435 The cost of indirect industrial expenses, administrative and

marketing, for the framework was followed by the factory following a special charging policy, which is (7.5 %) of the cost of direct raw materials and (5 %) of the cost of direct wages, respectively. That is, the administrative costs, which amounted to (17574) , were calculated through (234324 * 0.075) , and the marketing costs, which amounted to (2074), were calculated through (41470 * 0.05).

The actual cost of the frame size 20/1200 It amounted to (259766) as it includes the cost of direct raw materials (200610) and is distributed over five sections, as the share of each of the preparation section was (170905 Dinar) and the formation department (29705 Dinars) As for the construction, installation and inspection departments, their share of raw materials was zero. As for the cost of direct wages, the share of the preparation department was (5879 Dinar), Formation Department (4821 Dinar), Construction Department (9590 Dinar), Installation Department (10037 Dinars), then the Quality and Inspection Department had its share of it (7032 Dinars), while the indirect industrial expenses were the share of the preparation department (1948) . Dinar), Formation Department (645 Dinar), Construction Department (1652 Dinar), Installation Department (129 Dinars), then the Quality and Inspection Department received its share of (435 Dinars). The indirect industrial, administrative and marketing expenses of the framework were followed by the factory in a special loading policy, which is (7.5 %) of the cost of direct materials and (5 %) of the cost of direct wages, respectively. That is, the administrative costs, which amounted to (15046) , were calculated through (200610 * 0.075).

2. Determining job eligibility :

We can determine the percentage of job merit for each job in the framework size. 24/1200 frame size 20/1200 As well as determining the percentage of job entitlement for both direct wages and indirect expenses through the following table :

Table (3)

Determine the functional entitlement (%) for the functions and cost components of the framework size 24/1200 frame size 20/1200

No.	Cost elements	Relative importance					Arithmetic mean (1)	relative importance (%) (2)	Conversion rate (%) (3)	Job Merit (%) (2*3)=(4)
		1	2	3	4	5				
1	F1	0	0	8	10	12	8.26	3.78	1.30	4.91
2	F2	0	4	6	20	0	7.06	3.23	0.82	2.64
3	F3	0	0	0	9	21	9.41	4.31	0.34	1.46
4	F4	0	3	24	3	0	6.01	2.75	0.16	0.44
5	F5	1	2	17	4	6	6.81	3.12	1.55	4.83
6	F6	0	6	4	18	2	7.06	3.23	2.13	6.87
7	F7	1	1	4	24	0	7.41	3.39	0.83	2.81
8	F8	2	0	2	26	0	7.46	3.41	1.11	3.78
9	F9	0	6	2	22	0	7.06	3.23	0.85	2.74
10	F10	7	12	6	4	1	4.66	2.13	1.00	2.13
11	F11	0	1	2	27	0	7.73	3.66	1.00	3.66
12	F12	2	1	2	25	0	7.33	3.36	1.00	3.36
13	F13	0	0	5	24	1	7.73	3.6	0.93	3.34
14	F14	1	2	5	22	0	7.21	3.3	1.00	3.30
15	F15	0	0	9	21	0	7.41	3.4	1.02	3.46
16	F16	0	3	19	8	0	6.33	3	1.02	3.06
17	F17	1	1	4	24	0	7.41	3.4	1.00	3.40
18	F18	2	1	26	1	0	5.73	2.62	1.07	2.80
19	F19	1	8	18	1	2	5.66	2.32	1.07	2.48
20	F20	0	0	27	3	0	6.21	2.9	0.89	2.58
21	F21	1	2	23	4	0	6.01	2.75	1.03	2.83
22	F22	3	3	29	4	1	5.81	2.7	0.90	2.43

23	F23	0	4	18	8	0	6.26	2.86	0.83	2.37
24	F24	0	7	23	0	0	5.53	2.53	0.91	2.30
25	F25	2	2	18	8	0	6.13	2.85	1.14	3.24
26	F26	0	3	20	4	3	6.46	2.98	1.07	3.18
27	F27	0	5	16	8	1	6.33	2.9	1.06	3.07
28	F28	2	10	7	11	0	5.81	2.66	1.04	2.76
29	F29	0	2	21	4	3	6.53	2.99	1.00	2.99
30	F30	0	1	24	5	0	6.26	2.86	1.03	2.94
	Total direct raw material cost						201.08	92.22		92.16
31	Direct wages cost	0	1	10	17	2	7.33	3.36	1.00	3.36
	Indirect expenses									
32	Industrial	1	2	8	9	0	4.00	1.80	1.00	1.80
33	Marketing and administrative	1	3	25	1	0	5.73	2.62	1.00	2.62
	Total indirect expenses						9.73	4.42		4.42
	Total						218.14	100%		99.94%

