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THE EFFECT OF THE GREEN VALUE CHAIN IN REDUCING ENVIRONMENTAL FAILURE COSTS

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ABSTRACT

The research aims to apply the activities of the green value chain as one of the modern administrative techniques that economic units resort to develop solutions to the pollution problems that occur due to the activity of economic units and their products that may cause damage to the environment as well as the waste of natural resources and to identify the production of environmentally friendly products and reduce the costs of environmental failure of both types Internal and external that may be borne by economic units such as taxes, fines and compensation due to non-observance of environmental requirements and the preservation of human health and protection of the environment.

To achieve the goal of the research, the researchers relied on the descriptive analytical approach of the theoretical side by relying on Arabic and foreign books, letters, university theses, articles, research and periodicals related to the topic of the research. Engineers and employees of the aforementioned company.

The study concluded a set of conclusions, the most important of which is that there is an effect of green value chain activities in reducing the costs of environmental failure if mechanisms and materials that take into account the environment and human health are used by reducing waste and recycling products to preserve the environment and natural resources. In light of these conclusions, many recommendations were reached, the most important of which is that the economic units must apply value chain activities when producing products to obtain environmentally friendly, non-polluting products that do not cause harm to humans and contribute to avoiding economic units from being subjected to fines, taxes and penalties by complying with the requirements Environmental.

Keywords: *reduce environmental failure costs, green value chain.*

INTRODUCTION:

The rapid developments in the industrial sector and advanced technology have led to more prosperity in the global economy, and as a result of this progress and development, environmental pollution problems have arisen such as air pollution, soil and water pollution and climate change. Human health, as well as what the product causes when it is used by customers and the incorrect process of destroying it, all this led to environmental deterioration and the exposure of economic units to taxes, penalties, fines and compensations for not observing environmental requirements, as well as an increase in the costs of internal and external environmental failure. On the other hand, the entry of foreign products with specifications and more consideration of the environment made economic units move towards producing environmentally friendly products that meet the needs of customers on the one hand and take into account the environment on the other

hand, as well as recycling products, preserving natural resources, optimizing the use of resources, avoiding achieving losses and bearing additional costs imposed on Economic units to deal with the damage caused by their products and from this principle has been directed towards the green value chain that helps the management in analyzing the activities of the products and contributes to reducing and reducing the costs of environmental failure and the production of environmentally friendly products that meet the desires and needs of customers, recycling waste and shifting from the traditional value chain to green in all the activities of the economic unit, from the first activity of the primary green sources, which represents the green supply chain and green research and development, to the last activity of recycling waste, preserving the environment, not being subjected to fines and compensation, and reducing the costs of environmental failure, whether Was it internal or external. The green value chain has been implemented in Al-Wasat Refineries Company / Al-Dora Refinery, one of the companies of the Iraqi Ministry of Oil, which produces products that generate harmful environmental wastes such as emissions and other industrial wastes that cause air, soil and water pollution and suffer from increased costs incurred to protect the environment, humans and other living creatures. The green value chain is considered one of the modern strategic management methods to reduce costs, improve products and make them environmentally friendly, and also contribute to reducing the costs of environmental failure. Based on the foregoing, the research was divided into three sections: Where the first topic dealt with the research methodology, while the second topic was devoted to the theoretical framework of the green value chain and its impact on reducing the costs of environmental failure, and the third topic was devoted to the conclusions and recommendations reached by the researchers.

THE FIRST TOPIC: RESEARCH METHODOLOGY:

First: The research problem: In light of the scarcity of natural resources and the high rate of environmental pollution, which leads to the economic units bearing additional costs that lead to higher production costs, including the costs of protecting the environment, man and society from the damage caused by the products of economic units. Hence, the research problem emerged in the following questions:

The first question: Can economic units identify the activities of the green value chain and measure costs through them?

The second question: Does the use of the green value chain contribute to reducing the costs of environmental failure?

Second: The aim of the research: The research aims at the knowledge bases of the green value chain and its impact on reducing the costs of environmental failure and the non-exposure of economic units to taxes, penalties and fines as a result of the environmental damage caused by their industrial products and how to reduce the costs of internal and external environmental failure.

Third: The importance of the research: The importance of the research stems from the problem and the goal of the research, as the economic units are suffering at the present time from facing environmental deterioration and how to produce environmentally friendly products that do not cause harm and how to take into account the environmental requirements to protect humans and society and avoid exposure to fines and compensations borne by economic units due to lack of Taking into consideration the protection of the environment.

Fourth: Research hypothesis: The research is based on the hypothesis that there is an effect of the green value chain in reducing the costs of environmental failure.

Fifth: Research Methodology: The research was based on the theoretical side on Arabic and foreign books, theses, university theses, Arab and foreign articles and websites. As for the practical side, the research was applied in Al-Wasat Refineries Company / Al-Dora Refinery and determining the fat products that the company produces by relying on financial data, records and documents, as well as personal interviews with engineers and workers in the company and field experience in the refinery.

THE SECOND TOPIC: THEORETICAL FRAMEWORK OF THE GREEN VALUE CHAIN AND ITS IMPACT ON REDUCING ENVIRONMENTAL FAILURE COSTS

First: the green value chain:

During the past few decades, concepts, terminology, and goals of the value chain varied. Its beginnings go back to 1960, when it appeared with the concept of (Filiere), a French word meaning threats, which was issued by a French organization called (JNRA) and the focus was on profit. In 1970, Wallerstein developed the concept of appropriate chains (commodity chains) in world systems theory. In the mid-1980s, Porter

presented the concept of the value chain by distinguishing the main and supporting activities for it. Industry) and the vertical entrance (the development of aggregates - the supplier, the company and the customer). (Sorour, 2019: 175).

The Working Group on Green Growth DCED under the auspices of the International Labor Organization (ILO2) launched its Green value chains document, which is one of a set of documents it issued, as this document states that many products and services today pass-through value chains to reach the end user And enter into each stage of the chain a lot of natural resources that are used permanently. Therefore, the green value chain is a systemic approach of environmental support functions programs, environmental rules and regulations and market actors to prepare a cyclical view, the increasing importance of environmental management issues in business requires operations management and value chain managers to re-evaluate their actions due to the link between value chain activities and the environmental footprint of the company . Activities that researchers generally study in the areas of purchasing, operations management, and distribution/logistics management (e.g., new product design, process selection, supplier selection, quality control and management, etc.). Decisions made in these areas undoubtedly affect the amount of waste a company generates and must be disposed of. (Al-Mousawi, 2018: 5). A value chain is defined as a set of activities that cover the entire customer demand cycle, including design, procurement, manufacturing, assembly, packaging, logistics and distribution. In response, companies must have a formal planning process in place to respond to environmental issues. Environmental issues are generally seen as a regulatory nuisance that must be addressed only because non-compliance will result in severe financial penalties. (previous source). Porter (1985) pointed out that the most important task of the firm is value creation, and any complex series of activities aimed at creating value constitute a value chain. One of the company's priorities is to improve the perceived value of a product or service and reduce the cost of production. (kung and Huang, 2012:113).

