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The role of green value chain technology in achieving environmental sustainability

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Abstract : The research aims mainly at scientific consolidation by explaining the role of green value chain technology in achieving environmental sustainability in economic units, especially industrial ones, by identifying green value chain technology as well as identifying environmental sustainability and the requirements for achieving it. To achieve the research goal, the researcher used... a deductive approach in explaining the importance of the green value chain and its impact on achieving environmental sustainability in economic units. The researcher reached several conclusions, the most important of which is that the concept of the green value chain is one of the most important modern concepts for economic units because it seeks to preserve the environment by creating environmental value for customers, and that the application of the green value chain is considered a cornerstone in reducing pollutants and harmful environmental effects.

Keywords: green value chain technology , environmental sustainability

Introduction: With the increase in technological progress, and the increase in products and options of the communications revolution, the challenges facing economic units have increased, and among these challenges is the necessity of keeping up with the changes and adopting them as much as possible, and the increased intensity of competition between national companies and international companies as well, due to the speed of import and export, trade liberalization laws, etc. There are. Another set of challenges imposed by laws and civil society organizations is compliance with environmental requirements due to the increase in religious pollution, carbon dioxide problems, and others. Therefore, it has become necessary for economic units, especially industrial ones, to adopt the green value chain, study activities and get rid of non-value-added activities, to achieve environmental sustainability and improve the quality of their products in a way that fulfils customers' desires. The research derives its importance from several axes, the first of which is the importance of everything related to green ideas And for everything related to preserving the environment, which has become a global requirement, the other axis is the importance of any research that comes back in part - "environmental sustainability" because the specialists' view of it revolves around the necessity of achieving it, and that achieving it is a manifestation of the success of management, The importance of research can be viewed from the perspective of the importance of deepening the environmental commitment of industrial units towards the external environment surrounding them through Application of green value chain technology The research includes three sections. The first section was devoted to the research methodology and previous studies, and the second section was devoted to explaining the cognitive foundations of green value chain technology, as well as the cognitive foundations of environmental sustainability and explaining the role of green value chain technology in achieving environmental sustainability. The third section included the conclusions and recommendations for this research.

Methodology

1-Research problem

In light of the growing environmental awareness in general, and the spread of ideas and green production practices, this was the reason for the increase in the environmental responsibility of the economic unit and required it to monitor and reduce its environmental impacts, as the researcher noted the lack of interest in the environmental aspect on the part of the economic units, so the problem of the current research can be expressed through questions. The following:

1. Is it possible to apply green value chain technology in industrial economic units?
2. Do economic units realize the importance of applying green value chain technology in achieving environmental sustainability?
3. Does the application of the green value chain actually lead to achieving environmental sustainability?

2-Research objective

The main objective of the research is a scientific and pure attempt to improve the performance of Iraqi industrial units towards adopting the green product and improving environmental performance, and several sub-objectives emerge from this It can be expressed as follows:

a. Explaining the role of green value chain technology in achieving environmental sustainability in industrial units.

b. Explaining the importance of environmental sustainability for industrial units

3- Research Importance

The research derives its importance from several axes, the first of which is the importance of everything related to green ideas and everything related to preserving the environment, which has become a global requirement. The other axis is the importance of any research that delves into the " environmental sustainability" part. Because the specialists' view of it revolves around the necessity of achieving it, and that achieving it is a manifestation of the management's success. The importance of the research can be viewed from the perspective of the importance of deepening the environmental commitment of industrial units towards the surrounding external environment through the application of green value chain technology.

4- Research hypothesis

:The research is based on one hypothesis, which is as follows

There is a role for green value chain technology in achieving environmental sustainability in industrial economic units.

Literature Review

1 - Al-Zamili's study (2022) (The role of gree value chain technologies and the green product life cycle in reducing the costs of environmental failure and improving environmental performance) This research aims to demonstrate the role of green value chain technology and green product life cycle technology in reducing the costs of environmental failure and improving the inter-performance of Iraqi industrial units. The Diwaniyah Tire Factory was the research sample, as the tremendous progress in the business environment and the lifting of trade restrictions led to the intensification of global competition in The industrial environment, in addition to the goal of preserving the environment and reducing pollution, all of this led to the need for units to take care of their value chain and develop it until it becomes a green value chain. The research reached a set of conclusions, the most important of which is that there is a positive role for green value chain technology and cycle technology. Green product life reduces failure costs and environmental costs.