It is noted from the above table (3) that the percentage of job entitlement for direct raw materials has reached (92.16) . This is a very high percentage, due to the use of imported high-quality raw materials through which jobs are provided that meet the needs and desires of customers to obtain a product with high functional performance and excellent quality, and through which it competes with imported products offered in the markets. As for the percentage of functional entitlement for direct wages, it reached (3.36) and for indirect expenses it reached (4.42), which indicates its importance in improving the performance and quality of the product. It would like to point out that direct wages have obtained the lowest entitlement percentage due to the unjustified increase in the number of workers in the factory, in addition to the failure to use modern technology to manufacture the product under study .

3. Determine the value index and functions to be improved : -

After we calculated the functional cost ratio in Table (3) and the functional entitlement ratio in Table (13) for each job in the size framework, 24/1200 frame size 20/1200 In addition to determining it for direct wages and indirect expenses, the value index is calculated according to the following equation :

$$Value\ Index = Functional\ Merit\ (\%)\ /\ Functional\ Cost\ (\%)$$

If the value index is greater than one, this means that the functional entitlement has exceeded its cost. If the value index is less than one, this means that the cost has exceeded the functional entitlement. This suggests that some tasks require improvement by raising the product's quality and functional performance, lowering its cost, or doing both. If the functional entitlement is equal to the cost, i.e. the value index is equal to one, this means that the optimal value for the job has been reached. The value index for cost elements and jobs for the 24/1200 frame size and the 20/1200 frame size is calculated through the following table :

Table (4)

and cost elements for the tire size 24/1200 Frame size 20/1200

No.	Cost elements	cost ratio of tire size 24/1200	cost ratio of tire size 20/1200	Job Merit (%)	Tire Value Index Size 24	Elements that need improvement for the framework 24	Tire Value Index Size 20	Elements that need improvement for the framework 20

1	F1	4.34%	4.48%	4.91	1.13		1.09	
2	F2	37.1	36.7	2.64	0.07	Need improvement	0.07	Need improvement
3	F3	0.28	0.28	1.46	5.21		5.21	
4	F4	2.95	2.72	0.44	0.140	Need improvement	0.16	Need improvement
5	F5	2.46	2.47	4.83	1.960		1.95	
6	F6	0.28	0.28	6.87	24.53		24.50	
7	F7	0.4	0.38	2.81	7.02		7.39	
8	F8	0.31	0.2	3.78	12.19		18.90	
9	F9	0.91	0.91	2.74	3.01		3.01	
10	F10	0.38	0.39	2.13	5.60		5.46	
11	F11	0.91	0.91	3.66	4.02		4.02	
12	F12	0.88	0.88	3.36	3.81		3.81	
13	F13	0.13	0.12	3.34	25.69		27.83	
14	F14	0.16	0.17	3.30	20.62		19.41	
15	F15	0.51	0.57	3.46	6.78		6.07	
16	F16	0.01	0.01	3.06	30.60		30.60	
17	F17	0.47	0.42	3.40	7.23		8.09	
18	F18	0.52	0.67	2.80	5.38		4.17	
19	F19	0.46	0.39	2.48	5.39		6.35	
20	F20	0.49	0.44	2.58	5.26		5.86	
21	F21	1.58	1.37	2.83	1.79		2.06	
22	F22	0.02	0.02	2.43	12.50		12.50	
23	F23	5.36	2.61	2.37	0.44	Need improvement	0.90	Need improvement
24	F24	16.2	19.2	2.30	0.14	Need improvement	0.11	Need improvement
25	F25	0.22	0.12	3.24	14.72		27.00	
26	F26	0.02	0.01	3.18	15.90		31.80	
27	F27	0.15	0.15	3.07	20.46		20.46	
28	F28	0.14	0.14	2.76	19.71		19.71	
29	F29	0.01	0.02	2.99	29.90		14.90	
30	F30	0.05	0.05	2.94	58.80		58.80	
	Total direct raw material cost	77.56	77.07	92.16	1.188		1.196	
31	Direct wages cost	13.8	14.2	3.36	0.243	Need improvement	0.236	Need improvement
	Indirect expenses							
32	Industrial	1.81	1.91	1.80	0.99	Need improvement	0.94	Need improvement
33	Marketing and administrative	6.83	6.82	2.62	0.38	Need improvement	0.38	Need improvement
	Total indirect expenses	8.64	8.73	4.42	0.511	Need improvement	0.506	Need improvement
	Total	100%	100%	99.94%	0.999	Need improvement	0.999	Need improvement

It is clear from Table (14) that there is a group of functions for the 24/1200 frame and the 20/1200 frame that do not need improvement because their value index exceeds one, which means that their functional entitlement is higher than the cost of the product, and therefore these functions are value-adding and do not need improvement. There is another group of functions for both frames, in which the value index fell below one, and these functions are : F2 , F4 , F23 , F24. It does not add value and needs improvement. In addition to these functions, direct wages need improvement through the number of workers, especially those who are surplus to requirements. Indirect industrial expenses, administrative and marketing expenses also need improvement .

