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INTEGRATION OF GREEN TARGET COST SYSTEM AND VALUE ENGINEERING IN ACHIEVING SUSTAINABLE DEVELOPMENT. (AN APPLIED STUDY IN THE STATE COMPANY FOR THE FERTILIZER INDUSTRY, BASRA, IRAQ)

Dr. Abdulkareem Abdulghani Oudah [1] ,
Res. Sahar Nazar Abdulsalam[2]
ASSISTANT PROFESSOR
Shatt Al-Arab University College/ Basra , Iraq[1]
College of Graduate Studies, Southern Technical University, Basra , Iraq [2]

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Abstract:

The research aims to demonstrate the role of modern cost-effective technologies in reducing costs and producing green products, as the green product is based on several dimensions (it works to reduce pollution rates, avoids the use of toxic substances harmful to the environment, uses renewable energy, reduces the use of natural resources and preserves them). In general, a green product is designed or manufactured in a way that minimizes the environmental impact involved in its production, distribution and consumption, the main challenge in creating sustainable green products by integrating the product's environmental and traditional features. By integrating this technology with value engineering technology, which operates a systematic process of technical evaluation of a product to eliminate unnecessary costs and add value while maintaining or re-improving quality, scope and performance, the main procedure in implementing value engineering technology is to conduct analyzes during the design phase of new and modified products. From the point of view of the consumer, and that this analysis will diagnose the basic consumer details, the value engineering technique focuses on improving customer satisfaction with the product, material or process that has been studied by identifying their needs and requirements and working to implement their desires .

Keywords: Green Target Cost, Green Product, Value Engineering, Sustainable Development.

INTRODUCTION

Today, environmental issues, for example, environmental deterioration and misuse of natural resources, have become the primary reason for declaring the term sustainable development, as it has increasingly gained importance at all levels. Vulnerable to depletion and exhaustion as a result of their misuse, and so that natural resources are used without compromising the ability of future generations. Attention to environmental issues has increased at all levels, as well as interest in green products. One of the most important strategic techniques used in reducing costs while maintaining quality and producing an environmentally sustainable green product is the first. The green target cost technology, which came to meet the increasing desire of customers to obtain environmentally friendly products, taking into account the environmental standards imposed by the legislative authorities at an appropriate price for them, while the second is the value engineering technology, which is considered to have a comprehensive concept. It means re-engineering the performance function of the company And performing its role, it has become one of the most important modern administrative and technical methods and methods in ensuring the equitable distribution of natural resources.

1 RESEARCH METHODOLOGY

1.1 Problem Statement

In light of the current circumstances, various countries around the world, including Iraq, face various challenges from a decline in natural resources, destroyed infrastructure, high production costs, and an increase in environmental pollution and energy consumption. The General Company for the Fertilizer Industry has some problems related to the high cost of its products, as well as problems related to environmental pollution as a result of the waste posed by the product, as well as international and local

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interest in sustainable development in its three dimensions (economic, social and environmental) because of its vital and strategic impact on the facility in terms of costs and treatment Pollutants and concern for the social environment. Where the main problem of the study lies in the increase in the production costs of the product, which could be the result of an increase in the cost of raw materials or an increase in the number of workers, which added financial burdens on the company, i.e. an increase in wages or in the sense of mandatory increases in the wages of production staff and also as a result of a decrease in production capacity and the difficulty of increasing it due to The obsolescence of some devices, equipment and systems, the high prices and the rise in the levels of environmental pollution (water pollution, air pollution) caused through the production process, and accordingly it became obligatory for the company to seek to reduce its production costs as well as to treat pollutants, and here comes the role of integration between the green target cost system with Value engineering to reduce costs associated with components, components and functions of activities that do not add value to the product, as well as reduce environmental impacts. In light of this, the study problem can be formulated in the following questions:

1. Does the targeted green cost technology provide accurate information that avoids obstacles during production in the field of providing environmentally friendly and environmentally sustainable products?
2. To what extent is the value engineering technique capable of maintaining product quality in a fertilizer company as well as reducing costs for activities that do not add value to the product?

1.2 Research Objective

The objective of the study is to determine the best appropriate solutions to the issues related to the shortcomings and problems experienced by the economic units, the most prominent of which are the environmental issues related to the product.

1.3 Research Importance

The study derives its importance from the importance and possibility of using modern cost-effective techniques that help the company to provide green products that are environmentally friendly with a focus on reducing costs, protecting the environment and exploiting natural resources and the possibility of describing them as a useful element in achieving sustainable development through integration with value engineering, which is one of the methods of cost reduction in the stage of design and compare it with equivalent traditional technologies as well as increase the environmental awareness of customers with green products.

1.4 Research Hypothesis

To address the study problem, the following main hypothesis was formulated:

(There is a positive relationship through the integration of the two green target cost techniques and value engineering in reducing product costs without compromising its quality in addition to achieving environmental sustainability).

