Journal of Total Science
Volume (9), Issue (33), (Des. 2024)
ISSN: 2518-5799

مـجلـة الـعـلـوم الشـامـلـة
المجلد (9)، العدد (33)، ([ديسمبر 2024)
ردمد: 2518-5799

Environmental sustainability and the role of green technology in achieving it

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الملخص

من أحد أبرز التحديات التي تواجه عالمنا هو تحقيق الإستدامة البيئية، حيث اصبح من اوليات المنظمات الدولية ودول العالم ككل هو الوصول إلى نظام بيئي صحي مستدام للحياة ويدعم الأرض، وذلك من خلال تحقيق الإستدامة البيئية لحماية الموارد الطبيعية ولتلبية احتياجات الاجيال القادمة. رغما عن التحديات التي يواجهها العالم والتي تعوق تحقيقه. ، ومن هذا المنطلق جاءت هذه الدراسة للتعريف بالتكنولوجيا الخضراء وأهميتها في تحقيق الاستدامة البيئية والتطبيقات المستخدمة والتي بدورها تسعى إلى تقليل التأثير السلبي للأنشطة البشرية على البيئة، من خلال ابتكار تكنولوجيا صديقة للبيئة تساعد على الحد من انبعاثات غازات الدفيئة، وحماية البيئة وتحقيق استدامتها، وتعزيز النمو الاقتصادي للبلاد بطريقة مستدامة.

الكلمات المفتاحية: التكنولوجيا الخضراء، التنمية المستدامة، التنمية البيئية المستدامة.

Abstract

Achieving environmental sustainability is one of the most prominent challenges facing the world. Achieving a healthy global ecosystem that supports the Earth and is sustainable

for life has become a priority for countries around the world and international organizations that seek to achieve environmental sustainability for the safe consumption of natural resources and their protection to meet the needs of the current and future generations. Despite the efforts made to achieve environmental sustainability, the world faces many challenges that hinder its achievement. From this standpoint, this study came to define green technology and its importance in achieving environmental sustainability and the applications used, which in turn seek to reduce the negative impact of human activities on the environment, by innovating environmentally friendly technologies that help reduce greenhouse gas emissions, protect the environment and achieve its sustainability, and enhance the country's economic growth in a sustainable manner.

Keywords: Green technology, sustainable development, sustainable environmental development.

Study objectives

This study aims to clarify the following:

1. What is meant by green technology?
2. How important is it in preserving environmental resources and mitigating the effects of environmental degradation?

3. Identifying the mechanisms of green technology in achieving international environmental protection.
4. Coming up with a set of recommendations and proposals that contribute to spreading the concept of green technology and protecting the environment.

The Problem of The Study

The problem of the study lies in answering the following question: To what extent do green technologies contribute to achieving environmental sustainability?

The Importance of The Study

The importance of the study lies in the importance of the subject in that it is one of the modern studies that examine:

1. The development of green technologies and their applications.
2. Enhancing the uses of green technology, and what this can achieve in terms of transformation in confronting climate change and its various effects.

Introduction

Today, the world is living in the age of technology, which has helped increase the welfare of people and saved more time and effort. Technology has affected societies and thus helped advance many economies. Over time, there is no

place in the world that technology has not invaded, and we can no longer imagine our lives without it; as it has come to affect all aspects of human life and plays a prominent role in various fields such as research and development, health, education, and entertainment, in addition to changing working conditions, developing production, business, infrastructure, and encouraging innovation. Technology also greatly affects the ability of humans and animals to adapt to and control their natural environments. With the increase in the consumption of these technologies, their manufacturing has increased, which has led to an increase in the waste resulting from them; as the increase in consumption has contributed to the rise in the heat emitted from them, which has contributed to an increase in the emission of harmful gases such as carbon dioxide, which has led to an imbalance in the ecosystem. Therefore, it has become necessary to find clean and environmentally friendly technologies to work on mitigating the negative effects on the environment in order to achieve environmental sustainability and preserve natural resources. [1]

As countries strive to achieve environmental sustainability, the world faces a number of challenges, such as: limited natural resources, environmental imbalance, and pollution

problems. Therefore, it is necessary to search for innovative solutions that are less harmful to the environment, and here the importance of green technologies appears; as it is the only innovation that does not negatively affect living organisms and is the basis of the fourth industrial revolution that uses artificial intelligence, robots, and green digital vehicles. Since fossil fuels are expected to be depleted by 2050, which represents a major threat to humanity, the goal of green technologies is to reduce fossil fuel consumption. [27] The paper then seeks to answer a major question: To what extent can green technologies contribute to achieving environmental sustainability? In order to answer this question, the study used the qualitative analysis approach, by reviewing the green technologies applied in the world and their role in achieving environmental sustainability.