2- Al-Zalzali study (2023) (The effect of green target costing and the green value chain in reducing the costs of environmental failure in Iraqi economic units) The research aims to clarify the cognitive foundations of green target costing and the green value chain and work to reduce the costs of environmental failure by applying the steps of green target costing and green value chain activities during manufacturing processes and demonstrating the impact of each of these techniques in reducing the costs of environmental failure and reducing compensation and fines borne by units. Economic decline as a result of the pollutants emitted that accompany its production processes. This study was applied in the Central Refineries Company / Al-Dora Refinery and the selection of ready-made fat products by relying on the data of the economic unit of the research sample, as well as personal interviews and field visits. Based on the study, a set of conclusions were reached, the most important of which is that the green target cost and the green value chain contribute clearly. In reducing the costs of environmental failure by applying its steps and activities to products and contributing to the optimal exploitation of energy resources, improving the environmental performance of Iraqi economic units, producing low-cost and environmentally friendly products, and improving the reputation of the economic unit.

3- Judit Oláh et al (2020) (impact of industry on Environmental sustainability) This paper discusses the environmental sustainability impacts and challenges facing the industry. Four scenarios are discussed: deployment scenario, operation scenario, integration and compliance with the SDGs. And the long-term scenario. The results indicate a negative relationship related to the flow of the production process from inputs to the final product, including raw materials, energy and information requirements, waste disposal, and their impact on the environment. However, the integration of industry and SDGs enhances environmental sustainability to create inter-support that ensures high environmental performance with a more positive impact than before. This paper will help stakeholders and companies provide solutions to current environmental challenges that can be mediated through the adoption of new technologies. The novelty of this study is its depiction of the industry and its technologies integrated with the Sustainable Development Goals to create a sustainable industry that combines environmental protection and sustainability.

4- Amr Muhammad Nasser Alganad et al (2020) (Consumer green behaviour: An approach towards environmental sustainability) The current study aims to choose a model that can help change consumer behavior to environmentally friendly consumer behavior. A significant trend has been observed towards recognition of the strategic importance of protecting the environment through law enforcement. This type of effort is in favor of reducing the consumption of plastic bags, and the need has increased for taking practical and rapid measures to reduce the amount of plastic waste, especially nylon bags. However, plastic bags are still the most common and used by many individuals who prefer them over others to place their various needs, possessions and purchases, or to store their food

and drink due to its ease. Data was collected from shoppers in Jaya Directorate (Malaysia) and Bangkok (Thailand). The results found that knowledge and behavior have a significant and positive impact on green consumer behaviour. The study also found that banning plastic bags also has a significant and positive impact on green consumer behaviour. This significant impact shows the need for such government interventions to mitigate environmentally unfriendly behavior of consumers .

Green Value Chain Technology

1. The emergence of the green value chain

In the fifties of the last century, a new concept called the value chain concept appeared at the hands of the American merchant (Mills), through which he aimed to add value to the economic unit. This occurs by dividing it into main activities that add value and activities that do not add value. This concept was then developed by Porter, who divided activities into main activities that contribute to manufacturing the product and activities that are considered supportive of the production process. **(Al-Zamili, 2022: 23**) In the year 1960 AD, this technology emerged with the concept of "Filliere," which means threats issued by the French organization (national de la recerche agrounomique institute) specialized in agricultural research, and this concept was applied in developing countries, as this technology focuses on agricultural activities, starting with plowing. The land and up to the storage and marketing stage **(Al-Saadawi (2021)**) Then it was developed into a new concept called (the green value chain) which aims to manufacture green, environmentally friendly products by directing the activities of the economic unit towards paying attention to environmental issues and requirements and achieving a competitive advantage. During the period extending from (2000-2017), several concepts emerged, including the so-called triangle of the global economy, which It focuses on adding value to the trio (oil, gold, and the dollar) through studying and analyzing the green value chain. The information value chain was developed to add value to the accounting information available in the financial statements, which is considered an important product for its beneficiaries. (**Sorour 2021: 175**). After that, technology continued to develop until the concept of the environmental value chain emerged, which focuses on making the value chain activities environmentally friendly. This is done with the help of the economic unit to reduce pollutants emitted from all major and prevailing activities. It was also developed to show us a new concept or new chain, which is the green global value chain, which is concerned with With natural resources (water, oil, gas) and others with the aim of protecting the environment, until it reached the reverse green value chain and then the concept of the sustainable value chain by achieving sustainable development and contributing to providing the green product. (**Hussein 2022 23) .**