Second: The concept of the green value chain: The term green value chain is one of the contemporary terms that have accompanied in its emergence the requirements of sustainability and the green environment. The following is an explanation of some of the views that have been exposed to this concept, which will be clarified in Table No. (1).

Table No. (1) Green Value Chain Concepts:

N	Source	Definition
1	Kung and Li Huang,2012:112	The green value chain refers to the life cycle of a product from the initial source, through research and development (R&D) and production, all the way to the final recycling of waste and product disposal. Environmental control is implemented at every stage of the process to reduce waste of resources and reduce unnecessary expenditures. The resulting eco-friendly products have a unique market value gained from the preferred image
2	Couto, et al,2016:2	Environmentally friendly activities aimed at protecting the environment, improving the quality of internal processes, and applying carbon-neutral strategies to produce green products that add value to the customer and support the achievement of competitive advantage.
3	Ong, et al,2019: 496	The set of activities that are practiced ensuring the optimal consumption of natural resources as well as increasing the share of renewable and recycled resources on the input side to maximize resource and energy efficiency at each stage of operations and reduce negative environmental impacts as outputs at all points of the chain.

Source: Prepared by the researchers based on the sources mentioned in the table.

The researchers see through the above definitions that the green value chain is a series of activities starting from the activity of green resources and green research and development and ending with the activity of green recycling of products, where the process of environmental control is carried out at each stage of the production process and waste reduction and leads to the production of products High value, and also allows the economic unit to reduce pollution and waste during operations, as well as focus on recycling and subsequent treatment to reduce waste.

In light of the foregoing, we can summarize the objectives of the green value chain as follows:

- The green value chain seeks to reduce resource and energy consumption, waste and pollution.
- Supporting the economic unit's capabilities in its production of green products.
- Enhancing the health requirements of workers in the economic unit by transforming its activities into environmentally friendly ones.
- Contribute to process re-engineering to reduce waste and recycle or dispose of both production waste and used products. (Al-Bakri, 2012: 447).

Third: The advantages of the green value chain:

The use of the economic unit of the green value chain can support and enhance the achievement of the following advantages, which are shown below: (Abdul Qadir, 2019: 40).

- Achieving a sustainable competitive advantage by fulfilling obligations

under current environmental legislation and laws and by producing safe and green products to meet customer requirements in a way that increases the requirements that remain in the market for the longest period and does not harm humans and reduces the rate of contamination of products.

- Reducing costs by reducing waste, gas and toxic fumes, thus reducing fines and green taxes, and reducing disposal and maintenance costs through clean engineering techniques.
- Improving the quality of products by contracting with reputable suppliers who are committed to environmental controls as well as improving the quality and efficiency of production processes.
- Improving the reputation of the economic unit for its contribution to reducing pollution rates and manufacturing green products.
- Conserving natural materials and energy by reducing the amount of materials used in manufacturing, which are mostly recyclable and bio-disposal.
- Reducing waste by designing products that are recyclable and bio-disposal.

The researchers believe that the use of the green value chain increases the efficiency of economic units and preserves resources by reducing the use of materials, as well as recycling production waste and consumables, which leads to achieving sustainable development, that is, meeting the needs of the present and not compromising the ability of future generations to meet their own needs.

Fourth: Green value chain activities: The green value chain consists of a set of activities starting with green research and development and ending with green recycling. These activities will be explained as follows:

Figure No. (1) Green value chain activities

Source: Prepared by the researchers.

A- Green research and development: The research and development activity represent the main source of technological innovation, especially in large-sized economic units that have solid material and human capabilities. Including knowledge of humanity, culture and society and the use of this stock of knowledge in order to invent new applications" (Al-Haddad, 21: 2014). As for green research and development, it is considered the center of innovative activity in the economic unit that works to bring the green character of products by introducing technology that reduces global warming to its lowest levels and increases the efficiency of activities (Fei, et al, 2007:7) and it was defined as "a set of principles, tests and foundations necessary To help engineers design green products and green technologies to develop and test products over their lifespan. Green technologies mean "techniques that seek to develop products, equipment, and administrative systems to conserve natural resources and reduce negative impacts. "Sometimes called clean technologies or environmental technology, these technologies consist of a group of environmentally friendly methods and materials and often depend on non-traditional energy sources such as wind and solar energy. (Bhowmik & Dahekar, 2014:4).

Green research and development aims to innovate green products, and attention to green research and development enhances the potential for developing new ideas and methods to reduce costs, as many of the results associated with research and development activities are intangible and may take a variety of forms, including the knowledge store accumulated in the economic unit while It is related to production techniques, as well as accepting the application of new knowledge in order to achieve competitive advantage (Khazal, 251: 2019). By looking at the above, we can note that the scope of green research and development lies in the search for green technology to reduce emissions, pollution, energy consumption and enhance competitive advantage. Creating new green products or improving existing green products provides environmental training for workers in the economic unit and transfers the required skills and knowledge regarding greening to increase environmental awareness by disseminating best green practices.

Green training and development is defined as "a set of activities that give a great deal of attention to the development of employees' skills and improve knowledge that provides them with work methods that reduce waste, the proper use of resources and energy conservation. It also gives an opportunity to engage employees to

contribute to solving environmental problems and urge them to reach for ideas that increase green innovations." (Bangwal & Tiwari, 2015:48).

Figure 2 illustrates the innovation process for green products.

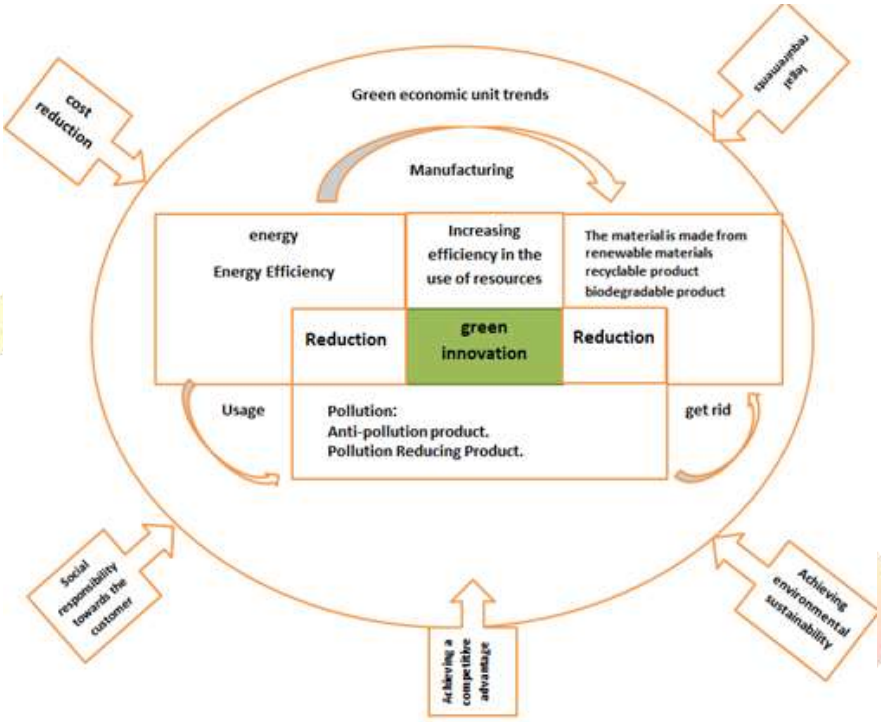

Figure No. (2) Innovation for green products

Source: Prepared by the researchers.

