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Role of Green Technology Innovations on Organisation's Sustainable Performance: An Empirical Study of Indian Organisations

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Abstract

Although green technology innovation is a keyway to protect the environment while supporting economic growth. It is a way of creating and improving eco-friendly ideas and methods, with the goal of preventing damage to the environment and saving natural resources. The present work will let us understand the purpose of green technology innovations and how it fulfills the wants, needs, and comforts of people in a way that reduces the use of natural resources, so that society's needs are met in an eco-friendly way. In this paper, we will focus on showing the state of green technology innovation on Indian organizations sustainable performance, though with a closer look at India. Furthermore, using and encouraging green technologies in India is a deliberate step, to lower the reliance on non-renewable energy sources and to meet the country's climate goals by reducing pollution as part of its plan to fight climate change. This research work, also aims to elaborate its potential to change Indian organizations, save resources, and lower the harmful impact of human activities on the environment. Study survey was conducted among 239 people from different industries to study the Role of Green Technology Innovations on Organization's Sustainable Performance.

Keywords: Green technology, Natural resources, Non-renewable energy, Innovations, Environment.

Introduction

India has one of the world's fastest growing economics and a population of around 1.4 billion. Because of this, the country has a high and constant demand for resources like energy, water, and food. This is putting pressure on the environment and making it harder to protect and save natural resources. Many developing and poor countries are trying to grow quickly in different areas like roads and buildings, factories, services, farming and more. This is happening because of globalization, and the rising competition between countries to make their economy better. Green technologies, such as energy-efficient equipment, can lead to significant reductions in energy consumption, water usage, and waste generation. Countries are being pushed by this serious situation, to overuse their natural ecosystems in search of limited resources, which also leads to harm to the environment due to growth that cannot be maintained overall. So, many countries especially like India are facing the challenge of improving the economy and people's well-being while, also trying to reduce harm to the environment. Because of this, many nations are focusing on this issue and working to find balance, while also trying to protect and bring back limited resources for future generations by introducing green technology. Green technology is a new term that, means making new technologies that are good for the environment. Saving energy, re-using materials, having concerns about health and safety, and using renewable resources are key parts of green technology (Iravani, et.al, 2017). The main goal of using green technology is to cut down harm to nature, protect animals, birds, and plants, as well as also prevent damage to the Earth overall. By creating green technology, we can lower the harm caused by pollution and other things that hurt the environment

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and animals. Though, it helps protect nature and reduce the negative effects of human activities. Green technologies today are particularly important for a country's economic growth in a way that can last overtime. They help create a clean and healthy environment now and in the future. Indian organizations are making a clear effort to use and support green technologies to rely less on non-renewable energy sources (Behera, et.al, 2024). This will eventually help the country reach its climatic goals by cutting down harmful emissions. These steps match well with various plans, focused on the country's long-term and eco-friendly economic growth. This translates into lower operating costs, increased productivity, and a more competitive advantage in the market. Green manufacturing has become an important focus in India's industrial sector, pushed by both global sustainability goals and local needs. As India aims for a $5 trillion economy and zero carbon emissions, the use of such environment-friendly methods in factories is growing quickly. Past technological revolutions have shown us that those who accept latest ideas early can move ahead faster. Such innovations can also build strong and lasting benefits over time to Indian organizations (Mishra, 2017). Though, climate change is expected to cause the most harm in developing countries like India, as well as many people in these areas are at risk because they do not have enough resources to deal with the changes. It is important for developing nations to take advantage of the value created by such technologies to help grow their economies. The Government of India is also working, to support eco-friendly and sustainable farming methods. One example is the National Innovations in Climate Resilient Agriculture (NICRA) project. The above-mentioned program aims to create farming technologies that can manage the effects of climate change and reduce its impact on agriculture. These technologies are being given much more importance at all levels, to support long-term sustainable goals of Indian organizations (Pattnaik, et.al, 2015). Green technology innovations directly address environmental concerns by minimizing pollution, reducing carbon emissions, and conserving natural resources. Green technology is also called clean technology. Thus, it is safe to use and helps to keep the environment clean and healthy. The main goal of this technology is to lower global warming and reduce the greenhouse effect. New and smart ideas are needed, to stop the repeated use of cheap but harmful methods, so that eco-friendly practices can be supported with enough money. Because of this, the country must improve its ability to use modern technologies and focus more on programs that encourage green technology innovation.