Third: Creativity and presenting ideas :
In this step, creativity and ideas are put forward to reach proposals and solutions to achieve good performance and the required functions, by following organized methodologies to work on reducing direct resources, direct salaries and indirect expenditures, as follows :

1. Reducing direct materials cost :
The cost of direct materials will be reduced by reducing the cost of jobs that achieved a functional merit less than the cost, i.e. the value index of these jobs was less than one, and some important matters will be clarified in reducing the cost of jobs related to the components of the 24/1200 tire and the 20/1200 tire, which are using cheaper materials from other sources that perform the same previous function of the product or better with higher quality and using modern machines to produce raw materials that are included in the tire industry and using fewer components than some raw materials provided that the functional performance of the product is the same as before .

A- Reducing the cost of the function of increasing the frictional cohesion between the car wheels and the ground (F2):
The actual cost of the frictional cohesion function between the car wheels and the ground for the tire is 24/1200 (111676) As for the frame size 20/1200 (95458), and in order to reduce the cost of this job, natural rubber can be imported from other sources that are geographically closer (for example, Turkey and Iran) than the import sources in Southwest Asia. After making this change , we can obtain financial savings, and according to the opinion of technicians and engineers, it may reach 30%, which means that the cost of the tire size will be 24/1200 It is (78173) and the frame size is 20/1200 It is (66821), and thus the savings achieved for the two frames are (33503) and (28637) respectively .

B- Reduce the cost of the job used as a reinforced filler (F4).
The actual cost of this job for the frame size was 24/1200 (8885) As for the frame size 20/1200 It is (7073), and this cost can be reduced by maintaining the machines that were manufacturing the carbon component. SRF Which was previously produced locally or importing modern machines to produce this component, and according to the opinion of the factory manager and the production manager, it will reduce the cost by 50%, which means that the cost for the frame size will be 24/1200 (4443) As for the frame size 20/1200 It is (3537), and thus the savings achieved for the two frames are (4442) and (3536) respectively .

C- Reducing the cost of the reinforced fabric function of the frame structure (F23) and (F24) .
The reinforced fabric function of the frame structure of nylon (75)1420 for the frame size has reached 24/1200 (16136 dinars) as for the frame size 20/1200 It is (6725 dinars), and the second type of nylon material cost for the frame size 24/1200 (48866 dinars) as for the frame size 20/1200 (49951 dinars), and according to the opinions of technicians, engineers and experts in the research sample factory, it was found that it is possible to use smaller quantities of nylon (100)1420 and nylon (75)1420 , which may reach 50%, and after making this change, the cost of the job will be reduced. F23 To be nylon material (75)1420 for the frame size 24/1200 (8068 dinars) as for the frame size 20/1200 It is (3363 dinars), and the cost of the job becomes F24 For frame size 24/1200 (24433 dinars) as for the frame size 20/1200 (24976 dinars), and thus the savings achieved for the two frames of job 23 F (8068 dinars) and (3362 dinars) respectively . And the savings achieved for the two frameworks of the job F24 (24433 dinars) and (24975 dinars) respectively .

2. Reducing direct wage costs :
The tire factory suffers from a problem of a large number of surplus workers, as some departments contain a large number of workers for one production line, while this line needs a smaller number than what is available. This is called disguised unemployment, which makes the cost of the product very high.