2 Definitions of green value chain

The concept of the green value chain is one of the modern concepts that has gained the attention of researchers because of their interest in the environmental controls that accompany the activities of the economic unit. Below are several definitions given:

Table (1)Green value chain definitions

Source	the definition
(Al-Zamili 2022: 34)	It is a group of interconnected activities practiced by the economic unit and appear in the form of valuable outputs, with a focus on the environmental aspect when implementing it to achieve an advantage for the products of this unit, and it is difficult to imitate as a result of the economic unit following sound rules in ...this field.
Muhammad 2022:51	It is an integrated set of activities that essentially support the process of producing green goods and services that are compatible with environmental sustainability requirements at all stages of production, by reducing emissions of toxic materials and gases, reducing the volume of waste, as well as the recycling .process.
(- Al-Zalzali 63:2023)	It is a series of activities that begin with the supply chain, "green supply sources," and green research and development, and end with the recycling activity.
Abdel Qader 2019 (55)	A group of activities necessary to manufacture green products, while paying attention to environmental requirements in all activities to reduce costs and reduce the volume of emissions and waste, as well as recycling or disposing of products in order to achieve a sustainable competitive advantage. .

From the above, the green value chain can be defined as a series of operations and activities that ...Aiming to achieve environmental sustainability, this series includes all stages of production from raw materials through manufacturing, distribution, use and recycling in a manner that takes into account environmental requirements. The green value chain aims to improve efficiency, reduce harmful emissions, and limit negative impacts to achieve environmental sustainability. .

3- The importance of the green value chain .

It is of great importance, To build the economic unit for green value chain technology, especially its industrial units Achieving :and we can summarize it as follows**: (Tan & Zailani, 2009: 239)**
competitive advantage through the economic unit's commitment to environmental legislation and laws that meet the needs and desires of customers represented by safe and healthy green products while reducing pollution rates
Preserving natural resources and ensuring optimal energy consumption by reducing the raw materials used in the .production process that are recyclable
a) -Contracting with suppliers committed to environmental controls to improve product quality and achieve efficiency through the use of green technologies
b) It contributes to improving the reputation of the economic unit as a result of its commitment to environmental requirements and its contribution to reducing environmental damage rates and producing green products
c) .5-Reducing the percentage of waste through the production of recyclable products and final disposal .

4- objectives and advantages of the green value chain

It is assumed that any technology used by the economic unit must have its own advantages, and that there must be goals that it must strive to achieve. From this standpoint, the green value chain It has several advantages and goals that it achieves, which are as follows**: (Al-Zalzali 2023: 63)**
-Objectives
a) To contribute to reducing resource and energy consumption and reducing waste and pollution.
b) Strengthening the efforts of the economic unit to produce green products
c) Preserving the health requirements of workers in the economic unit by converting them into environmentally friendly activities.
d) Contribute to re-engineering processes to reduce waste and recycle both waste and used products or dispose of them in health-safe ways .