1.5 Research Method

The research relied on the scientific method in achieving the objectives of the study, which includes combining the theoretical and practical aspects in applying ideas according to the proposed study model.

1.6 Review of literature:

The researcher deals with a brief presentation of some of the previous foreign studies that have been collected and looks at the results of the previous studies. And as follows:

1- Study (Malon,2015)

Cost management tools for the environmentally sustainable firm , Published paper for Cost Management Journal / Goddard School of Business and Economics Weber State University.

The study aims to develop a variety of tools designed to identify environmental resource-intensive activities to assist an organization in its pursuit of higher levels of maturity in environmental sustainability. For example, a product of TC and ABM's tools for sustainability can provide managers with data that allows for a more accurate determination of the environmental costs imposed by products and/or processes. The most important conclusions that the study reached For a variety of reasons, the company has an incentive to consider strategically the application of environmental sustainability initiatives in its operations. Whether the company faces regulatory pressures, anticipates changes in regulatory or market conditions, is actively seeking progress in the CSR communities, wishes to be included in CSR portfolios, or simply anticipates potential savings In costs by integrating otherwise cost-effective resources into their business operations, an environmentally sustainable option is often preferable. This article has introduced two cost management tools that can help a company strive to be environmentally sustainable while still operating cost-effectively.

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2- Study (Briciu , 2013)

PROS AND CONS FOR THE IMPLEMENTATION OF TARGET COSTING METHOD IN ROMANIAN ECONOMIC ENTITIES , Research submitted to "Dmitri Cantemir" Christian University, Bucharest, Romania

Purpose of the study to Analysis of the pros and cons of important implementation factors or non-implementation related to the target cost method in home appliance manufacturing entities and the impact on the company's internal and competitive environment. The research was conducted through the use of quantitative and qualitative methods, but also through the use of theoretical ideas in preparing the case study. The most important conclusions that the study reached The target costing method assumes a significant change in many Romanian industrial entities, managers and accountants who are accustomed to work in a business environment that accepts the gradual increase in prices and due to the increasing pressure on the global level the Romanian competitive environment can respond faster to the approach and benefits of the target cost method. In order to succeed in the implementation of the target cost the implementation team must conduct personal training in the economically productive home appliance companies in Romania and to ensure the stability of their future workplaces and the cooperation that must take place at all levels within the company so that the method chosen to achieve the desired results and achieve the main objective and the continuous reduction of costs and thus contribute in obtaining a profit.

3- Study(Timothy, 2012)

A Comparative Study of Target Costing Methods , Thesis in the Department of Mechanical and Industrial Engineering presented in partial fulfillment of the requirements for the degree of Master of Applied Sciences (Industrial Engineering) at Concordia, University of Montreal, Canada.

The objective of the thesis is to introduce the concept of target cost and how it can be used in the early stages of product development. One of the most important conclusions is that the concept of target cost is essential, as it will help the company in planning and determining the target cost focuses on cost management and profitability in product development during the conceptual design stages, and often What designers and decision makers need to know is accurate cost information to evaluate and compare multiple alternatives to determine the preferred design. Senior management needs to evaluate potential cost reductions and alternatives that affect system performance, so appropriate cost estimation models must depict robust and accurate cost estimates to support design and cost studies in the early conceptual stage of new programs. This study focused on target cost models and adapting this knowledge to a case study. In the airline.

4- Study (Samaneh, 2016)

The Utilization of Target Costing and its Implementation Method in Iran, Department of Accounting, Islamic Azad University Damghan Branch, Damghan, Iran.

This study aimed to investigate the use of the target cost and the method of its implementation in Iran based on field and quantitative methods. The activity is necessary for the successful implementation of the target cost, in addition to the need to increase the various skills in human resources and the use of modern systems, which reduces costs for products

1.7 Rationale and Contributions Study

1. The current study focused on the green target cost technology, which is a technology that was developed for the traditional target cost technology due to the trend towards environmental issues. This study included the cognitive and scientific foundations in terms of concept, goals, reasons used, and steps, where this study showed how the green target cost is calculated. For the traditional product with the aim of converting it from a non-environmentally friendly product to an environmentally friendly product in the research sample company.
2. The current study dealt with the value engineering technology as a support technology for the green target cost technology to transform the traditional product into an environmentally friendly (green) product that takes into account environmental standards.
3. This study combined two modern techniques, the green target costing technique and the value engineering technique, and it was oriented towards environmental sustainability, which distinguished it from previous studies.
4. The current study provided for the prospects of future studies by benefiting from them in the future, as it sheds light on the environmental aspect and care for it through

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the financial and material information provided by the two technologies to reduce emissions and pollutants, reduce costs, maintain quality and achieve environmental sustainability.