Figure (2) shows that the pressure of laws, legislation, customer requirements, and the economic unit's pursuit of sustainable development and gaining a competitive advantage to stay in the competitive market led to the innovation of green products by achieving environmental sustainability, getting rid of pollutants, and bearing social responsibility in the optimal exploitation of the unit's natural resources and the production of friendly products. The environment meets the needs of customers.

B- Green design: Green design or environmental design is an appellation for environmentally friendly design. Green design begins with a life-cycle assessment and taking into account the environmental impact throughout the entire process, starting with the selection of materials, through the processes of manufacturing, packaging, transportation, product use, and even waste disposal. The focus of green design is on "researching, developing and designing green life cycles," and the key lies not in existing waste recycling methods, but rather in enabling designers

to anticipate the potential environmental impact of a product as it envisions it. Table (2) shows the definitions of this concept.

Table (2) Definitions of Green Design:

N	Source	Definition
1	Chan & Lettice, 2012:34	A group of activities that aim to reduce the use of materials or use recyclable materials while using processes that do not pollute the environment and reduce the energy used in production to a minimum.
2	DeLa Grandier, 2019:15	Design goods that reduce material and energy consumption and facilitate reuse and recycling while avoiding the use of hazardous products.
3	Hong, 2020:168	It is defined as a useful tool for improving the environmental performance of economic units. It focuses on addressing product functions and reducing environmental impacts when using and targeting green conscious customers.
4	Al-Ghwayeen & Abdallah, 2018:5	The goal of green design is to reduce a product's environmental impact without affecting other design parameters such as performance

Source: Prepared by the researchers based on the confiscation indicated in the table.

Green design can be defined as an activity that seeks to improve product quality through the use of low-pollution and recyclable materials that do not require much energy to be extracted or used.

Re-use and recycling of the product is one of the most important aspects of green design, and in order for this to succeed, cooperation must take place between all the activities of the economic unit in order to design a product that is not harmful to the environment and is very easy to use and install. The importance of green design lies in the following: (Pu, et al. , 2020:2).

- Designing green products that are safe in terms of health.
- Reducing waste and waste of raw materials through the use of more efficient equipment.
- Distinguishing the product offered by the economic unit from the competition products.
- Reducing production costs through more efficient and less polluting techniques.
- Creating a good green reputation for the economic unit and presenting it as a beneficial element for the community.
- Meet customers' requirements by obtaining green products at reasonable prices and appropriate to their needs
- Greening the products leads to a reduction in the harmful effect of the products on the environment during the life cycle of the product.

The green design uses many of the activities and tools shown below, which

have been summarized as follows: (Baleta, et al, 2019: 1429).

- Green design from the source: in this design, environmentally hazardous materials are dispensed with and the number of components of the product is reduced.
- Design for the purpose of reuse: The product or some of its parts can be reused, and some of its components can be used again as it aims to improve the life of the product.
- Design for resource efficiency: engineers can reduce material and energy depletion when designing a product, as well as stimulate the use of renewable resources and improve economic efficiency.
- Design for the purpose of disassembly: The goal of the disassembly design is to increase the rate of product recovery, ease the separation of parts and components of materials, and reduce the complexity in the parts of the product. The disassembly design can be used in:
  - ✓ Design for Remanufacturing: Designing products to be remanufactured in a manner similar to the performance of the original product.
  - ✓ Design for the purpose of recycling: It is designed in a way that is easy to separate waste materials according to each substance and is reprocessed for the purpose of reducing waste and ensuring that the materials can be recovered at the end of their useful life.

C_ Green Manufacturing: Green manufacturing is one of the modern and contemporary activities in the management of production and operations, as it is a method that reduces industrial waste by adopting modern methods and methods in the production of goods that do not harm humans and the environment. Therefore, it is considered one of the best systems that increase manufacturing efficiency in the economic unit worldwide. Below is a table (3) that shows some definitions of green manufacturing. (Saleh and Hussein, 90: 2017)

Table (3) Definitions of green manufacturing:

N	Source	Definition
1	Prasad&Sharma,2014:511	It is a manufacturing method that reduces pollution and waste, and this is achieved through research, innovation, process design, and support for renewable energy to manufacture environmentally friendly products and services.
2	Barzegar et al., 2018: 62	Continuous improvement of manufacturing processes in order to reduce or prevent pollution by recycling the product, reducing the materials used and choosing the raw materials that cause less environmental impact.
3	Bokolo,2019:385	It is the activities that use information technology materials and products that have significantly low environmental impacts, that produce little waste or generate less pollution in industrial processes, and use clean technologies, which enhances energy efficiency and thus reduces costs and improves the environment.

Source: Prepared by the researcher based on the sources indicated in the above table.

From the foregoing, green manufacturing is defined as "a series of successive stages in which raw materials are transformed into a green product with low carbon emissions and hazardous materials harmful to the environment, and its products can be recycled or manufactured while maintaining product quality at low cost, which contributes to achieving dimensions of sustainable development" .

There are many requirements for the success of green manufacturing, the most important of which are (green procurement, green human resources, and cleaner production techniques, which help reduce costs, improve quality and recycle products. Green manufacturing is the first step towards sustainable development, because its essence is to reduce damage to the environment and achieve a rapid increase in growth economically and sustainably. By integrating research, green development and green design activities in creating green manufacturing processes that reduce environmental impact and resource consumption during the life cycle (Abdul Qader, 2019: 42). The objectives, foundations and benefits of green manufacturing will be discussed, as follows:

- **Green Manufacturing Objectives:**

There are many goals of green manufacturing, and the most prominent goal among them is to achieve the optimal use of resources and improve the efficiency of production processes in industrial economic units. These goals are as follows: (Ibrahim, 2017: 134) (Awad, 2020: 33) (Al-Razzaq, 2012: 121).

1-Reducing costs by reducing waste materials, treating them and making maximum use of clean raw materials.

2-Controlling emissions of gases and vapors to ensure access to a clean environment.

3-Providing clean energy sources by innovating new technologies or approaches in manufacturing processes.

4-Maximizing the financial return by reducing industrial waste in order to improve manufacturing processes.

- **Green Manufacturing Foundations:**

Effective green manufacturing needs to rely on the following set of foundations: (Musa and Jamil, 57: 2012) (Al-Ta'i, 47: 2018).

1-Make products recyclable: Products must be designed in such a way that their components can be reused more than once.