Previous Studies

- Study (Yebo, 2022)[6]: entitled "The role of social responsibility in supporting green institutions in Algeria", this study aimed to highlight the role of social responsibility in supporting green institutions, and the descriptive analytical approach was relied upon, as the study tool was represented by a questionnaire distributed

to a sample of 33 individuals, and the study concluded that most green institutions are based on the dimensions of social responsibility in all their tasks and components.

- Study (Saif al-Rahman, 2021)[11]: entitled "The effects of green management practices in Bangladeshi industries from the perspective of environmental sustainability", aimed to study the effects of green management practices in industries in Bangladesh while ensuring the achievement of environmental sustainability, so the study tool was represented by a questionnaire distributed to 122 employees, and the study reached a set of results, the most important of which is that developing green management practices plays a vital role in the context of environmental sustainability.
- Study (Hamza, 2021) [15]: entitled "Achieving Environmental Sustainability According to Green Human Resources Management Practices", the study aimed to clarify the role of green human resources management practices in achieving environmental sustainability. The study tools were represented in the use of a questionnaire and personal interviews, on a sample of 136 male and

female employees in the Al-Kadhimiya Medical City. The study reached the most important results, the existence of a positive impact of green human resources practices in achieving environmental sustainability.

- A study (Shaarawy, 2020) [12] entitled "Green Management and its Relationship to Achieving Competitive Advantage in Banks Operating in the Central and Southern West Bank", the study aimed to know the relationship between green management in its six dimensions (green strategy, green human resources, green productivity, environmentally friendly practices, green supply chain, and obstacles to implementing green management), and its achievement of competitive advantage. The study community consisted of banks operating in the central and southern West Bank, and the number of banks to which the questionnaire was distributed was 14 banks. The study used the descriptive analytical approach, and the data collection tool was a questionnaire consisting of 60 questions. 135 questionnaires were distributed, of which 103 were retrieved. The study also relied on interviews with senior

management of banks as a tool for collecting data. The study reached the most important results, which is the existence of a positive and direct correlation between green management in its dimensions and achieving competitive advantage.

First topic: The Concept of Green Technology and Its Importance

First requirement: Definition of Green Technology

The term green technology has emerged as one of the new innovative ways to preserve natural resources and the environment. It is intended to be an alternative to traditional technology that uses fossil fuels and has a negative impact on the environment and human health, and aims to reduce the amounts of waste and pollution resulting from production and consumption processes. The term green technology refers to the development of products and equipment used to reduce the negative impact of human activities. It is also defined as technology that meets the needs of the current generation while taking into account the needs of future generations in what is known as sustainable technology. [21]

The term green technology is one of the modern terms that has received great attention during the last millennium in

light of the challenge of sustainable development that the international community seeks to achieve in various fields due to the limited environmental resources and their depletion.[8]

Green or clean technology is defined as any product or process that contributes to reducing the negative impacts on the environment and in technologies that aim to mitigate the effects of climate change and attempt to adapt to it through the optimal use of energy and available resources and sustainable waste management.[9]

So today, in any industry or product, its special importance is measured by measuring what was taken into account when manufacturing it from a technological strategy to preserve the environment, i.e. the extent to which it is based when producing it by following green technology mechanisms, and there is no better evidence of this than reducing the shares of companies that are unable to address the environmental problems they leave behind.[7]

Second requirement: The Importance of Green Technology

The use of green technology leads to: [23]

1. Achieving efficiency in the use of natural resources; which leads to reducing the use of natural resources, and reducing waste resulting from production processes.
2. From an economic point of view, the use of green technologies by companies and factories leads to an increase in the return resulting from investment in them in addition to a decrease in the cost of production and an increase in the competitiveness of products; which facilitates increasing the economic growth of the country.
3. From a social point of view, green technologies contribute to achieving food security through the use of sustainable agricultural methods.
4. Green technologies contribute to the transfer of energy services and improving sanitation and water services for rural areas.
5. Reducing costs related to pollution and environmental degradation problems.