2.THEORETICAL BACKGROUND

2.1 Green Product Concept

The definition of the green product is accurate and comprehensive, and it is difficult to give a specific description of it, and this depends on many factors, including the available raw materials, time factor, culture, and geographical position. But in general, the green product can be defined as the product that relies on environmentally friendly materials (it can be self-analyzed or recycled) with the obligation to follow it in the stages of its life cycle to ensure its survival during the environmental commitment (Mohammed Al-Ajaji, 2009-2010: 5), and this will It includes not using harmful materials (preservatives), not using toxic chemicals, using the minimum required raw materials, using the minimum required energy, and using packages that are recyclable or can be used after the contents of the package are finished. (Outler, Philip et al., 2002 ,2-10): In general, a green product is designed or manufactured in a way that minimizes the environmental impact involved in its production, distribution, and consumption (L. Tomasin , And others, 2013: 274-282) .

2.2 The basic dimensions of green product adoption

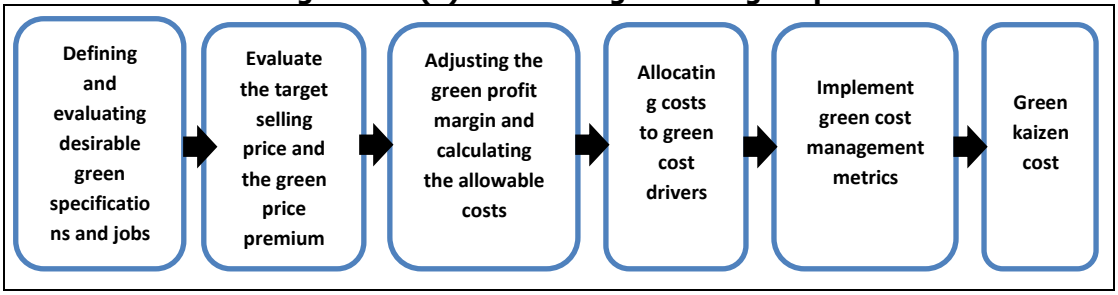
There are several basic dimensions in the adoption of green products, as they have been identified as follows: (Al Bakri, 2012: 26-241)

1. Loyalty to the green mark: It can be defined as a set of benefits and properties related to creating the environmental impact of the product, which is basically environmentally friendly. Loyalty is defined by the frequency of purchase that results from strong commitments with the brand .
2. The quality of the green product: Some believe that the green product is inferior to the well-known traditional product because many of them depend on recycled materials, so the quality must be linked to the green product and subject to measurement standards for approved quality in terms of performance level, conformity with the goal, strength Durability, comfort.
3. Rationalization in energy consumption: It is represented in using a lesser amount of energy in order to produce the same damage or effect or perform the same function.
4. Green promotional campaigns: In general, promotion is considered the active factor in distancing the adoption of a green product that generates the desired effect.

2.3 Green target cost concept

Green target costing is defined as a technique for integrating and implementing target costing mechanisms in order to develop an environmental sustainability strategy. Customers are unwilling to incur the additional costs of purchasing products even though environmental programs point out the importance of a green product (Hendricks, 2015:11).
Green target costing has also been defined as the process of including environmental issues in the traditional pattern of traditional target costing technology, which is due to regulations and legal issues, stakeholder desire, and desire for green consumer goods. We sometimes see these issues as specific to the nature of economic unit products, which often present themselves, for example, in the automobile industry, cars must be designed according to environmental standards set by law enforcement agencies (Mallone, 2015:6).

Figure No. (1): Green Target Costing Steps



Source : Horvath , P. and Berlin, S., 2012, 'Green target costing: getting ready for the green challenge!' Cost management, Vol. 26, No. 3.