2-Using recycled materials: by collecting the remaining products after their use, and then processing and reusing them in the manufacturing process.

3- Using raw materials that are not harmful from an environmental point of view: that is, identifying the characteristics of the components of raw materials, and excluding materials that are harmful to the environment.

4-Using lighter materials and components: This contributes significantly to reducing the amount of materials used.

5-Reducing energy use: by reducing the energy used in production processes, and reducing the energy consumed by the product when used.

6-Raising the efficiency of resource use: the percentage of materials used in the product is reduced, by activating the role of research and development activities or by raising the efficiency of its production processes and reducing damage and loss during production processes, thus controlling costs and achieving environmental safety.

- **Benefits of Going Green Manufacturing:**

The application of green manufacturing has become a duty on the economic unit instead of being an option due to the benefits it provides to the economic unit, the environment and customers, and the most important of these benefits are: (Deif, 2011:27)

1- Assisting in influencing the internal and external behavior of the economic unit to ensure sustainability.

2- Raising efficiency by increasing productivity and improving the quality of products.

3- Contributes to adapting and preserving environmental changes by reducing waste through the efficient use of energy and raw materials.

4- It helps the community by providing new factories that depend on renewable energy, which provides more job opportunities.
5- Increasing profits, as manufacturers can increase profits by saving energy, thus reducing product costs.
6- Providing a cleaner source of energy through modern technology or methods.
7- Preserving resources by converting pollutants and waste into products and encouraging their use and recycling.
8- Reduce waste by improving processes, such as selecting good raw materials, selecting the right fuel mixture and automation.

Through the foregoing, it can be said that the most important benefits of green manufacturing is to contribute to achieving cleaner production, which will reflect positively on meeting the customers' desires to obtain safe and healthy production and provide an appropriate working environment for workers in the economic unit, as well as reducing costs due to increased efficiency, which enhances the competitive advantage of the economic unit and improves of its reputation and reduces the environmental fines imposed on it.

D- Green Marketing: Green marketing appeared in the late eighties and nineties after expanding discussions about the role of marketing and its importance to society, as a new concept emerged that represents an extension of that, which is green marketing and is sometimes called environmental marketing or sustainable marketing.

Table (4) shows some definitions of the concept of green marketing.

N	Source	Definition
1	Eneizan et al,2020:26	Green marketing is described as all practices that aim to create and enable any business planned to satisfy the needs or desires of customers while taking into account the harmful impact on the environment and on customers while conserving resources and energy.
2	Tiong et al,2021:4	Marketing activities that contribute to reducing the negative social and environmental impacts of existing products and production systems, and that promote less harmful products and services.
3	Shabbir, etal,2020:14	They are sequential steps to try to develop different strategies to target consumers who have a greater interest in the environment.
4	mostafa,2019:6	A tool that companies can use to achieve their strategic goals by supporting the possibilities of meeting the requirements and needs of customers as well as spreading environmental awareness of the community, that is, companies should abide by their responsibilities in terms of ethical selection of sources of raw materials and their products as well as

Source: Prepared by the researchers based on the sources indicated in the above table.

Green marketing can be defined as integrated practices that aim to create a positive impact on customers' desires and preferences so as to motivate them to demand green products that are environmentally friendly and change their consumption habits in a manner that is consistent with working to create products that meet the needs of this trend, so that the final result will be environmental preservation. Ensuring the health and safety of the customer and achieving profits for the economic unit. The following table shows the differences between traditional marketing and green marketing.

Table No. (5) The differences between traditional marketing and green marketing:

N	comparison Point	Traditional marketing	Green marketing
1	Target	Satisfying the customer to achieve the objectives of the economic unit.	Satisfying the customer to achieve the goals of the economic unit, reduce environmental impacts and enhance sustainability between the economic unit and the customer.
2	Parties	Economic unit and customer	Economic unity, customer and sustainable green environment.
3	Responsibility	Economic responsibility	Economic and social responsibility
4	Decisions	Economic unit management	The entire product value chain from acquiring resources to customer services and preserving the environment.
5	Requirements	Legal requirements	Legal and environmental requirements
6	Green pressure groups	Negative attitude	Sustainable cooperation and relationships

Source: KRAJINA A(2018) " CONTEMPORARY GREEN MARKETING STRATEGIES" Master Thesis Introduction to MASARYK UNIVERSITY Administration Faculty of Economics : p (14) .

From the observation of the table above, we find that the economic unit that seeks to implement green marketing enjoys the assistance and support of associations that seek to preserve the environment and support government agencies in terms of reducing environmental fines and taxes or assisting them with grants and loans and obtaining an environmental quality certificate.

E- Green Distribution:

The green promotion activity refers to the need to use safe transportation from an environmental point of view, as the objectives of the economic unit are achieved only by implementing a sound and tight plan for the distribution of its products, in order to distribute the customers on a large scale. Green distribution is "the process of considering environmental considerations in moving environmentally friendly products from source to customer." The most important considerations that must be taken into account in the green distribution activity is to reduce the consumption of energy and

resources and reduce emissions to reduce global warming (Abu Ayyash, 51: 2017). The distribution of products depends on the following:

- Physical Distribution: It is a set of activities that start at the end of the production process and end with the delivery of the product to the customer, and it includes many sub-activities such as customer orders, shipping products, inventory management and choosing store locations.
- Distribution channels: They are a group of economic units and a number of individuals responsible for the chain of flow of products and services to customers.

Green distribution can be defined as one of the important activities of the green value chain that contributes to adding value to green products by reducing energy use and reducing pollution through the activities of transporting finished products by means of transportation that are not harmful to the environment and the selection of distribution outlets that are environmentally safe and healthy.

F- Green services:

The growing interest in the environment has made economic units more responsible towards the environment, and many of these units have invested in this approach to create a competitive advantage by preserving the environment by providing green products, hence the concept of green services.

Green services have been defined as "all activities undertaken by the producer to enable the customer to achieve the greatest benefit from the products and services while preserving the environment and reducing waste and energy consumption (Cocca & Ganz, 2015: 181)".).

From what was mentioned previously, it can be noted that green services are an activity carried out by the economic unit to ensure safe use from an environmental and health point of view, and to show the customer the extent of its seriousness in adopting green policies and gaining a competitive advantage by preserving the environment and gaining the confidence of its customers.

G- Recycling and disposal:

The concept of recycling activity includes great opportunities to reduce the consumption of natural resources and reduce environmental pollution, while waste has been recognized as a resource for recycling, and the process of recycling waste is directly related to green manufacturing processes. Waste in an appropriate manner, which generated additional pressure on the economic unit to walk the path of achieving recycling or safe disposal to preserve human health and the environment. Reducing the amount of waste and reusing and recycling waste

materials as a by-product or as raw materials for other products can reduce costs through environmentally friendly processes. Recycling is defined as "all the means that enable the economic unit to use industrial waste and benefit from it in other works without any impact on humans and the environment." Disposal of the product is based on the principle of increasing the value of the product, focusing on recycling and reusing old products that no longer have economic value, with the purpose of extending the life cycle and value of the product, ultimately leading to resource circulation and sustainable development. Disposal of products mainly refers to recycling, reuse and renewal. Recycling refers to companies that have the responsibility to recycle the waste they produce. By recycling and controlling pollution, companies can improve production efficiency, and thus reduce costs and increase energy efficiency, companies can cut expenses further. They can also avoid high insurance premiums and maintain positive relationships with residents in local communities. In doing so, companies benefit from producing high-value green products while enjoying a number of other potential advantages.