Second opic: Sustainable Development, Environmental Sustainability and Its Most Important Goals

First requirement: The Concept of Sustainable Development

Sustainable development is a development model that aims to achieve a balance between economic growth, quality of life and environmental conservation, in the medium and long term, without depleting natural resources. Both the "World Commission on Environment and Development" and the "Organization for Economic Co-operation and Development" have defined sustainable development as the rational management of economic resources in a way that preserves natural resources and the environment; in order to increase human well-being at the present time without compromising the needs of future generations.[17]

Environmental sustainability is one of the dimensions of sustainable development that aims to protect natural resources and preserve the environment from pollution, in order to increase the ability of the ecosystem to maintain its functional and structural features[11].

Achieving environmental sustainability requires designing, producing and presenting products in a manner that is compatible with environmental requirements, as well as taking into account the goal of environmental sustainability when designing the product, which is the function of green technology, which works to reduce the use of material resources and adopt the "recycling" approach and produce

products in a way that makes them recyclable, and use renewable energy sources instead of depleting (non-renewable) energy sources, and safe disposal of waste.[15] It is defined as "raising the efficiency of exploiting resources that meet the needs of present generations without depleting them and preserving them for future generations through environmental balance strategies as a controlling axis for them."[14]

Second requirement: Environmental Sustainability Goals

Environmental sustainability seeks to achieve a set of goals that serve the environment and humanity now and in the future. These goals can be summarized as follows:[6]

1. Reducing the depletion of natural resources and exploiting them properly.
2. Adopting innovative development reform policies and methods that help protect the environment and prevent damage to it as a result of urban and technical progress.
3. Preserving the ecosystem and biodiversity.
4. Establishing regulations and laws that control human activity and adhere to international agreements aimed at protecting the environment and biodiversity.

5. Promoting environmental and social responsibility among individuals and organizations.
6. Using clean technology and increasing human and organizational awareness in protecting the environment.

Third topic: Green Technology and its Relationship to Environmental Sustainability

It can be said that the term green technology or environmentally friendly technology is given to products and equipment that are characterized by a number of characteristics, including: their use is safe and does not produce harmful gases, and helps in the efficient exploitation of natural resources and energy, and works through renewable energy sources, and works to reduce environmental degradation.[7]

In order for green technology to provide a healthy environment, it must focus on four basic elements, which are:[27]

- Economy: To achieve economic development through the use of modern technology.
- Energy: It seeks to achieve effective use and independence in the field of energy.

- Environment: It is concerned with protecting the environment and reducing the negative impact on it,

• Finally, society: It also works to increase the welfare of society.

Fourth topic: The Role of Green Technology in Achieving Environmental Sustainability

Many technology techniques have emerged to achieve the goals of international sustainable development by preserving natural resources and not depleting them and keeping them to meet the needs of future generations. The most important of these techniques is replacing energy sources from energy based on burning fossil fuels, which causes the emission of greenhouse gases, especially carbon dioxide, and thus exacerbates the phenomenon of climate change, to green energy sources or what is called renewable and environmentally friendly energy.[4]

Green technology in achieving environmental sustainability goals depends on a number of main mechanisms, including: green energy, green chemistry, green buildings, and green nanotechnology.

1. Green energy

Green energy is produced from renewable sources that have a little effect on the environment; This is in order to protect the environment and reach the goal of energy sustainability. Green energy is generated directly from natural resources, such as: sun, wind, rain, tide and carrots. The following are some types of green energy: [26]

- Solar energy: The sun is a huge source of solar energy, which provides energy for all living organisms on Earth, and can be used as green energy, because it does not result in any harmful gases such as carbon dioxide, and does not contribute to increasing global warming, and therefore it is less harmful to the environment. [10]
- Wind Energy: It is the energy generated by wind movement using wind turbines, and it is a clean energy that does not result in any harmful gases. [20]
- Biomedice: Biomedice is one of the most important sources of renewable energy provided by agriculture. It refers to fuel made of animal waste and plants. [24], [16]

- Earth's thermal energy: It is also considered a sustainable and clean energy sources, generated from the heat of the earth, and is used in many areas, such as: generating electricity and heating buildings. [9], [25]
  - Extension energy generated by water movement in the seas and oceans. [24]

Renewable energy sources contribute to environmental sustainability; It represents sustainable and clean energy sources, and then contributes to reducing greenhouse gas emissions and reducing air pollution. In the economic point of view, renewable energy is cheaper and safer on the environment than other non -renewable energy sources, which facilitates energy access to all parts of the world. [18], [2]