Literature Review

Over the past few decades, green technologies have become more popular. Using green technology now seems to be the only way to survive because the Earth's natural resources are running out. Green technology is getting more attention from people and groups. To attain sustainable development, organizations across the world, especially in India want to start projects that help both society and the environment in a positive way (Yadav, et.al, 2020). We are at the beginning of a modern technology era, focused on green technologies. This new wave of progress is expected to have a strong effect on the world economy. Adopting green technology innovations can enhance an organization's reputation as environmentally responsible, which attracts investors, customers, and employees who value sustainability. Green technology means a wide range of new as well as creative methods which aim to make daily life better while also helping the environment. It also involves creating and using products, methods, and systems that help protect the natural environment and its resources. Thus, with an objective to reduce and limit the harmful effects of human actions on nature. Today, many believe that green technology will lead to major and creative changes in our daily lives. These changes could be as important as those brought by the 4.0 digital revolution (Mubarak, et.al, 2021). As it is a part of the renewable energy field in the environmental technology movement, it is important that it should not be overlooked. By creating green technology, we can lower the harm caused by pollution and other things that damage nature and wildlife. They can be used in many areas, such as biofuels, eco-friendly forestry, clean energy, and waste management. It is a large field because it touches every part of human life. In India, agriculture sector plays a key role in the conversion about cutting down the effects of climate change. It is also key in finding ways to adjust to these changes for many reasons. This sector of the Indian economy is, one

of the industries that harms both human health and the environment. Agriculture is one of the biggest sources of greenhouse gases (GHG). This is especially true in developing countries, where farming causes about 35% of all GHG emissions. Most organizations believe that protecting the environment and improving food safety are especially important. These goals are connected to the daily lives of small farmers. It is worrying, because using chemicals affects the health of both farmers and consumers. Green technology innovations often drive further research and development, leading to new and improved processes and products. Green innovations are the latest methods to reduce the use of chemicals and pesticides in farming as; they help protect crops in a safer way (Aroonsrimorakot, et.al, 2021). Farmers can do their work with less effort and without hurting the environment. One example is the use of Geographic Information Systems (GIS). This system uses computers to study location-based data about crops and farms. Government leaders and businesses believe that growing green technologies is important. They see it, as a key step towards moving to sustainable development. All advanced innovative ideas that can be added to farming, like machines and watering systems, are called green technological innovations. These helps make the farming process more eco-friendly. Green technologies are particularly important today, for a country's economic growth in a sustainable way. They help support both present and future development. These technologies also help create a clean and healthy environment. Green innovations in farming can be grouped into technical, administrative, and organizational types. Technological green innovations make farmers work easier and do not harm the environment. These green technologies include the use of Geographic Information Systems (GIS). GIS works through computer-based methods, that study location-specific data about crops and farmland (Dawn, et.al, 2023). The Global Positioning System (GPS) is also a green technology tool. It helps farmers do their work more easily, even when they cannot see clearly, like in fog or darkness. There is a clear need for such clean technology as pollution has been causing serious problems for a long time. Every year, pollution leads to the deaths of millions of people in India. Integration of green technologies is made to protect the environment and save natural resources. They include solar power, wind power, ocean power, saving energy and cleaning up pollution using natural methods like bioremediation. There is intense competition in the field of renewable energy. Solar power has become one of the main sources in this era. Solar energy is used more often to generate electricity, heat water, or clean it. Solar Photo-voltaic Technology (SPVT) is a very adaptable technology. It comes in many sizes, from small solar kits for homes and rooftop systems with power of 3 to 20 kW, to much larger systems that produce hundreds of megawatts. With the help of SPVT, for larger Indian organizations making electricity has become more accessible to everyone. SPVT is also used to provide lighting solutions. The wind energy market is growing quickly. It is becoming more important because, wind power produces less greenhouse gases and air pollution than other energy sources. Wind turbines, are used for making mechanical or electrical power, are a proven technology. Biofuels such as bioethanol and biodiesel may become an important part of energy sources in the future. However, while using biofuel as a green farming methods needs careful thinking in densely populated countries like- India. It is important to look at issues like food safety, harm to the environment, and risks to plant and animal life. Thes concerns must be studied to understand if the link between farming and biofuel is truly sustainable. It can be burnt directly to produce heat or power. Such innovations can also be changed into substitutes for oil or gas. The transportation organizations use liquid biofuels the most, as they are a useful renewable option instead of petrol. By using green and modern products and methods, we can save energy. This can be done by using machines that need less power and use less electricity. As a result, we use fewer fossil fuels to produce the same amount of energy. This can provide a competitive advantage in markets where sustainability is increasingly valued. Organizations that adopt green technology innovations are better positioned to comply with environmental regulations and standards. Green innovations play an important part on India's green technology market. It plays a key role in the country's move toward clean and sustainable development. They are also used in industries that use a lot of energy, like iron and steel, cement, pulp, paper, and others. It can be used in all areas where energy is used, and in programs that help manage energy demand. By using, green technology it can help, lower the effects of global warming by cutting