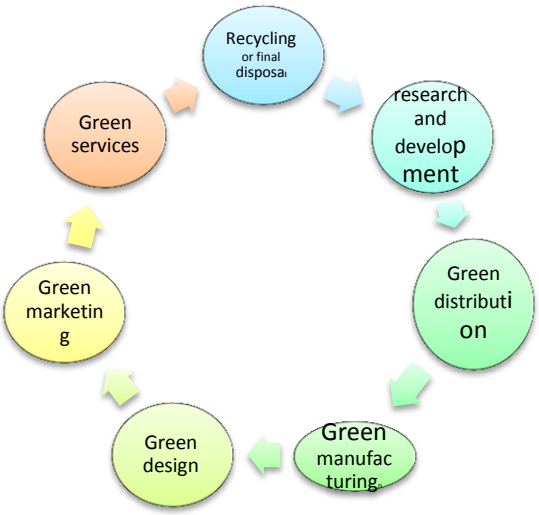
Advantages

a) Improving the reputation of the economic unit through its contribution to reducing pollution rates and industry-harmless green products.
b) Improving the quality of produced goods by contracting with suppliers with a good reputation and commitment Environmental controls as well as improving the quality and efficiency of production processes. Reducing costs by reducing waste and fumes and thus reducing taxes.
c) It focuses on reducing the amount of raw materials used in the design process to preserve natural resources and energy. We are keen to design recyclable products to contribute to reducing waste.

5- Green value chain activities

The green value chain consists of a group of activities that begin with green research and development and end with green recycling activity, and will be illustrated in the following figure:

Figure (1)
Green value chain activities



Source: Prepared by the researcher

1- Green Research and Development

Research and development activity is considered the main starting point for technological innovation, especially in economic units of large size in terms of solid material and human capabilities. The UNESCO Institute for Statistics has defined it as: "It is creative work that is practiced on systematic foundations to increase the stock of knowledge, including knowledge related to humanity, culture, and society, and this stock is used." To innovate new applications" **(Al-Zalzali, 2023: 65)**. As for green research and development, it(It is considered the center of innovative activity in economic units that focuses on the green quality of products through the introduction of technology that works to make environmental impacts at the lowest level and increases the activities of the economic unit. **(Fei, et al,2020: 7**) and it is defined as "a set of foundations, principles and tests that help the unit's engineers design green, environmentally friendly products, represented by testing and developing the product throughout its life" **(Al-Zamili, 2022: 36)**. Green research and development activity aims to

innovate green products and find the necessary technologies to reduce toxic substances and fumes. These are called clean or green technologies**. (Lee & Min 2: 2018**) Green research and development activity is considered an important step that contributed to the economy's transition to a green economy with low emissions and optimal use of natural resources. (Previous source) By reviewing the above, we can know the activity of green research and development activity as "a group of integrated activities that work to provide a great deal of importance to enhancing and developing the skills of workers in the unit and improving their expertise to help them innovate new methods for reducing waste. It also... It gives employees an opportunity to participate in solving environmental problems and encourages them to invent new ideas to protect the environment."

2- Green Design

Green design is one of the basic activities of the green value chain, as it seeks to reduce the environmental impact of the product during its life cycle. Thinking about the green direction in design can distinguish the environmental image of the product and the economic unit. The goal of green design is to provide and develop current products in safe and environmentally friendly ways. . **(Al-Zamili, 2022:40**). Green design is defined as "the process of designing goods that help reduce the consumption of natural resources and energy and facilitate the recycling process while avoiding the use of products that are harmful to the environment" **(Dela Grandil, 2019:15) .**The importance of green design lies in the following **:(Pazok & Samarghandi 2020:30)**

a- It helps the economic unit in the process of product development and recycling.

b- Prevents or reduces the use of toxic materials so that the products are safer during production And use.

3- Green Manufacturing

Green manufacturing is one of the modern and contemporary activities of the green value chain technology for managing production and operations because it reduces industrial waste by adopting modern methods and methods in manufacturing products that do not harm humans and the environment, as well as improving safety, as it is considered one of the best systems that increase manufacturing efficiency. In the economic unit**. (Al-Zalzali 2023: 70)** It is defined as "the process of making green products in a way that focuses on adherence to environmental requirements by using modern technologies and environmentally friendly raw materials, as well as workers directed to preserving the environment to achieve a competitive advantage during production processes" **(Abdel Qader, 2019: 42**). The researcher believes that green manufacturing is a process during which the raw materials entered into the production process are converted into green goods and services that are harmful Low and safe for the environment and society.

4-Green Marketing

Green marketing means that it is a group of activities that facilitate any type of exchange that aims to meet the needs and desires of customers without causing any harm to the environment**,(Hussein 2022 41)**. It also focuses on a true commitment to environmental sustainability and includes indispensable principles such as implementing environmentally friendly initiatives and waste management, as well as transparency towards green practices. Practicing green marketing activity is not only about meeting the needs of customers, but rather creating new marketing techniques aimed at achieving maximum social benefits. With low commercial interest, green marketing is considered "the careful integration of social expectations **(Naznin et al, 2023143)**" and environmental concerns and the economic inclinations of a company.