Factors affecting the success of the green value chain:

There are several factors that have a significant role in the success of the green value chain, which can be categorized as follows: (Abdul Qadir, 2019: 52).

- Green organizational culture: The organizational culture of the economic unit is one of the determinants in the implementation of environmental strategies. The organizational culture depends on the history of the economic unit, the areas in which it operates, its headquarters and its branches. It plays a major role in achieving competitive advantage. The top management should instill environmental cultures and applications among employees. To form a green culture and continuity in competition with other units.
- Green management: It is part of the processes carried out by the administration to achieve environmental sustainability and reduce waste. This is done through continuous education and development. There should be an environmental management system that assists the administration in carrying out its duties related to the environmental aspect.
- Green Human Resources: This concept refers to the increased enthusiasm of employees in environmental initiatives and their commitment to the

environmental issues of the targeted development.

In conclusion: the researchers believe that the green value chain is one of the strategic cost management techniques, and the knowledge bases of this technology have been divided into its seven activities in terms of manufacturing, which are (green research and development, green design, green manufacturing, green marketing, green distribution, and recycling and disposal). Where the use of this technology contributes to assisting the management of economic units in reducing environmental costs and reducing environmental pollution rates through the creation of environmentally friendly products, as well as through the optimal exploitation of natural resources, raw materials and energy. Green Sourcing Green procurement ensures that all components purchased comply with environmental requirements. Green sourcing is defined as "the procurement of raw materials that comply with environmental standards that show a preference for reusable, recyclable or previously recycled materials". In this case, sourcing also takes into account the environmental performance of upstream suppliers, thus incorporating environmental principles into supplier management. The process of reducing costs will be clarified in the next section of this chapter.

The proposed form of the green value chain is as follows, as suggested by the researchers:

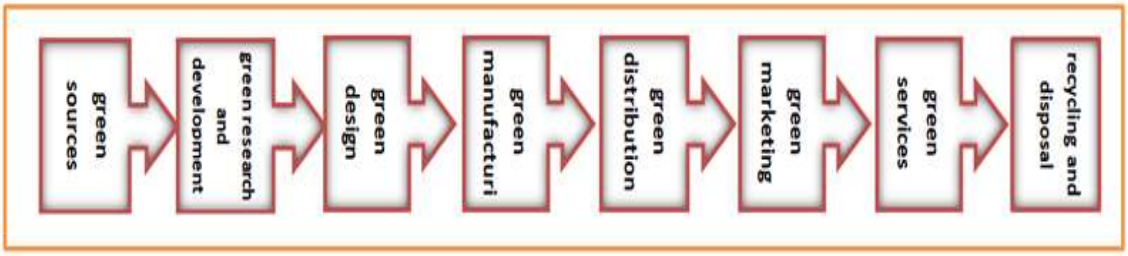

Figure No. (4) The proposed green value chain activities

Source: Prepared by the researchers.

The impact of the green value chain on reducing environmental failure costs:

From here, we will address the activities of the green value chain and how they will have a role in reducing the costs of environmental failure, as follows: (Al-Samarrai and Abdel-Qader, 2019: 64).

A- Green sources: in this activity, economic units seek to obtain raw materials from suppliers that take into account the environment in the supplies of materials that are relied upon in the manufacturing process, reduce the negative effects of products and services, and do not

need to spend costs in production processes and waste treatment after consumption, in order for the units to establish It is economical to purchase environmentally friendly materials that do not leave pollutants during the manufacturing process, as well as when used by customers, as well as the possibility of recycling them at the end of their useful life. This depends on choosing sources of supply that take into account the requirements of the environment.

B- Green research and development: During the research and development process, economic units seek to research and develop products into environmentally friendly products at the lowest cost, and this in turn will reduce the costs of failure, both internal and external, that may be imposed on companies if they do not search for environmentally friendly products or Develop its products to be environmentally friendly in order to remain in the competitive market. The costs of research and development activity were green after applying the green value chain to fat products as in the following table:

Table No. (6) the total costs of research and development activity for the year 2019 for the Dora refinery:

N	Statement	Studies Department (1)	Training and Development Department (2)	Amounts (Iraq Currency) 1 + 2
1	Direct costs to the department	1019920895	1541163130	2561084025
2	In-kind benefits	100000	2265000	2365000
3	maintenance costs	698000	13979875	14677875
4	Energy service costs	9670750	45483250	55154000
Total		1030389645	1602891255	2633280900

Source: Prepared by the researchers based on the records of the financial department / production accounts division.

The records of the allocation of costs in the financial department showed that the share distributed to fat products from the costs of the studies department amounted to (249457333) dinars, which is equivalent to 24.21% of the total cost of the studies department, while the remaining percentage is allocated and distributed among the rest of the products (light derivatives). As for the distributed share, which belongs to the Training and Manpower Development Department, it amounted to (3,88059973 dinars), which is approximately 24.21% of the department's

costs, and then the total costs of this activity allocated to fat products amounted to (6,37517306 dinars), these costs are the research and development costs allocated to (fat products).

H- Green design: Many companies seek to find products with a design that suits the environmental requirements and the desires and needs of customers at the lowest possible cost and does not cause damage or pollution to the environment.

The technical and engineering authority in all its departments (Civil Engineering Department, Projects Department, Environmental Engineering Department, Contracts Department, Valuation Division, Administrative Division) except for the Studies Department as well as the Engineering Examination and Central Measurement and Calibration Departments are representative of the design (engineering) activity in the Dora refinery being responsible In establishing modern projects and referring them to the executing companies (contracting companies), as well as determining the costs of these projects through the appraisal division. The costs of this activity were as shown in the following table:

Table (7) the total costs of the design activity for the year 2019 for the session liquidator:

N	Statement	Engineering and Technical Authority	Engineering Examination Department	Measurement and Calibration Department
1	Direct costs to the department	2989102188	1542007472	1025272359
2	In-kind benefits	260000	11944947	210000
3	Maintenance costs	123299009	22187734	3908950
4	Energy service costs	29628369	19263164	3980000
Total		3142289566	1595403317	1033371309

Source: Prepared by the researchers based on the records of the financial department / production accounts division.

The allocation records showed that the costs distributed to the fat products and related to the costs of the technical and engineering authority, except for the studies department, amounted to (760748303 dinars), while the costs distributed to the product and related to the costs of the engineering examination department amounted to (386247143 dinars), while the product's share of the costs of the measurement and calibration department amounted to (250179193). dinars), and then the total cost of the design activity distributed on fat products becomes (139,7174639 dinars), which is approximately 24.21% of the total costs of the activity.