down CO2 emissions (Qamar, et.al, 2021). When a company uses this kind of production, it can reduce costs for materials, energy, and up-keep. This can help the company become more competitive. India is growing quickly in the industrial sector. Many businesses have willingly stepped up to protect the environment. They are choosing greener ways to achieve success. TCS was named the world's greenest company for its sustainable practices. The organization scored 80.4% in a global rating, for working on green technology that helps the environment (Trivedi & Sharma, 2017). Wipro has helped create technologies that save energy and reduce waste. It is head office in Pune is known as one of the most eco-friendly and green buildings in this field across India. LG India, a leader in making eco-friendly electronic devices, has recently introduced the E60 and E90 series of LED monitors. These monitors use 40% less energy compared to regular LED monitors (Triet & Rangaraju, 2024). The company is also trying to reduce the use of harmful materials in its products. ONGC, one of the biggest oil producers in India, has started changing how green crematoriums are made. These new crematoriums can replace traditional pyers. They produce less smoke and use less oxygen. Samsung India makes many types of LED TV screens. Recently, it launched an eco-friendly LED backlight that uses 40% less electricity and does not contain harmful chemicals like mercury and lead. IndusInd bank of India is the first bank in India to stop using paper for ATM receipts. Instead, it started sending electronic messages. This helps save paper and reduce cutting down trees. To reduce harm to the environment, green technology innovations play a key role towards sustainable development. The Government of India is considering many more important actions, to promote green technology to protect the Earth and make our lives better by educating people about green technology innovations, green buildings, green transport, and waste recycling. India has made big goals till the year 2030, and these ambitious targets cover many areas of sustainable growth and development in different organizations. At both, the undergraduate and post-graduate levels, scholarships should be increased for students studying green technology. Indian Railways has also taken big steps to cut down its, carbon emissions and fuel expenses. It aims to reach "net-zero" carbon emissions by 2030. A major step in this plan, is fully switching its broad-gauge network to electric power. This shift from diesel engines to electric trains is meant to stop carbon emissions. It also helps reduce the use of fossil fuels. Irrespective of, so many green technological innovations taking place the Indian government is working on many more green technology programs to fight climate change (Kothawade, 2017). These include the National Hydrogen Mission, electric vehicle (EV) rules being set by central as well as state governments, and the Renewable Power Obligation (RPO). The RPO asks states, to get 25% of their energy from renewable sources. Besides these programs, the government is also launching many financial and learning initiatives. The efforts aim to attract both, big and small private companies to use advanced methods. They also help these companies take part in the global green technology market. Therefore, given the current scenario, green technology clearly shows results as it uses several types of alternative energy to meet today's sustainable growth.