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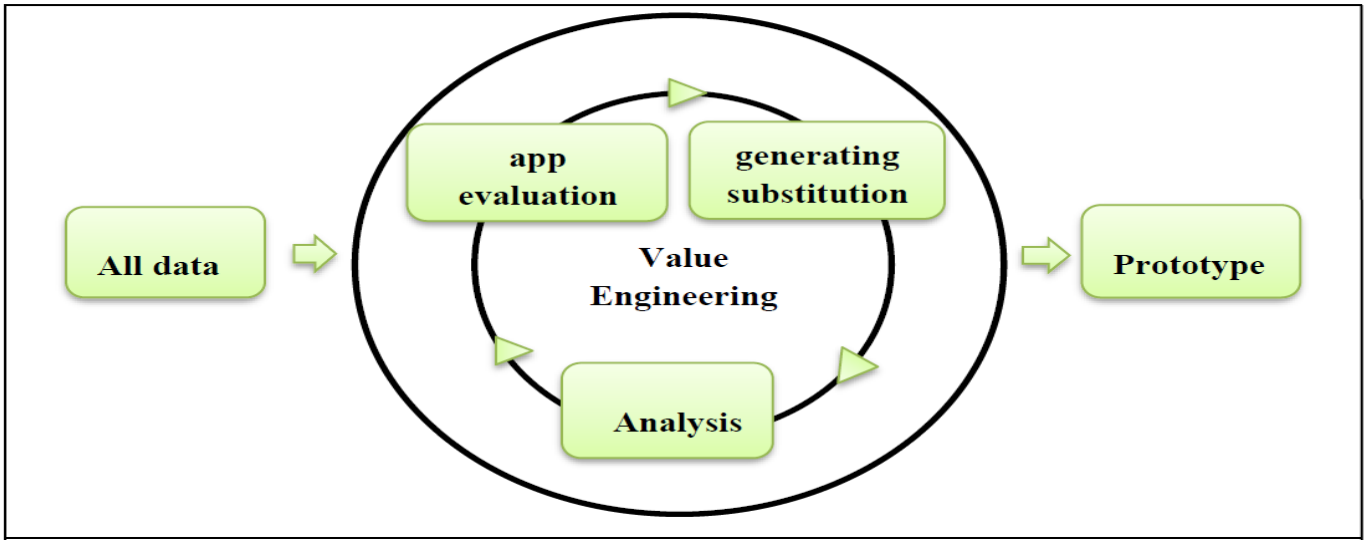
2.4 The importance of green target cost

During the process of designing the green product, the economic units face the preferences of customers to obtain the green product at an appropriate or appropriate price with the objectives of the institution, which makes the company in a poor competitive position, as the economic unit when it produces the green product will bear additional environmental costs and this leads to higher costs, and accordingly the economic unit was Attention to the development of green target cost technology. As the reasons for the interest of economic units to produce the green product are different, it is mandatory for economic units to produce environmentally friendly products, for example, an economic unit that participates in the American car markets, it may not be required to produce a specific car model at a cost that achieves the necessary profits only, but rather it must adhere to the standards On the basis of a special economic average on fuel consumption, where regulations and laws are the motivation for product design. The desire of the economic unit to be more advanced may be in becoming environmentally friendly in addition to achieving environmental sustainability (Malone 2015:6) and since economic units may receive many limitations on capacity and resources and all activities must be value-added (Bennett et. al,2003:1).

2.5 value engineering concept

Value engineering has been defined by many writers and according to different points of view, the most important of these definitions are the following: (Ramus, Birchall & Griffiths, 2006) describes value engineering as a procedure aimed at providing an organized and systematic process for the technical evaluation of a project, product or developed process to eliminate costs unnecessary and add value while maintaining or improving quality, scope and performance. (Mary Nabil, 2007: 80), that (Blocher, others) believe that value engineering will be used in target costs to reduce the cost of the product through the analysis of the various functions of the product, and that the main step in implementing value engineering is to conduct analyzes during the design phase of new products And adjusted from the point of view of the consumer, and that this analysis will diagnose the main consumer details.

Figure (2): Value Engineering Application



Source : Karim Eldash , VALUE ENGINEERING (Course Notes) , Benha University , 42 PUBLICATIONS 153 CITATIONS , 2012 .

2.6 Characteristics of sustainable development

Sustainable development has emerged with several specific characteristics as follows: (Abdul Hadi, 2017: 572-573)

1. Thinking or taking into account the needs of future generations for natural resources and their preservation.
2. Long-term development because the time dimension is considered the basis in it and it depends on estimating the available

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possibilities in addition to planning for the longest future period of time.

3. Preserve or take care of natural resources while preserving the ocean or the vital processes of the natural environment through its components and basic elements such as water, air and gases.
4. It primarily works to meet the needs of individuals, as it meets the necessary and basic needs and requirements of services, education and others, in addition to improving the quality of life of the individual, social and material.
5. It works on the integration and coordination between the policies of the resources used, the direction of investments, the choice or technological alternatives, in addition to the institutional form to achieve integrated development and make it work regularly and with understanding.
6. It is not possible to separate its components or components and measure their indicators, due to the overlapping of their quantitative and qualitative dimensions that they contain.
7. It is considered more complex and more intrusive, and it is keen on developing the cultural and spiritual aspects or dimensions that are related to maintaining the privacy of civilization for societies.

2.7 Value Engineering Tools

There are many tools that are used in the study of value engineering as follows: (Tsuchiya, others, 2005)

1. Design documents: such as specifications, blueprints, directions, design standards, accounts, bills of quantities, schedules, and cost estimates.
2. Field visits: Sites, research centers, general regulations, similar projects, public service lines, municipal regulations, and standard engineering reference libraries are visited.
3. Personal interviews: Senior officials, site managers, project users, owner, designer and implementation engineers are interviewed.