The cost of wages can be reduced by following some important steps, including the following :
A- Reducing the number of surplus workers :
The number of workers in the production departments for the production of tires size 24/1200 and tire size 20/1200 reached (291 workers) for the year 2016 in the tire factory, and their annual direct wages amounted to (2186063952 dinars) distributed over five departments: preparation, forming, construction, installation and inspection department. After arriving at the actual loading rate for each department and multiplying it by the number of working hours for each department, we obtain the cost of direct wages for tire size 24 (-1200) which amounted to 41470 Dinars, and the direct wages cost for the frame size (20-1200) amounted to 37395 Dinars, and thus the number of workers can be reduced by 83%, meaning that the cost of wages for the 24-frame will decrease by 83%, and thus the cost of wages for the 24-1200 frame will become (7050 dinars for each unit produced.
B- Using modern technology in all factory departments :
The machines and mechanisms used in the factory are very old and do not keep pace with the rapid vicissitudes and growths that have occurred in the industrial environment. There are also modern types of machines available in foreign markets that produce a high-quality product and require a small number of workers, so they save on direct wage costs. However, the main problem in not doing this is the lack of liquidity as a result of government neglect .
3. Reducing indirect costs : -
Indirect costs, including industrial, marketing and administrative costs, have achieved a functional cost higher than the functional entitlement, i.e. their value index is less than one. Therefore, these costs must be reconsidered in order to reduce them, and the focus will be on some matters, including not spending amounts in the wrong way. That is, they must have a positive impact on the value of the product, maintain the quality of the product, and reduce damage and waste of time to the lowest possible level. This reduction can be demonstrated through the following :
A- Reducing industrial costs :

The indirect industrial costs for the 24-1200 tire amounted to 5354 dinars, and for the 20-1200 tire amounted to 4845 dinars, and achieved a functional cost higher than the functional entitlement, meaning that its value index is less than the correct one for both tires, which required improvements to be made to them by reducing unnecessary and non-value-adding costs that lead to an increase in the cost of the product and a decrease in its quality. It was found that the possibility of reduction could reach 35%, which means that the indirect industrial costs for the 24-1200 tire will be (3480 dinars), and for the 20-1200 tire it will be (3149 dinars), which means that the reduction amount for the two tires is (1874 dinars) (1696 dinars) respectively.

B- Reducing marketing and administrative costs :
The administrative and marketing costs for the 24-1200 tire amounted to 17,574 dinars and 2,074 dinars respectively, while the administrative costs for the 20-1200 tire amounted to 15,046 dinars. Dinars and marketing costs amounted to 1870 dinars, and the factory had adopted a special policy for calculating them, meaning that administrative costs represent 7.5% of direct materials, while administrative costs include 5%. When making adjustments and reductions to the cost of direct materials and direct wages, the administrative and marketing costs will decrease with them and according to the applicable loading rates .
The size 24-1200 frame and the size 20-1200 frame, whose functional entitlement is less than its functional cost, i.e., its value index is less than one, can demonstrate the amount of cost reduction in the product as a result of applying the value analysis technique based on the preceding paragraphs in the following table once the suggestions and ideas to lower the costs of the functions and cost elements of the product have been completed:

Table (5)
The cost of a tire size 24-1200 and a tire size 20-1200 as a result of applying the value analysis technique and adopting ideas and proposals

No.	Cost elements to be improved	Actual cost For frame size 24 (Dinar)	Actual cost For frame size 20 (Dinar)	Amount of discount (Dinar) Size 24	Amount of discount (Dinar) Size 20	Cost after discount for size 24 tire (dinar)	Cost after discount for frame size 20 (dinars)
1	F2	111676	95458	33503	28637	78173	66821
2	F4	8885	7073	4443	3537	4442	3536
3	F23	16136	6725	8068	3363	8068	3362

4	F24	48866	49951	24433	24976	24433	24975
5	Direct wages	41470	37395	34420	31038	7050	6357
6	FOH	5354	4845	1874	1696	3480	3149
7	M&A.OH	19648	16916	7004	6090	12644	10826
	the total	252035	218363	113745	99337	138290	119026

Source : Prepared by the researcher based on the ideas and proposals put forward for reduction .

It is noted from the table above that the actual cost of the cost elements to be improved for the 24-1200 tire size has reached 252,035 dinars, while the reduction amount for these elements is 113,745 dinars. This means that the cost of the elements for the 24-1200 tire size has become 138,290 dinars after the reduction. As for the actual cost of the cost elements to be improved for the 20-1200 tire size, it has reached 218,363 dinars, while the reduction amount for these elements is 99,337 dinars. This means that the cost of the elements for the 20-1200 tire size has become 119,026 dinars after the reduction. Therefore, the reduction percentage for the 24-1200 tire has reached 45% of (252,035 / 113,745) , while the reduction percentage for the 20-1200 tire has also reached 45% (99,337 / 218,363) , which indicates the presence of a number of aspects Unjustified spending on these items, and therefore it can be said that using the value analysis.