Objective

To study the Role of Green Technology Innovations on Organisation's Sustainable Performance.

Methodology

Study survey was conducted among 239 people from different regions. "Random sampling method" along with "T-test" were used to collect and analyse the data.

Data Analysis

In the total population of study survey males are 51.05% and females are 48.95%. 33.05% of them are 25 to 30 years of age, 34.73% are between 30 to 35 years, and 32.22% are above 35 years. Looking at the industries, 41.17% are from food & beverages sector, 26.70% are from medical industry, and 32.13% are from agriculture sector.

"Table 1 General Details"

"Variables"	"Respondents"	"Percentage"
Male	122	51.05
Female	117	48.95
Total	**239**	**100**
Age (years)		
25 to 30	79	33.05
30 to 35	83	34.73
Above 35	77	32.22
Total	**239**	**100**
Industries		
Food & Beverages	81	41.17
Medical industry	69	26.70
Agriculture sector	89	32.13
Total	**239**	**100**

Table 2 Role of Green Technology Innovations on Organisation's Sustainable Performance

"S. No."	"Statements"	"Mean Value"	"t value"	"Sig."
1.	Green technologies, such as energy-efficient equipment, can lead to significant reductions in energy consumption	4.11	17.462	0.000
2.	Green technologies help in lowering operating costs, and increased productivity	3.15	2.375	0.009
3.	It directly addresses environmental concerns by minimizing pollution, and reducing carbon emissions	4.22	19.621	0.000
4.	It helps companies understand customer behavior, refine marketing campaigns, and optimize return on investment	4.19	18.753	0.000
5.	It involves adopting sustainable materials, implementing renewable energy sources	3.17	2.723	0.003
6.	Adopting green technology innovations enhance organization's reputation as environmentally responsible	4.27	19.999	0.000
7.	It improves market competitiveness and strengthens stakeholder relationships	4.03	16.373	0.000
8.	Organizations adopting green technology are positioned to comply with environmental regulations and standards	4.30	20.757	0.000
9.	Meeting stricter emissions standards through green technology can give companies a competitive edge	4.00	15.775	0.000
10.	It can create new job opportunities and stimulate economic growth	4.23	19.742	0.000

Table 2 shows Role of Green Technology Innovations on Organisation's Sustainable Performance where respondent says that green technologies, such as energy-efficient equipment, can lead to significant reductions in energy consumption (4.11), Green technologies help in lowering operating costs, and increased productivity (3.15), It directly addresses environmental concerns by minimizing pollution, and reducing carbon emissions (4.22), It helps companies understand customer behaviour, refine marketing campaigns, and optimize return on investment (4.19), It involves adopting sustainable materials, implementing renewable energy sources (3.17), Adopting green technology innovations enhance organization's reputation as environmentally responsible (4.27), It improves market competitiveness and strengthens stakeholder relationships (4.03), Organizations adopting green technology are positioned to comply with environmental regulations and standards (4.03), Meeting stricter emissions standards through green technology can give companies a competitive edge (4.00), and It can create new job

opportunities and stimulate economic growth (4.23). All statements pertaining to Role of Green Technology Innovations on Organisation's Sustainable Performance are found to be significance, with p-values below 0.05 following the application of a t-test.