5- Green Services

Green services are defined as "all activities that exist to enable customers to achieve the greatest benefit from the product or service while preserving the environment and reducing waste" **(Al-Zalzali 2023, 78**). We can know it through the above: "It is one of the activities carried out by the economic unit to ensure the safe and healthy use of products and to show a customer how serious it is in adopting green practices and gaining a competitive advantage by preserving resources and gaining customers' trust".

6-Green distribution

Green distribution is defined as one of the green value chain activities that works to add... Value of green products through the use of energy and reducing pollution rates through activities related to transporting final products by

means of transport with low environmental damage. Choosing safe and healthy outlets to distribute products. **(Sorour: 2023**) .

7- Recycling

The process of recycling or final disposal is the last stage, as it takes place either by final disposal of the product through a landfill in remote areas or by remanufacturing it and returning it to service. It is considered the only way to move forward if we want to reduce environmental damage and reduce global warming. Therefore, the benefits of the **(Al-Khalayla ،2022:786)**recycling process can be summarized as follows :

.**a- Economic sustainability**: means the continuation of manufacturing operations and financial profits

.**b- Environmental sustainability**: means reducing toxic emissions to our environment

c- Social sustainability: Providing job opportunities, as additional numbers of workers require recycling, thus .opening new doors of livelihood for young people

.**e-Preserving natural resources**: The recycling process contributes to providing raw materials for various industries

From the above, we can say that "the most important activity of the green value chain is recycling activity, in which ".the end of the chain is linked to its beginning by converting waste into raw materials that are used as inputs again

6- Factors affecting the success of the green value chain

There are several factors that play a major role in the success of the green value chain, which are as follows: **(Abdul Al-Qadir,2019: 53)**

a- **Green Organizational Culture:** The culture of the economic unit is one of the most important determinants in implementing the environmental strategy, as the organizational culture depends on the history of the economic unit, the areas in which it operates, its main headquarters, and its branches. The unit's senior management should be keen to instill green cultures and applications among employees

b- Green Management (Green Management is part of the operations carried out by the administration to achieve environmental sustainability through continuous research and development. .

c- Green Human Resources: This concept aims to increase employees' awareness of green initiatives and their commitment to environmental issues.

d-The green customer: means a person who is concerned about environmental changes and who wants to buy green products that do not cause environmental damage.

e-Green supply chain: means integration between sustainability and the traditional supply chain through selecting the quality of materials, delivering the product to the customer, and recycling it afterward the use .

Environmental sustainability

Linguistically, sustainability: The verb "sustain" has a root (dum) which means perseverance and continuation of something, i.e. a request to continue doing and maintaining it .

The term "sustainable" goes back to the science of ecology, where sustainability was used to express the formation and development of dynamic systems that are exposed to changes in structure that lead to changes in their characteristics, elements, and relationships with each other. **(Qashti2023 :3**). As for the development concept, the term sustainability refers to expressing the nature of the relationship between economics and ecology, as the two are considered to be of the same "Greek" origin, as each of them begins with "Eco," which in Arabic means a house or house. The term Ecology means the study of components House and the term Economy means studying the management of the components, House **(Fatiha ,2015:153**).

The term sustainability received great attention after the Brundtland Commission report issued in 1987, which formulated the first definition of sustainability and defined it as "development that is keen on meeting current needs, without compromising the capabilities of future generations and meeting their needs." This definition defined the general framework of sustainability that is keen on and demands Equality between generations in terms of meeting their needs. **(Sadiq, 2015 (92)**. Sustainability was and still is the world's most important issue. It is the issue for which all societies compete, as they seek to develop plans and ideas to advance the environmental, economic and social reality, in order to raise the standard of living for individuals and societies through the emergence and growth of capabilities, trends and strategies. Which is used to direct the efforts of the people with the public authority, and from the end of the sixties until the mid-seventies of the twentieth century, thinking about increasing economic growth became one of the important matters that development took, as well as equitable distribution to all groups of society, Distribution. This is achieved by .by working to reduce the percentage of the poor, unemployment and poor health applying basic needs strategies, and participating in developing, implementing and following up development plans. **((**Abu **Sakin et al., 2021 :216).**