2. Green buildings

That is, a sustainable construction, which is the design of buildings with renewable materials with the use of the technical strategies of renewable energy to make the building comfortable for its residents using the non - harmful methods of the environment. [20] It is a design based on environmental conscious assessment techniques (green consciousness), so the design of

buildings in a way that makes them more efficient in energy use will reduce global warming emissions. [22]

3. Green nanotechnology:

Green nanotechnology is a technique based on the study of the material and its components, and it can be of great benefit to achieving sustainable development, through its contributions in many fields, such as: water purification, air, agriculture, clean energy, and food security. The use of green nanotechnology achieves two goals: producing products without damaging the environment or the health of living organisms, and producing products that provide solutions to environmental problems. [1]

The contribution of green nanotechnology in achieving environmental sustainability is linked to the achievement of an equation that: reducing environmental deterioration on the one hand, and the efficient use of natural resources on the other hand. It is used in the field of environmental protection, solving pollution problems by getting rid of pollutants and eliminating unpleasant odors, as well as using them to remove toxic substances from wastewater, and it has been proven that these technologies reduce the emissions that cause global

warming by 2% and this may reach this The percentage to 20% in 2050, according to expectations. [3]

4. Green chemistry

Green chemistry has been known as the design and manufacture of chemical products in a sustainable, safe and non -polluting manner in the environment, and small amounts of natural resources and energy are exhausted, and on the other hand it produces little waste or does not produce waste at all. [19]

Green chemistry aims to enhance innovation and increase profits with environmental protection and human health, known as sustainable chemistry. There are many aspects that can be used as sustainable green chemistry; It is noted that the cost of green chemistry is less economically than the costs of the usual chemistry, and the green chemistry is sustainable in the aspect of resources, by using resources efficiently and recycling them. [13], [5]

Conclusions

1. Green technology is a technology that is used as a way to preserve the environment and maintain an environmental balance in particular with the presence

of industrial progress and the resulting deterioration and depletion of natural resources in the environment.

2. As a result of green technology, the international community today sees any product and is estimated at the extent of its ability to treat its environmental waste.
3. Green technology, through its technologies, aims to achieve sustainable environmental development, that is, preserving the environment and its natural resources for future generations.
4. Green technology has many technologies, whether in the field of green energy generation or in the safe disposal of industrial waste.

Recommendations

1. The need to issue the necessary legal legislation that guarantees the state's commitment to green technology technology to keep pace with international work in achieving sustainable international development and to reduce climate change and environmental preservation.
2. Increasing green awareness and adopting this internationally, especially with regard to the uses of

electronic devices such as mobile phones and computers to show the most important technologies necessary to provide energy and safe disposal of their waste.

3. Adopting models for green buildings and encouraging citizens to take them by providing them with financial facilities.
4. Providing financial government support for private sector institutions in the shift towards the use of green energy.

Reference

1. أحمد أحمد،(2019)، "الاستثمار في التكنولوجيا الخضراء والطاقة المتجددة(دراسة مقارنة)" ، مجلة جامعة جنوب الوادي للبحوث البيئية، المجلد1 .
2. اسامة سعود سلمان،(2021) ، مستقبل الطاقة النووية في التخفيف من التغيرات المناخية وتحقيق التنمية المستدامة مجلة كلية التربية، العدد, 110 المجلد27 ص، 1018 1019
3. انسام فاضل، نض الرضا الخلف،(2021) ،" دور تكنولوجيا النانو في تحقيق أبعاد التنمية المستدامة"،مجلة الإدارة والاقتصاد، العدد 129 – 419.،ص406 .
4. التقرير السادس للهيئة الحكومية الدولية المعنيةب تغيرا لمناخ, تغير المناخ, 2022 الاثار والتكيف وسرعة التاثر https://www.ipcc.ch/report/ar6/wg2/
5. تكنولوجيا المعلومات والاتصالات الصديقة للبيئة (الخضراء) المدخل لتحقيق نمو بيئي مبتكر، جميورية مصر العربية , وزارة الاتصالات وتكنولوجيا المعلومات 2022.
6. جلال، رحماني؛ عبدالرحمن،(2022)، العلاقة التفاعلية بين حماية البيئة والتنمية المستدامة . رسالة ماجستيرم نشورة، الجزائر :جامعة زيانعاشور.
7. حسنية صيفي،(2020)، آليات التكنولوجيا الخضراء ودورها في تحيقيق التنمية البيئية المستدامة"، مجلة المسؤولية الاجتماعية والتنمية المستدامة. العدد(2)،ص1-20.