2.8 Environmental Sustainability:

The concept of environmental sustainability revolves around the natural environment and how it remains resilient and productive to support human life. Environmental sustainability is related to the integrity of the ecosystem as well as the carrying capacity of the natural environment (Brodhag & Taliere, 2006: 136–145). It requires that natural capital be used sustainably and as a source of economic inputs and as a drain of waste, its implication is that natural resources must be harvested no faster than can be renewed on the one hand, while waste must be emitted faster than the environment can absorb on the other hand, because systems The Earth has limits through which balance is maintained (284-72: Evers, 2018).

2.9 Integration of green target costing and value engineering technologies to achieve sustainable development

The Brundtland Commission report defined sustainable development as: "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Schaefer & Crane, 2005: 76–92, Corinn, 2006: 166). It also defined sustainable development as "development that can continue either indefinitely or for a certain period of time (Dernbach, , 2003: 247–285). the environmental goals for sustainable development are: (Hylton, 2019: 515–534; Saner et al., 2019:23-418) .

1. Integration of all interests to preserve the biosphere for the work of ecological communities in addition to the protection of natural ecosystems through a measure to protect the quality of the environment.
2. Ensuring a healthy and sound life by eliminating poverty and hunger.
3. Universal access to basic services such as water, sanitation and sustainable energy.
4. Concern for environmental safety by combating climate change and protecting the Earth's oceans and ecosystems.
5. Enhancing cooperation between various social agents to create a healthy environment and ensure consumption and production.

3 The practical side:

3.3 About the company in question:

The State Company for Fertilizers Industry / Southern Region is a government company and one of the companies of the Ministry of Industry and Minerals. At the beginning of 1976, a construction contract was signed with the Japanese Mitsubishi Heavy Industries to establish a plant for the production of ammonia and urea using natural gas produced in the southern oil fields. These factories included two lines for the production of ammonia in a manner Topsoe capacity of 1000 tons / day each and two urea production lines with a capacity of 1600 tons / day each by snamporgetti method. The plant was operated in 1978. Where in the seventies the fertilizer industry began in Iraq due to the abundance of raw materials required in this industry, which is natural gas, in

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addition to the country's need for a urea fertilizer product to develop agricultural programs and also the use of agricultural land to ensure food security for the Iraqi individual, in addition to exporting the surplus amount of produced urea Outside the city and the exploitation of natural gas, the General Company for Fertilizers Industry / Southern Region is considered the first company established in Iraq to produce urea fertilizer, which is located 3 km from the port of Khor Al-Zubair and within 35 km from the port of Umm Qasr. Developed foundations, the first factory that produces urea granules with a simple capacity of 200 tons / day, sulfuric acid and ammonium sulfate. The second factory was established in 1973 with a design capacity of 420,000 tons / year of granulated urea and was completed in 1976 to start production in 1977 and continued to work until 1980 During that period, the quantity produced of urea was more than 950,000 tons, and the factories were severely damaged during the Iran-Iraq war. Especially the first project, which was completely destroyed, the second project, the urea plant was completely destroyed, and the ammonia plant was partially damaged at a high rate. The company produces two types of products, namely urea fertilizer (the main product) and ammonia (the secondary product).

3.4 Applying and calculating the green target costing technique

3.4.1 Calculation of the actual cost of the product:

For the purpose of calculating the actual cost of the product (urea fertilizer), it is necessary to rely on the actual data of the company for the year 2019, including the list of the company's business results as follows:

Table (2) a list of the company's business results

Details	Amounts
	total revenue :
Revenue from current activity	125617480711
Benefits and rents	270101500
Transferable revenue	1472515851
Other revenue	443415461
Total	127560513583
	Total expenses :
salaries and wages	63301839202
commodity supplies	33745974057
service supplies	4577571320
Destruction	6537748926
Transfer Expenses	1472515851
Other expenses	443415461
Other ongoing activity costs	5003531843
Total	113318718177
net profit or loss	14241795406

Source: Prepared by the researcher

As the cost of the product (urea fertilizer) according to the system adopted by the company is as follows:

Product cost (tons) = total costs ÷ production quantity
The cost of urea fertilizer (one ton) = 11331871817 ÷ 267952

= 422,907 dinars

The table below shows the total costs of the product (manufacturing, marketing and administrative) and the selling price for the purpose of calculating the profit margin.

Table (3): Total costs details

Product	measuring	manufacturing	marketing	administrative	total
urea fertilizer	Tons	344786	2266	75855	

Source: Prepared by the researcher

Table (4): Profit Margin

Product	measuring unit	total costs	selling price	Profit Margin
urea fertilizer	Tons	422907	450000	27093

Source: Prepared by the researcher

Profit Margin = Selling Price - Total Costs

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= 450000 - 422907
= 27093 dinars

From the above, we conclude that the profit margin for the product (urea fertilizer) is (27093) per ton .