The essence of the concept of sustainability is derived from the three-dimensional concept, which includes a balance between the three pillars (economic sustainability, which is concerned with preserving the natural, social, and human capital necessary for living, and social sustainability, which aims to guarantee human rights and equality, preserve cultural identity, and respect cultural and ethnic diversity. religion, and environmental sustainability, which focuses on

maintaining the quality of the environment necessary for the practice of economic activities and the quality of human life(, **Purvis et al ,2018: 8**) In 1987 AD, the World Commission on Environment and Development issued a report entitled "Our Common Future." Sustainable development was presented as a model that takes into account the conditions of economic development while taking into account the environmental aspect at the same time, meaning that This meeting showed sustainable development in terms that take into account and care about environmental balance. In 1989, the Basel Convention was issued, which specializes in controlling, reducing and disposing of hazardous waste, and 150 countries ratified it. In 1992, the so-called "Earth Summit" was held in Rio de Janeiro in Brazil, where It resulted in Agenda 21, which was ratified by 182 countries. It is considered a detailed plan to achieve the sustainable future of the planet. The Kyoto Protocol was adopted in 1997, which aims primarily to reduce greenhouse gas emissions. In 2002, the World Summit for Development was held. Sustainable Development in Johannesburg, South Africa, which stressed the need to change patterns of production and consumption and preserve biodiversity The Kyoto Protocol entered into force in 2005 to address the problem of global warming **(zawaw etal ,2018: 3) .**

The International Conference on Confronting Climate Change was held in Indonesia during the period extending from (3-14) December 2007 AD. The discussions of this conference centered on many serious environmental issues, the most important of which was the significant rise in temperatures due to global warming. Three years later, the climate summit was held in the city of Copenhagen in 2010 AD due to the continuing environmental deterioration, as the participating members identified broad lines of action to combat climate change and address global warming. **(Hajam and Tari, 2020: 129**). In 2016 AD, the sustainable development goals became temporal and measurable with the establishment of the 2016 (2030) agenda with global goals, local agendas, and 169 goals related to people, planet, peace, partnership, and biodiversity, where biodiversity is defined as a variety of life forms within Ecosystems that provide the resources necessary for living, such as water, clean air, food **(Scopelliti et al, 2018**), energy, and in general all ecosystem services.

As a result of the increase in population and consumption of natural resources, sustainable development is considered a model of development that seeks to achieve a balance between economic growth, quality of life, and environmental preservation in the long and medium term without increasing the consumption of natural resources beyond the capacity of the Earth, until attention is shifted from consumption development to development. Sustainable development and recognition of new courses of action as a result of worsening problems such as the depletion of natural resources, damage to the natural environment, as well as recurring economic and financial crises, and increased consumption **(duran,2015:812).**

As for environmental sustainability: it means maintaining important environmental functions that refer to environmental services, as well as eliminating harmful waste and emissions, and supplying natural resources (**Liu et al 2019:3**). The environmental dimension is concerned with establishing an estimate of the environmental impacts in all basic development projects in society and reducing waste by reusing it, which leads to a reduction in spoilage rates and increases the contribution of returned resources to production and use. It is also concerned with increasing environmental awareness, which ensures the local participation of all in preserving the environment and not causing harm. With it. **(Al-Barqi 2023: 574).**

the environmental dimension is based on the principle of flexibility or its ability to maintain its ecological integrity and its ability to adapt. If these systems lose their flexibility, they become more It is vulnerable to other threats, so environmental limits should be taken into account, as each system has its own specific limits that cannot be exceeded in terms of consumption or depletion, but if they are exceeded, it leads to the deterioration of that system, and on this basis limits have been set against consumption, population growth, environmental pollution, and depletion. Water, forests and soil. **(Winkler, 2006:14**) Some elements must be present for the success of environmental sustainability, and these elements are: **(Sarhan, 2022: 29)**

a- Good environmental management of development projects to preserve the environment.

b- Conducting a continuous environmental assessment of development projects

c- Establishing a law on environmental requirements that will be a deterrent and working to establish special environmental units.