I- Green manufacturing: The production and manufacturing process is one of the most important activities within the green

value chain, as the production and manufacturing process requires the use of non-polluting machines and equipment, and also helps reduce costs. On the contrary, when old machines and equipment are used that pollute the internal and external environment, technology and automation are used. Modern manufacturing processes that are more convenient and help reduce the costs of both types of failure when used.

The process of manufacturing fats is one of the production processes carried out by the Dora refinery through the refining units of crude oil and converting it into fuel oil, on which the process of distillation and hydrogenation takes place in order to turn into multiple products, including oils, grease and wax. The costs of the manufacturing activity amounted to as shown in the following table:

Table (8) costs of the activity of manufacturing fat products for the year 2019 for the Dora refinery:

N	Statement	Amounts (Iraq Currency)
1	Raw material costs	18691916000
2	Salaries	278220463
3	Cost of chemical services	201878513
4	The cost of depreciation	141307507
5	energy costs	2081326107
6	maintenance costs	190510813
7	laboratory costs	144800292
Total		21539448882

Source: Prepared by the researchers based on the data of the financial department / production accounts division.

Where in the Euphrates (1, 2, 3, 4) they represent direct costs, while paragraphs (5, 6, 7) are grammatical.

Supporting activities: The predominant activities represent the administrative body in its various departments except for the Training and Manpower Development Department, as well as the Safety and Fire Department, Contracts and Procurement Department, Information and Communication Technology Department, Legal Department, Control and Internal Audit Department, Karbala Refinery Department, General Manager Office, and Quality Management Division. Table (4) shows the costs of activities prevalent and distributed over fat products based on direct product costs.

Table (9) costs of activities supporting fat products for the year 2019 for Dora refinery:

N	Statement	Amounts (Iraq Currency)
1	Administrative and Financial Authority	130891877
2	Safety and fire department	28536005
3	Procurement Section	14813439
4	Department of Information and Communication Technology	13071783
5	Law Department	40759900
6	Department of Control and Internal Audit	37624916
7	Kerbala refinery Department	7952157
8	Quality Management Division	5816288
9	Manager's office	14322880
	Total	293789245

Source: Prepared by the researchers based on the records of the financial department / production accounts division.

According to the previous analysis of the value chain for fat products, Table No. (10) shows the costs of the products according to the value chain analysis and the ratio of each activity to the total costs of the products.

Table No. (10) The cost of fat products according to the traditional value chain analysis

N	Activities	Amounts (Iraq Currency)	Parentage
1	research and development	63751305	0.2%
2	Design	1397174639	5.99%
3	Manufacturing	21539448882	92.47%
4	Chock	293789245	1.26%
	Total	23294164071	100%

Source: Prepared by the researchers.

Green development and training:

The Ministry of Oil has obligated all its companies to enroll their employees in training courses during the minimum period for the promotion of the employee, considering them as one of the requirements for the issuance of the administrative order for promotion or promotion. Courses in training centers at the headquarters of the Ministry of Oil or the Oil Training Institute (one of the formations of the Ministry of Oil) in exchange for subscription fees of (25,000 dinars) for one trainee, as in the following table:

Table No. (11) Profits from green training:

N	Statement	Details
1	Number of monthly green training course	47 courses
2	The number of months of the year	12 months
3	The number of external trainees	30 trainees
4	Fees for participating in the course	25000 dinars
5	Revenue from green training 1 x 2 x 3 x 4	423000000 dinars
6	Trainer Fees (100,000 x 48 course /year)	4800000 dinars
7	Operating expenses (150,000 x 48 course /year)	720,000 dinars
8	net profit from green training	411000000 dinars

Source: Prepared by the researchers based on the interview with the in-house training officer, Dr. Ramez Mahdi.

Research and development costs can be reduced after the greening process is carried out according to what is shown in Table (12).

Table No. (12) net total research and development costs after holding training courses:

N	Statement	Amounts (Iraq Currency)
1	Total research and development cost Table 43	2633280900 dinars
2	Profits realized from green training Table 52	411000000 dinars
3	Net total R&D cost	2222280900 dinars

Source: Prepared by the researchers.

The percentage of oil products from research and development costs is 24.21%.

Research and development costs after the establishment of green training and distributed to the product

Net research and development cost x the percentage of the fat product from these costs

2222280900 x 24.21% = 538014206 dinars research and development costs distributed on fat products after moving towards environmental training.

The amount of the reduction is extracted according to the following steps:

Amount of reduction = activity costs before reduction (from table 10) - activity costs after reduction

637517306 dinars - 538014206 dinars = 99503100 dinars and represents the amount of savings in research and development costs distributed on fat products after conducting the green training.

Green design:

The engineers of the Environmental Department of the Technical and Engineering Authority believe that the refinery units, gasoline and liquid gas improvement units, fats and hydrogenation units, daily export thousands of tons of various carcinogenic gases.

The engineers in the Environmental Department believe that the recovery of these emitted gases that are wasted to the atmosphere will lead to a reduction in environmental pollution and an improvement in the quality of the environment, as well as an increase in production quantities. Electricity that is powered by gas energy, which leads to meeting the country's needs of electrical energy and reducing the quantities of white oil production (heater fuel), which is produced and consumed in large quantities, especially in the cold winter season as a result of providing electric power to citizens and other state ministries through gas-powered generators, as well as On mitigating the negative environmental impacts of kerosene power plants.

The technology of gas recycling or gas recovery provides a step in investing 90% of the gases emitted from the refinery units. This system is linked to the liquid gas unit and transfers all recycled gases to the liquid gas unit for production purposes, in addition to recycling the emitted gases. During the manufacture of gas back into the system and prevent waste and loss of inputs and achieve the optimal relationship between inputs and outputs through the recycling of gases emitted to the unit of liquid gas.

Table (13) costs of the Air Pollution Division for the year 2019 Dora refinery:

N	Statement	cost elements	Amounts (Iraq Currency)
1	Costs of raw materials used to reduce air pollution	Raw materials	105387000 dinars
2	Environmental department employee salaries	Wages	195000000 dinars
3	Purchases of inspection tools and machines	Direct costs	106583000 dinars
4	Emissions inspection costs		138740000 dinars
5	annihilations		112650000 dinars
Total			658360000 dinars

Source: Prepared by the two researchers based on the Environment Department and the Financial Department / Air Division costs.

The company wishes to reduce the costs of the Air Pollution Division by 75%, according to the opinions of the experts of the engineering community and the financial department, from the cost of (used raw materials, emissions costs, and purchases of equipment and inspection machines), as the costs of salaries and waste cannot be reduced because the company bears them in all cases.

The total reduction can be calculated at the level of the company and the product of the research sample:

The amount of reduction = (costs of raw materials used + costs of emissions + purchases of inspection machines) x 75%

(138740000 + 106583000 + 105387000) x 75% of Table (13).