3.4.2 Calculation of Environmental Costs:

For the purpose of calculating the environmental costs, it is necessary to know the environmental pollutants generated by the product, and they are of two types as follows:

1. Atmospheric pollutants: They are the pollutants that are emitted to the atmosphere and they are in three forms. The first is the result of burning the fuel represented by natural gas in the boiler unit to generate steam, as well as the result of burning fuel (natural gas) to heat the primary shaft pipes in the ammonia unit, while the second form is dust The urea produced from the granulation tower and other drying processes, and this rises to the atmosphere. As for the third form, it is the ammonia gases that are put into the atmosphere through the ammonia liquid tank, where there are compressors that pull the ammonia gas and put it into the atmosphere to maintain the tank pressure.
2. Marine pollutants: These pollutants fall during maintenance operations and are dumped into the river. The industrial water drained into the main drainage basin, which has a capacity of (1,300) cubic meters, is carried out through the drainage channels of the company's production factories (ammonia manufacturers, urea manufacturers). Cooling towers, power unit, water treatment unit) all of these units put their industrial waste into these channels and then to the main drainage basin. Urea solution (carbamate), as well as some acids such as sulfuric acid and hydrochloric acid, as well as phosphate and some chemicals used in water treatment (anti-corrosion, anti-sedimentation and bio-growth inhibitor), as well as the increase in the biological and chemical need for oxygen, noting that there is no regular treatment unit for these wastes where they are Pre-treatment of the water collected in the drainage basin before it is thrown to the general estuary, such as aeration, raising the pH function, and then subtracting these areas. The polluted night goes to the Basra estuary water through a 2 km long drainage pipe and then an open channel 5 km long.

The environmental costs of the urea fertilizer product are calculated at 20% of the manufacturing costs, which include all costs related to the environment from operations, elements or services borne by the company to reduce pollutants, reduce solid waste and recycle them, as they are cost items related to environmental protection and environmental management systems from pollution damage environment as follows:

20% * 344,780 = 68956 dinars

The total costs of the product (urea fertilizer) = the actual costs of the product + environmental costs

= 422,907 + 68956

= 491863 dinars

The method of calculating the green target cost is now being carried out according to the following steps:

1.Determine the target selling price:

This step is considered the first step for the green target cost technology, and since the company is considered a government sector that has no internal competitor only external (Iranian fertilizer), whose quality level is identical with the same local product, so the target selling price is according to what prevails in the market 450000 dinars per ton.

2.Determine the target profit margin:

After the green target price has been determined, the green profit margin should be determined as a second step of the green target cost steps. The company has generally determined the normal profit margin (50%) and this percentage was determined based on the opinions of the company's specialists, including managers, technicians and engineers:

We extract the green target profit margin ratio as follows:

Green Target Profit Margin Ratio = Regular Profit Margin Percentage x Percentage Added Environmental Specifications + Ordinary Profit Margin Percentage

= 6% x 50% + 6%

= 9%

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The calculation of the green target profit margin is as follows:

Green Target Profit Margin = Green Target Selling Price x Green Target Profit Margin Ratio

= 450,000 x 9%
= 40500 dinars

3.Determine the green target cost:

The third step of the green target cost steps, in which the green target cost is determined for the environmentally friendly product (urea fertilizer) that the company wants to produce and put in the market, and the green target cost is determined based on the green target price that was determined based on the target price for the traditional product and is calculated as follows :

Green Target Cost = Green Target Selling Price – Green Target Profit Margin

= 450000 – 40500
= 409500 dinars

The amount of the green target reduction in product costs (urea fertilizer) is calculated by the difference between the actual cost of the product and the green target cost. To achieve the green target reduction in the actual cost and reach the green target cost of the product, it is calculated as follows:

Green target reduction amount = Actual cost of the product – Green target cost of the product

Green target reduction amount = 491863 - 409500
= 82364 dinars

3.5 Application and calculation of value engineering

3.5.1 Calculation of Job Analysis

The value engineering technique requires the use of the functional analysis of the product, and the analysis of the product includes many elements to determine the main functions and characteristics, through the use of the value indicator in its functional analysis, which is one of the most important stages of implementing value engineering. , the product (urea fertilizer) is functionally decomposed into

Table (5): Functional analysis of the product (urea fertilizer)

Parts	measuring unit	Part cost	Part Cost Ratio *	Job Merit (relative importance of the part) **	value index ***
NH_3	tons	174137	64 %	%76	1.19
Electricity	kwh	87764	32 %	%19	0.59
cooling water	tons	11250	% 4	%5	1.3
		273151	100 %	%100	

Source: Prepared by the researcher

Part cost ratio = part cost ÷ total parts cost
** Job Merit = Based on the experience of the employees
*** Value Index = Job Merit ÷ Part Cost Ratio