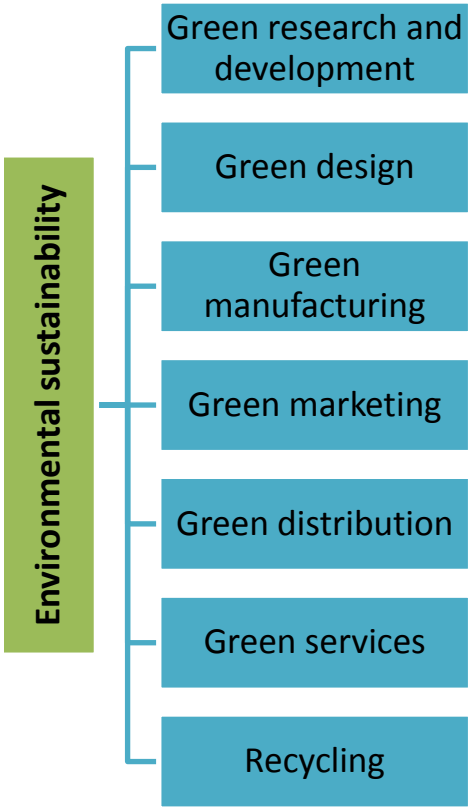
Technological improvement is also considered one of the most important factors that help achieve environmental sustainability through the use of green technologies to reduce gas emissions and intensive use.. for resources and more.

The impact of green value chain technology in achieving environmental sustainable development

The green value chain aims to contribute to the manufacture and design of environmentally safe products, which are called "green products," meaning environmentally friendly products that are manufactured from natural ingredients with little impact on the environment. "The safety feature has become one of the most important requirements for

customer satisfaction, and fulfilling their requirements, especially those who are distinguished by Unlike others, they take into account the environmental requirements and health conditions of the product before making the purchase, as the economic units bear the costs of the sustainability and quality of the product required by customers, as the green value chain seeks to achieve environmental sustainability by seeking to reduce levels of pollution and waste and manufacturing environmentally friendly products that reduce Risks to humans and living organisms.

The role of the green value chain in achieving environmental sustainability will be clarified through its multiple activities, as shown in the following figure: -



Source - prepared by the researcher

1-Green research and development : is one of the activities of the green value chain that aims to propose solutions and technologies necessary to reduce emissions and toxic gases, reduce negative environmental impacts, and improve the value of the economic unit (**Lee & Min ,2015: 7**). Green research and development also contributes to improving business Other activities of the green value chain by promoting sustainability Environment and green product development **(Ganda, 2017:1),** and highlights its role in achieving sustainability Environmental through searching for clean technologies and environmentally friendly machines and equipment that lead to the disposal of waste and reduce the cost of primary resources due to the ability of these technologies to achieve efficiency between inputs and outputs **(Abdel Qader, 2019 :65**). Through the above, the researcher believes that the research Green development contributes to achieving environmental sustainability through the development of clean and sustainable energy sources, which contributes to reducing emissions and global warming, and preserving biodiversity (the diversity of different living organisms on Earth).

2- Green design : Green design analyzes the life cycle of the product to determine the environmental impact at each stage of the life cycle for the purposes of selecting green raw materials, green processes, packaging and transportation, and ends with the disposal of waste **(Kung & Huang, 2016: 114)**. Green design reduces The negative environmental impact is through adherence to government legislation and laws related to environmental sustainability, as it works to replace hazardous materials with environmentally friendly green materials and reduce the consumption of electrical energy and fuel during manufacturing processes and during the use of the product by customers **(Abdel Qader, 2019 : 66**). The researcher believes that the design Green contributes to achieving environmental sustainability because it reduces the negative impact on the environment, that is, it contributes to the production of green products that have

little impact on the environment, meaning adding value to the product, and thus contributes to stimulating green industries, which creates new job opportunities.

3-Green Manufacturing: The most prominent goal of green manufacturing is manifested in achieving optimal use of resources through the following: (Awad, 2019 (290)

- Using small amounts of materials and energy, meaning using alternative inputs.
- Industrial coexistence by converting outputs into inputs (recycling).
- . Providing clean energy sources through the use of modern technologies.
- Converting waste and pollutants into by-products, and promoting their use and recycling Rotate it.