236032500 dinars, the amount of the reduction at the company level.

Amount of reduction at the level of the fat product = Total reduction amount x allocation ratio for the product.

236032500 dinars x 24.21 % = 57143468 dinars and represents the amount of reduction in design activity costs distributed on fat products.

Green Manufacturing:

Klaus technology and the gas recovery system are engineering means and techniques to achieve green manufacturing in the Wasat Refineries Company / Dora Refinery, as the first eliminates the emission of hydrogen sulfide gas (H2S), while the second recovers gases instead of burning and wasting them to the atmosphere. During the integration between these two technologies, production elements will be addressed before and after the application of green manufacturing, bearing in mind that the production elements for fat products are:

Table (14) shows the differences resulting from the increase and decrease in the costs of the production elements represented in raw materials, direct wages, chemical raw materials, energy and direct laboratories before and after the application of the use of green manufacturing represented by the gas recovery system and the sulfur recovery unit (Klaus technology), with an explanation of the reasons that led to the increase or decrease in costs. :

Table No. (14) Contributions of green manufacturing:

Production elements	Total costs before using the green value chain	Total costs after using the green value chain	difference (increase or decrease)
Raw materials	14691930196	268297640712	253605710616 +
Wages	223992000	395280000	171288000 +
Chemical raw materials	162530000	420480000	257750000 +
annihilations	113765000	172865000	59100000 +
Energy	1675651000	1316517960	359133040 _
Laboratories	116577000	38852333	77724667 _
Total	16984445196	270641636005	253657190809

Source: Prepared by the researchers based on the green manufacturing tables after applying the gas recovery system.

Through Table No. (14) it is clear that the amount of reduction for the manufacturing activity (436857707) dinars as a result of the decrease in laboratory costs and energy costs. The following table shows the analysis of the costs of environmental failure in Al Wasat Refineries Company / Dora Refinery. And through the following table, we will notice an analysis of the environmental costs of failure after applying the green value chain to the fat products in Dora refinery.

Table No. (15) analysis of environmental failure costs before and after the application of the green value chain:

N	Environmental failure cost Internal failure costs	Costs before application	Costs after application	Difference	Source
1	Research and development activity	637517306	538014206	99503100	p.18
2	design activity	1397174639	1340031171	57143468	p.23
3	laboratory costs	116577000	38852333	77724667	Table14
4	energy costs	1675651000	1316517960	359133040	Table14
Total internal failure costs		3826919945	3233415670	593504275	
External failure costs					
1	Fines and Compensation (3832)	58985791	17695737	41290054	Financial Department
Total		3885905736	3251111407	634794329	

Source: Prepared by the researcher based on the tables and pages referred to in the table.

In conclusion, the researchers believe that the application of the green value chain in Al-Wasat Refineries Company / Al-Dora Refinery contributes significantly to reducing environmental failure costs, whether internal or external, as it achieved a reduction amount of (634794329) dinars, achieving quality products, competitive advantage and significant financial savings that accrue to the company in profits. To develop its products and make them environmentally friendly and competitive with other products. Also, when providing advanced technology and replacing the old units in the refinery with modern and advanced technology units, it will increase the production capacity of the refinery and add modern and advanced specifications to its products, which makes the products with a competitive advantage as well as low cost and environmentally friendly.

Through the foregoing, we note that the activities of the green value chain will lead to cost reduction and thus reduce the costs of environmental failure if companies take into account environmental requirements

when designing their products, as well as when taking responsibility for the recycling and use of green products, and thus companies will maintain their market share and stay in The competition . This shows that there is an effect of green value chain activities on reducing internal and external failure costs if companies work to produce green products that are environmentally friendly.

THE THIRD TOPIC: CONCLUSIONS AND RECOMMENDATIONS

The researchers reached the following conclusions:

Conclusions:

1. The use of the green value chain by economic units in manufacturing and production processes leads to reducing environmental impacts and reducing waste treatment costs and contributes to reducing environmental failure costs.
2. The use of the green value chain leads to the development of environmentally friendly products at low cost.
3. The economic units that use the green value chain contribute to the production of products with a design that suits the environmental requirements and the desires of customers and has an optimal exploitation of natural resources.
4. The green value chain, through the use of advanced equipment, tools and technology, reduces the pollution resulting from its production processes.
5. The green value chain generates an understanding for the customer of the green product, which contributes to enhancing the image and reputation of economic units in the competitive market.
6. The green value chain contributes to the marketing of green, environmentally friendly products that meet the needs of customers and society.
7. The use of the green value chain in production processes contributes to providing after-sales services at a low cost to customers.
8. The green value chain contributes to extending the life cycle of the product at a low cost.
9. The green value chain helps reduce spoilage through good storage, prevent pollution and damage, and reduce the costs of environmental failure borne by economic units, whether they are fines, compensation or taxes.

Recommendations:

1. The economic units that seek to build a green value chain must enroll all their employees in training courses in the field of environment and get acquainted with the latest developments in this field.
2. Economic units must be provided and equipped with modern equipment that prevents or reduces pollution to a minimum, as well as achieving efficiency in production.
3. The necessity of using environmentally friendly raw materials by contracting with suppliers that take into account environmental requirements in order to reduce the costs of environmental failure and achieve financial savings.
4. Activating the incentives and rewards system in the company, as well as imposing penalties on units that do not comply with the legislation and laws issued by the Ministry of Environment and do not observe environmental standards.
5. Economic units must apply the green value chain in analyzing the activities of the product into main activities and supporting activities, and the companies taking into account the environmental requirements and the needs of customers.
6. Industrial companies must form a team of engineers, technicians and specialized cadres in financial and legal fields for the purpose of concluding contracts with international companies for the purpose of equipping them with modern environmentally friendly equipment and reducing the costs of environmental failure.
7. The company must purchase new and modern laboratory equipment for the purpose of analyzing the components of products to determine the elements and compounds that affect the environment and human health instead of the old equipment and taking into account the modern marketing specifications of the Organization of Petroleum Exporting Countries.

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REFERENCES

1. Al-Bakri, Thamer, and Al-Nouri, Ahmad Nizar, 2009, “Green Marketing”, first edition, Al-Yazuri House for Printing and Publishing, Amman, Jordan.