The above table shows that the ratio of the cost of NH3 is 64% and its functional entitlement is 76% higher than the ratio of the electricity cost of 32% and its functional entitlement is 19% and higher than the ratio of the cost of cooling water of 4% and its functional entitlement is 5%, because the cost of NH3 is the highest and this is a natural matter because the job The main factor of the urea fertilizer product is to provide ammonia, and it also shows that the functional part that is candidate to improve the value is electricity, because the value index of this functional part is less than the correct one. As for the functional part of the ammonia (NH3) and cooling water, it achieved a value index higher than the correct one, and this is a basic function that adds value to the product Therefore, the part whose value index appeared to be less than the correct one must be studied by engineers and technicians in order to find solutions from alternatives and treatments that reduce this part.

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Table (6): The proposed reduction according to the value index

Parts	measuring unit	Part cost	value index ***	value indicator signal	Part cost after discount
NH_3	ton	**174137**	**1.19**	Not subject to discount	**174137**
Electricity	kwh	**87764**	**0.59**	subject to reduction	* **51780**
cooling water	ton	**11250**	**1.3**	Not subject to discount	**11250**

Source: Prepared by the researcher

* * Part cost after reduction = part cost - (part cost x 1 - value index)

= 11250- (11250 x 1 - 1.3)

= 51780 dinars

3.5.2 Cancellation of unnecessary functions and activities:

Value engineering works to reduce cost by eliminating unnecessary and non-value adding activities during production, as the costs of value-adding activities are costs that, if eliminated or excluded, would reduce the actual or perceived value and reduce the benefit (benefit) that The customer obtains from the use of the product or service, in other words, the activities whose presence is necessary in the formation of the product. As for the costs that do not add value, they are those costs that, if they are eliminated or excluded, do not add the real value, benefit or benefit that the customer obtains from using the product Or the service, i.e. the activities whose presence is not necessary in the formation of the product, so the activities that do not add value will be reduced and thus costs will be reduced because they will provide benefits to the customer and because these activities all add value to the product and at the same time the reduction must be achieved so the researcher will calculate the waste in The unit of water because the waste in it is large and must be calculated and thus we can reduce the cost of the product.

3.5.3 Calculation of Wastage Costs

For the purpose of calculating the cost of wastage per unit of water and materials used, both the standard and actual quantities must be determined, as the water used is of several types, including raw water coming from the Shatt al-Arab, filtered water after removing turbidity, mud and RO water by reverse osmosis method, in addition to the resulting boiler water From RO, on which the process of removing negative and positive ions is carried out to be free of salts, it is used in steam production boilers.

Table (7): the flow of quantities in a unit of water

Sequence	Product	unit of measurement	Quantity
1	boiler water	m^3	5580645
2	Water from boilers	m^3	215000
3	raw water	m^3	10254032
4	filtered water	m^3	11875000
5	Output water for RO	m^3	2467005
6	Inlet water for RO	m^3	3708333

Source: Prepared by the researcher

Table (8): Standard Quantities of Raw Materials

Material	Ppm	Concentration	Standard quantity kg/m^3 *	Quantity	Standard Quantity**
Hydrazine	0.3	0.32	0.00093	5580645	5190.00
Triple Sodium Phosphate	5	0.25	0.02000	215000	4300.00
Alum	3.8	0.15	0.02480	10254032	254299.99
Polyelectrolyte	0.4	1	0.0004	11875000	4750.00
Hexa-Sodium Phosphate	6.4	0.65	0.00985	2467005	24300.00
Sodium sulfite	1.2	1	0.0012	3708333	4450.00

Source: Prepared by the researchers

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* Standard quantity kg/m3 of water = concentration of the substance in PPM ÷ concentration of the original substance (in barrel or bag) x 1000

1. Hydrazine = 0.3 ÷ (0.32 x 1000) = 0.00093
2. Triple Sodium Phosphate = 5 ÷ (0.25 x 1000) = 0.02000
3. Alum = 3.8 ÷ (0.15 x 1000) = 0.02480
4. Polyelectrolytes = 0.4 ÷ (1 x 1000) = 0.0004
5. Hexa-Sodium Phosphate = 6.4 ÷ (0.65 x 1000) = 0.00985
6. Sodium sulfite = 1.2 ÷ (1 x 1000) = 0.0012

** Standard quantity consumed = quantity of the standard substance in kg per cubic meter of water (and this is a standard fixed quantity according to the type of water) x the amount of water used

1. Hydrazine = 0.0 0093 x 5580645 = 5190.00
2. Triple Sodium Phosphate = 0.02000 x 215000 = 4300.00
3. Alum = 0.02480 x 10254032 = 254299.99
4. Polyelectrolyte = 0.0004 x 11875000 = 4750.00
5. Hexa-Sodium Phosphate = 0.00985 x 2467005 = 24300.00
6. Sodium sulfite = 0.0012 x 3708333 = 4450.00