8. د.رفاءفرجس موعيون هضة علي عباس، اثر استراتيجية التكنولوجيا في الانتاجية الخضراء دراسة تحليلية في شركة مصافي الوسط / الدورة. مجلة كلية التراث الجامعة، الع د الحادي والعشرون 2017.
9. د.سولاف عدنان النوري، د.عبير يحيى السكاني، امكانية توظيف الرياحفي انتاج الطاقة الكهربائية، (دراسةفي جغرافية الطاقة)، مجلة كلية التربية الاساسية للعلوم التربوية والانسانية، جامعة بابل، العدد18 ، كانون الاول.
10. د.عبدالجبار عبود الحلفي، (2012) .تطور الطاقة المتجددة في دولة الامارات العربية المتحدة، مجلة الخليج العربي، المجلد 40، العدد(3-4)، ص 45
11. سلطان، حكمترشيد،(2020)، دورا لتخطيط الاستراتيجي في استراتيجيات الاستدامة البيئية دراسة استطلاعية لآراء القيادات الإدارية في عينة منشركات المياه المعدنية في محافظة دهوك .المجلة الاكاديمي ة لجامعة نوروز .مجالمجلد 2، العدد 4،ص100-16
12. شعراوي، يحيى محمد،(2020).الإدارة الخضراء وعلاقتها بتحقيق الميزة التنافسية لدى البنوك العاملة في وسط وجنوب الضفة الغربية ،رسالة ماجستير منشورة، فلسطين :جامعة الخليل.
13. د .طارق علي جاسر،(2018)، تخضير تكنولوجيا المعلومات للاستدامة البيئية/ دراسة ميدانية ,العدد الرابععشر ص351 .
14. كشانرضا،(2021) ، استراتيجية التنمية البيئية المستدامة في الجزائر،الواقع والتحديات .أطروحة دكتوراه منشورة، الجزائر :جامعة باتنة.
15. محمد علي،(2021)، " دور تكنولوجيا المعلومات والاتصالات في تحقيق الاستدامة البيئية"، مجلة النيل للعلوم التجارية والقانونية ونظم المعلومات، العدد 1، الاصدار(1).
16. محمد راضي جعفر، عدن انداود محمد العتاري(2016) ، دراسة مقارنة بين الطاقة المتجددة والطاقة غير التقليدية العالمية، مجلة الغريل لعموم الاقتصادية والادارية، المجلد الثالث عشر، العدد 39 ، ص 32
17. منى الشعباني،(2018)، " دور مراجعة البعد البيئي في دعم تقارير التنمية المستدامة، دراسة استكشافية في منشآت العمال في البيئة المصرية"، الفكر المحاسبي، الاصدار(6)، ص255-316.

18. Bartolomé Marco-Lajara, et al, "Analyzing the Role of Renewable Energy in Meeting the Sustainable Development Goals: A Bibliometric Analysis", Energies, vol. 16, no. 7, 2023.
19. Claudio Santi, et al, "Green Chemistry for Environmental Sustainability: An Example of "Bio-Logic"
20. IEA, " Net onshore wind electricity capacity additions by country or region, 2022-2024", May 2023, (Accesed4 Sep 2023), https://bitly.ws/TVhQ
21. Mohd Shafiei and Hooman Abadi, "The Importance of Green Technologies and Energy Efficiency for Environmental Protection", International Journal of Applied Environmental Sciences, vol. 12, pp. 937-951, 2017.
22. MohdLaeeq, et al, "GREEN BUILDING: CONCEPTS AND AWARENESS", International Research Journal of Engineering and Technology (IRJET), vol. 4, no. 7, 2017.
23. Nizar Halasah and Bashaar Ammary, "Promoting Green Technology in Arab Countries", United Nations.
24. Nada, Alrikabi, "Renewable Energy Types", Journal of Clean Energy Technologies, vol. 2, no. 1, 2014.
25. United Nations, "TECHNOLOGY AND INNOVATION REPORT 2023", Ob.cit.
26. Vijay Kalyani, et al, "GREEN ENERGY: The NEED of the WORLD," Journal of Management Engineering and Information Technology (JMEIT), vol. 2, no. 5, 2015.
27. Shireen, Mohammed, "Advantages of Green Technology to Mitigate the Environment Problems", Earth and Environmental Science, 2021