2. Al-Bakri, Thamer, 2012, "Green Marketing Strategies", 1st Edition, Al-Yazuri Publishing House, Amman, Jordan.
3. Sorour, Manal Jabbar, 2019 "(Strategic Cost Management), College of Administration and Economics, Al-Waziriyah, second edition, 2019, Baghdad, Iraq.
4. Al-Haddad, Haitham Raouf Ahmed, 2014, "Rationalizing the costs of research and development using value engineering technology: an applied study in the Oil Research and Development Center", a doctoral thesis submitted to the Council of the Higher Institute for Accounting and Financial Studies, University of Baghdad, Iraq.
5. Al-Tai, Nour Fadel Shahada, 2018, "The role of managing environmental costs by using green supply chain activities in achieving sustainable development: An applied research in a gas filling company / public company", a doctoral thesis submitted to the Council of the Higher Institute for Accounting and Financial Studies, University of Baghdad, Iraq .
6. Abu Ayyash, Lina Ziyad Mahmoud, 2017, "Applications of green marketing in the Palestinian industrial sector in the Hebron Governorate", a master's thesis submitted by the College of Graduate Studies / Hebron University, to obtain a master's degree in business administration.
7. Hassan, Ali Hamza, 2019, "Integration between Lean Production and Green Manufacturing and its Impact on Project Success: An Exploratory Study in the Oil Projects Company," a master's thesis in Operations Management Techniques, Administrative Technical College, Baghdad, Middle Technical University.
8. Abdul Qader, Mustafa Muhammad Ali, 2019 "Using the green value chain to reduce costs and improve product quality", a master's thesis submitted to the Accounting Department Council, College of Administration and Economics, University of Baghdad, Iraq.
9. Al-Mousawi, Ali Hadi Rasham, 2019, "A proposed model for building a green value chain according to sustainability criteria to achieve competitive advantages," a master's thesis submitted to the Board of the College of Administration and Economics, Wasit University, Iraq.
10. Al-Samarrai, Manal Jabbar Sorour, and Abdel-Qader, Mustafa Muhammad Ali, 2019, "Measuring the cost of the product according to the analysis of the green value chain to reduce costs", research published in the Tikrit Journal of Administrative and Economic Sciences / Volume (15) Issue (46) Part 1 / 2019 .
11. Awad, Hoda Tariq, 2020, "The effects of green manufacturing strategies on the competitive performance of the organization: a comparative analytical study in two industrial organizations", a master's thesis submitted to the Technical Administrative College Council, Baghdad, Iraq.
12. Abdel-Zaher, Nada Ashour. 2011. "Environmental Solid Waste and the Economy," A research published in the Assiut Journal of Environmental Studies, 91-102.
13. Khazal, Baseerah Khalaf, 2018, "The effect of distancing workers' attitudes in green organizational culture: an exploratory study of the opinions of a sample of workers in Al-Karunji Company in Kirkuk Governorate", research published in the Tikrit Journal of Administrative and Economic Sciences, Volume - 2 - Issue - 22 - C 1.
14. Salih, Nidaa Mahdi, and Hussein, Intisar Hadi, 2017, "The role of the green manufacturing strategy in reducing costs by using the value

stream map", research published in Al-Taqni magazine, Volume 30, No. 4, 2017.

15. Ibrahim, Muthanna Firas, 2017, "The effect of reverse supply strategies on green manufacturing strategies: a field study in a sample of food manufacturing companies in Kirkuk", research published in the Journal of Administration and Economics, issue - 112 - 2017.
16. Baleta, J., Mikulčić, H., Klemeš, J. J., Urbaniec, K., & Duić, N. (2019). " Integration of energy, water and environmental systems for a sustainable development. Journal of cleaner production", 215, 1424-1436.
17. Bangwal, D., & Tiwari, P. (2015), " Green HRM–A way to greening the environment ". IOSR Journal of Business and Management, 17(12), 45-53.
18. Bhowmik , Abhijeet & Dahekar , Rahul M. (2014), "Green technology for sustainable urban life" Recent Research in Science and Technology, 6(1).
19. Couto, João & Tiago, Teresa & Gil, Artur & Flávio Tiago & Faria, Sandra,(2016), "It's hard to be green: Reverse green value chain" J. Coutoetal., Environmental Research, vol 10 .
20. Cocca, S., & Ganz, W. (2015). "Requirements for developing green services." The Service Industries Journal, 35(4), 179-196.
21. Al-Razzaq, Asma Muhammad Abd, 2012, "The relationship of environmental costs with product life cycle costs and application in the General Company for the Battery Industry", research published in the Journal of the College of Administration and Economics, University of Baghdad, Journal of Economic and Administrative Sciences, Vol. 18-No. 68, December 2012.
22. Defra, 2011. "Guidance on Applying the Waste Hierarchy" www.defra.gov.uk.
23. De La Grandiere, M. D. (2019). " Optimizing Green Supply Chain Management Strategies" .
24. Daft, Richard L. (2010), "Management",9th ed., South-Western Cengage Learning, Natorp Boulevard Mason, USA.
25. Eneizan, B., Alshare, F., Salaymeh, M., Enaizan, O., & Abdul-Latif, M. Green ., April – 2020,"Marketing and Sustainability", Pages: 26-30 .
26. Fei, Rilong, Aixue Cui, and Keyu Qin. "Can technology R&D continuously improve green development level in the open economy? Empirical evidence from China's industrial sector", Environmental Science and Pollution Research 27, no. 27 (2020): 34052-34066.
27. Al-Ghwayeen, Wafaa Shihadeh, and Ayman Bahjat Abdallah. "Green supply chain management and export performance." Journal of Manufacturing Technology Management (2018).
28. Hong, Z., Wang, H., & Gong, Y. (2020). " Green product design considering functional-product reference ". International Journal of Production Economics, 210, 155-168.
29. Ong, J. W., Goh, G. G. G., Goh, C. Y., & Yong, H. S. S. (2019). "The green value chain construct: instrument validation and green practices among Malaysian corporations ". World Review of Entrepreneurship, Management and Sustainable Development, 15(4), 494-512 .
30. Pu, Yongfeng, Fangwu Ma, Lu Han, and Guowang Wang. "Material selection of green design processes for car body via considering environment property", Mathematical Problems in Engineering 2020 (2020).
31. Shabbir, M. S., Bait Ali Sulaiman, M. A., Hasan Al-Kumaim, N., Mahmood, A., & Abbas, M. (2020). "Green Marketing Approaches and Their Impact on Consumer

Behavior towards the Environment—A Study from the UAE. Sustainability “, 12(21), 8977.

32. Mostafa, A. (2019). “The Impact of Enviropreneurial Orientation on Small Firms’ Business Performance: The Mediation of Green Marketing Mix and Eco-Labeling Strategies. Sustainability”, 12(1), 1-17, 2019 .
33. Tiong, Y. Y., Sondoh Jr, S. L., Tanakinjal, G. H., & Iggau, O. A. (2021). “Cleaner operations in hotels: Recommendation for post-pandemic green recovery”, Journal of cleaner production, 283, 124621.
34. Zhuo, C. and Levendis, Y. A. 2014. "Upcycling Waste Plastics Into Carbon Nanomaterials: A Review", Journal Of Applied Polymer Science 131(4):1-14.
35. Kung ,Fan-Hua & Huang, Cheng-Li, (2012), Assessing the green value chain to improve environmental performance, International Journal of Development Issues Vol. 11 No. 2.
36. KRAJINA A(2018) "CONTEMPORARY GREEN MARKETING STRATEGIES" Master Thesis Introduction to MASARYK UNIVERSITY Administration Faculty of Economics.