Table (9): Calculation of Wastage Quantities

Material	measuring unit	Actual quantity	Standard Quantity	Wastage Amount*	% wastage **
Hydrazine	Kg	5297	5190.00	107.00	2.06
Triple Sodium Phosphate	Kg	4395	4300.00	95.00	2.21
Alum	Kg	278000	254299.99	23700	9.32
Polyelectrolyte	Kg	4990	4750.00	5.00	0.11
Hexa-Sodium Phosphate	Kg	24200	24300.00	100.0-0	-0.41
Sodium sulfite	Kg	4600	4450.00	150.00	3.37
Total		321482	29728999.	23957	16.66

Source: Prepared by the researchers

* Waste amount = Actual consumable amount - Standard consumable quantity

1. Hydrazine = 5297 - 5190.00 = 107.00
2. Triple Sodium Phosphate = 4395 - 4300.00 = 95.00
3. Alum = 278000 - 254299.99 = 23700
4. Polyelectrolytes = 4990 - 4750.00 = 5.00
5. Hexa-Sodium Phosphate = 24200 - 24300.00 = - 100.00
6. Sodium sulfite = 4600 - 4450.00 = 150.00

** Waste percentage = amount of waste ÷ amount of actual material consumed x 100%

1. Hydrazine = 107.00 ÷ 5297 x 100% = 2.06
2. Tripe Sodium Phosphate = 95.00 ÷ 4395 x 100% = 2.21
3. Alum = 23700 ÷ 278000 x 100% = 9.32
4. Polyelectrolyte = 5.00 ÷ 4990 x 100% = 0.11
5. Hexa-Sodium Phosphate = 100.00 ÷ 24200 x 100% = -0.41
6. Sodium sulfite = 150.00 ÷ 4600 x 100% = 3.37

From the above table, it was found that there is a waste of materials by 16.66%, that is, with a waste amount ranging about 23,957 kg.

Table (10): Calculation of waste costs

Material	measuring unit	Wastage Amount*	Unit price (in dinars)	wastage costs
Hydrazine	Kg	107.00	845000	904150000
Triple Sodium Phosphate	Kg	95.00	175000	166250000
Alum	Kg	23700	610000	14457000000
Polyelectrolyte	Kg	5.00	6750000	33750000
Hexa-Sodium Phosphate	Kg	100.00-	2750000	275000000
Sodium sulfite	Kg	150.00	2675000	401250000
Total				1568740000

Source: Prepared by the researchers

The above table shows that there is a waste cost per unit of water at a value of (1568740000), and after calculating this cost and the extent of its environmental effects on the company, it will be excluded from the cost of the product as follows:

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Amount of reduction per ton = total wastage cost ÷ actual production

= 1568740000 ÷ 267952 = 58546 dinars

Product cost (urea fertilizer) = 491864 - 58546

= 433317 dinars

It is thus clear that the use of the integration of green target cost technology and value engineering together will lead to achieving sustainable development by reducing costs for the product while achieving environmental requirements and providing an environmentally friendly green product that characterizes the economic unit. Environmentally, and thus the main hypothesis is accepted that (there is a positive relationship through the integration of the two green target cost techniques and value engineering in reducing product costs without compromising its quality in addition to achieving environmental sustainability for the State Company for the Fertilizer Industry).

4 CONCLUSION:

The purpose of implementing the green target cost technique is to develop an environmental sustainability strategy, as the target cost strategy enhances the strength of the procedures that lead to a clearer approach, and is likely to be a useful tool to help determine the cost of permissible products because often the customer is not willing to bear the additional costs To buy products despite the environmental programs' indication of the importance of the green product. Value engineering technology is a systematic process of technical evaluation of a product to eliminate unnecessary costs and add value while maintaining or re-improving quality, scope and performance. The objectives and tasks required with the possibility of acquiring the functions desired by the owner such as the environment, safety and others, and the basic procedure in implementing the value engineering technique is to conduct analyzes during the design phase of new and modified products from the point of view of the consumer, and that this analysis will diagnose the basic consumer details, including Value Engineering Technology Action Plan Considering all necessary aspects of the problem. The Value Engineering Technology Action Plan divides the important value engineering technology action plan into functions, since it will provide time for major creative work and the necessary analysis for it so that the best options can be made for further development. This technology will achieve a number of A large number of important results in the performance measure, for example, reducing the cost, reducing the time period in work, and the speed to complete the work, in addition to Quality of products or services and significant improvement in performance, value engineering technology focuses on improving customer satisfaction with the product, material or process that has been studied by identifying their needs and requirements and working to implement their desires.

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