Fourth: Evaluating ideas :

During this step, the previously suggested ideas for reducing costs for jobs or elements in which the value index has fallen below one are evaluated and work is done to modify them to keep pace with the developments and circumstances that have emerged in the business environment, while estimating the costs that the producer bears for its cost elements, according to what the laboratory management deems appropriate, which may add value to the product and contribute to increasing its functional merit .

Fifth: Development and implementation :

During this step, proposals and solutions are developed that include choosing the best one that helps solve problems represented by the high costs of product elements, and also works to solve problems that increase costs and decrease product quality, and prepare a final report that includes information about costs and improvement of products, and this report is sent to senior management to implement the best alternative that was chosen in order to reduce its cost.

3-2-3- The role of value analysis technology in improving product quality and achieving competitive advantage : -

We will explain the amount of cost reduction for the 24-1200 tire and the 20-1200 tire after applying the value analysis technique as in following table :

Table (6)

The amount of reduction in the cost of the tire size 24-1200 and the tire size 20-1200

the details	Cost before applying value analysis technique for frame 24-1200	Cost before applying value analysis technique for frame 20-1200	Cost after applying value analysis technique for frame 24-1200	Cost after applying value analysis technique for frame 20-1200	Amount Discount In frame cost 24-1200	Amount Discount In frame cost 20-1200
Direct materials	234,324	200,610	163,878	140,100	70,446	60,510
Direct wages	41,470	37,395	7,050	6,357	34,420	31,038
Indirect expenses	25,002	21,761	16,124	13,975	8,878	7,786
the total	300,796	259,766	187,052	160,432	113,744	99,334

Source : Prepared by the researcher .

It is noted from the table above that the total cost of the frame size 24/1200 has reached (187052 dinars) , which is equivalent to 62.18% of the actual cost before the discount, which amounted to 300796 dinars. This means that the discount rate is 37.18%, while the total cost of the tire size 20/1200 It amounted to (160,432 dinars), which is equivalent to 61.76% of the actual cost before the reduction, which amounted to 259,766 dinars, which means that the reduction rate is 38.24 %.

As for the role of value analysis technology in improving product quality, we now have new technical specifications after implementing the ideas and proposals presented that helped improve product quality and make it more suitable for customer use and conform to the specifications and standards set for quality, thus meeting the needs and desires of customers and improving the actual performance of the product and its value. Therefore, strategic cost analysis using value analysis technology can help improve product quality and thus achieve competitive advantage .

CHAPTER FOUR: CONCLUSIONS AND RECOMMENDATIONS:
5-1- Conclusions :

1.   Value analysis is a process used in product design that aims to create goods with the lowest possible cost and functional performance that meets customer expectations. It is a tool that examines a product's function as a primary objective that aims to increase its value while lowering the cost of its life cycle needed to carry out the essential tasks.
2.   Value analysis is a process used in product design that aims to create goods with the lowest possible cost and functional performance that meets customer expectations. It is a tool that examines a product's function as a primary objective that aims to increase its value while lowering the cost of its life cycle needed to carry out the essential tasks.
3.   If an economic unit adheres to any of the general competitive strategies, it can gain a competitive advantage, which is defined as any element that gives it an advantage over rivals. Competitive advantage has four primary dimensions: cost, quality, time, and flexibility.
4.   The goal of the value analysis technique is to find, examine, and eliminate functions that do not contribute value. By helping managers differentiate between activities that bring value and those that don't, the creative thinking methodology will help them reduce expenses and increase value without sacrificing quality.
5.   Applying the value analysis technique involves three steps: the pre-study, the value study or business plan, and the post-study. Information, functional analysis, innovation, evaluation, development, execution, and feedback are some of the steps that make up the second stage.

5-2- Recommendations :

1.   the need to pay attention to contemporary cost and administrative methods since they are better suited to the demands of the contemporary company environment, which is marked by fierce rivalry and a customer-centric mindset. Economic units can outperform rivals by using these strategies to lower the costs of their operations and goods.
2.   In order to gain a competitive edge and set oneself apart from other competitors in the market, economic units must analyze their internal and external environments in order to identify and take advantage of the most significant opportunities. They must also identify and work to counteract any threats they face.
3.   A joint database for information sharing must be established, and economic units must supply qualified personnel to apply these techniques, particularly value analysis techniques, form a multi-functional work team, and create a work plan that is appropriate for their situation.
4.   To maximize the value analysis technique's benefits, it is imperative that the fundamental phases and procedures for its application be followed, beginning with the prior study and continuing through the future research.
5.   A number of rules must be followed in order to use value analysis technology to gain a competitive edge. The most crucial of these is following the process of examining the unique features of the technology and trying to eliminate any elements and features that don't add value from the perspective of the customer.

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