Based on the above, the researcher believes that green manufacturing activity contributes to achieving environmental sustainability by reducing harmful emissions and environmentally polluting gases, using resources more efficiently by using renewable materials and recycling to reduce consumption of non-renewable resources, and supporting alternative and sustainable technology in manufacturing processes such as Using solar and wind energy as alternative sources of energy generation, and encourages community participation such as rehabilitation courses and other community activities.

4-Green Marketing: Green marketing seeks to encourage and push institutions to offer a variety of green products by ensuring that the materials contained in these products have a low impact on the environment (Al-Hosary et al., 2022: 654).

Based on the above, green marketing contributes to achieving sustainable development by promoting environmental, social and economic practices and behaviours, as it works to enhance environmental awareness through sustainable advertising campaigns, encourage sustainable purchasing decisions, and push individuals and companies to invest in sustainable development according to this point of view. The researcher.

5- Green Distribution: Environmental requirements must be taken into account in places designated for selling products, as well as reducing noise levels, improving employee behavior in dealing with customers, and moving to alternative energy sources in transporting products. This leads to improving the image of the economic unit and enhancing environmental sustainability in it (2013). :645, Abzari, et al.)

Based on what was stated above, the researcher believes that green distribution aims to achieve development while respecting the environment and preserving natural resources by distributing resources and wealth in a fair manner. And sustainable.

6- Green Services : Green services seek to increase customer satisfaction by providing after-sales services that take into account environmental requirements, and achieve a sustainable competitive advantagefor the economic unit. (**Cocca & Ganz, 2015:194)**

The researcher believes that the use of green services means services that aim to preserve the environment and enhance sustainability, and include waste management, sustainable design, green transportation, environmental education, and environmental rehabilitation) that achieves environmental sustainability by contributing to the preservation of natural resources, such as preventing desertification and soil degradation, and also contributes to Improving community health, for example, using bicycles for transportation leads to reducing emissions, sulfur gases, and other pollutants.

7-Recycling & Reuse Recycling : activity contributes to preserving natural resources such as mineral resources and wood, and also contributes to reducing greenhouse gas emissions (those gases that can absorb and emit infrared rays) that cause global warming and change Climate, as it reduces landfilling and burning operations and reduces the land used for this matter, which leads to achieving a socio-economic balance in obtaining green products **(Abdel Qader, 2019: 67**), and the researcher believes that recycling contributes to reducing waste and reducing environmental impacts. Referring to the research problem, does the use of green value chain analysis help the management of the economic unit achieve environmental sustainability? The problem was solved and we reached a conclusion, which is that the use of green value chain technology leads to achieving environmental sustainability by reducing environmental damage rates through green value chain activities. Accordingly, the research hypothesis was proven, which states that there is a role for green value chain technology in achieving environmental sustainability. In economic units.

Conclusions and recommendations

Conclusions

1. The concept of the green value chain is one of the most important modern concepts for unit Economics because it seeks to preserve the environment by creating environmental value for customers.

2-The application of the green value chain is considered the cornerstone of reducing pollutants and harmful environmental impacts.

3-The value chain concept helps economic units achieve a competitive advantage that enhances their market position.

4. Environmental sustainability is extremely important given the daily consumption of energy, food and artificial resources, and the exacerbation of environmental problems represented by the increase in the proportion of pollutants and waste Harmful.

Recommendations

1-The importance of economic units adopting the concept of the green value chain clearly within
Main strategic plans to protect the environment and satisfy customers' needs.

2- Support recycling activities, monitor the required budgets, adopt modern technology, and improve the level of employees through continuous training and development and spreading a culture of recycling.

3- The researcher recommends paying attention to green research and development as it is the key to the success of the factory and informing workers about green value chain technology because of the environmental protection this technology achieves to achieve a comprehensive contribution to environmental sustainability through the use of modern technologies in production.

4-The researcher recommends the necessity of moving towards modern green technologies that contribute to reducing environmental impacts due to the global trend in caring for the environment due to the increase in environmental pollution and the decrease in natural resources, especially rare resources.

the reviewer

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