Conclusion

The points mentioned above lead us to conclude that using green technology is important in today's world. Sustainable development means growing and improving in a way that satisfies today's needs. It is necessary if we want to protect the environment and live in a way that supports long-term sustainability. Farmers' environmentally friendly beliefs can positively influence their willingness to try new green ideas. These values can also help them choose and use green technologies more often. Usage of green technologies by organizations of India, can help both the economy and the environment (Sahoo, et.al, 2023). It can lead to better financial results and reduce harm to nature. This study also suggests that the desire to try new green ideas is linked to using green technology. Therefore, it also concludes that to build a sustainable and clean future for India, it is important to unlock creative ideas and new innovations. Many green technology inventions, like SPVT or portable water cleaning tools, impact society and the economy down to the local communities. Protecting the environment, saving resources, and other financial factors are important to keep the environment sustainable. Green technology innovations can make cities better places to live by cleaning the air. This improvement can attract more workers to move there in such organizations (Addanki & Venkataraman, 2017). Thus, we may also conclude by saying that both rich and poor countries should keep supporting the growth of green technology innovation. This is important, not just to protect the world's environment and climate, but also to ensure people can live well in the future. Study survey was conducted among 239 people to study Role of Green Technology Innovations on Organisation's Sustainable Performance.

References

Iravani, A., Akbari, M. H., & Zohoori, M. (2017). Advantages and disadvantages of green technology; goals, challenges, and strengths. Int J Sci Eng Appl, 6(9), 272-284.

Behera, P., Sethi, L., & Sethi, N. (2024). Balancing India's energy trilemma: Assessing the role of renewable energy and green technology innovation for sustainable development. Energy, 308, 132842.

Mishra, P. (2017). Green human resource management: A framework for sustainable organizational development in an emerging economy. International Journal of Organizational Analysis, 25(5), 762-788.

Pattnaik, B. K., & Dhal, D. (2015). Mobilizing from appropriate technologies to sustainable technologies based on grassroots innovations. Technology in Society, 40, 93-110.

Yadav, G., Kumar, A., Luthra, S., Garza-Reyes, J. A., Kumar, V., & Batista, L. (2020). A framework to achieve sustainability in manufacturing organisations of developing economies using industry 4.0 technologies' enablers. Computers in industry, 122, 103280.

Mubarak, M. F., Tiwari, S., Petraite, M., Mubarik, M., & Raja Mohd Rasi, R. Z. (2021). How Industry 4.0 technologies and open innovation can improve green innovation performance? Management of Environmental Quality: An International Journal, 32(5), 1007-1022.

Aroonsrimorakot, S., Laiphrakpam, M., & Paisantanakij, W. (2021). Application of innovative eco-friendly energy technology for sustainable agricultural farming. Green Technological Innovation for Sustainable Smart Societies: Post Pandemic Era, 211-231.

Dawn, N., Ghosh, T., Ghosh, S., Saha, A., Mukherjee, P., Sarkar, S., ... & Sanyal, T. (2023). Implementation of Artificial Intelligence, Machine Learning, and Internet of Things (IoT) in revolutionizing Agriculture: A review on recent trends and challenges. International Journal of Experimental Research and Review, 30, 190-218.

Qamar, M. Z., Ali, W., Qamar, M. O., & Noor, M. (2021). Green technology and its implications worldwide. The Inquisitive Meridian, 3(1), 1-11.

Trivedi, P., & Sharma, M. E. G. H. N. A. (2017). Impact of green production and green technology on sustainability: Cases on companies in India. International journal of mechanical and production engineering research and development, 7(6), 591-606.

Triet, N. L. M., & Rangaraju, S. (2024). The Evolution of LG Electronics: Innovations, Market Strategies, and Sustainability in the Global Technology Landscape. Evolution, 1(01).

Kothawade, N. S. (2017). Green manufacturing: solution for Indian climate change commitment and make in India aspirations. International Journal of Science and Research (IJSR) Volume, 6(1), 725-733.

Sahoo, S., Kumar, A., & Upadhyay, A. (2023). How do green knowledge management and green technology innovation impact corporate environmental performance? Understanding the role of green knowledge acquisition. Business Strategy and the Environment, 32(1), 551-569.

Addanki, S. C., & Venkataraman, H. (2017). Greening the economy: A review of urban sustainability measures for developing new cities. Sustainable cities and society, 32, 1-8.