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THE IMPACT OF GREEN IT ON ORGANIZATIONAL PERFORMANCE: AN EMPIRICAL STUDY OF SUSTAINABLE PRACTICES

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ABSTRACT
Sustainable development has become a major topic of discussion globally, with growing pressure on companies to shift toward more eco-conscious practices. One of the key approaches gaining attention is Green Information Technology (IT) since nearly all businesses rely on IT in some way to carry out their daily operations. Green innovation is a new approach to achieving sustainable social development. Examining whether firms can reap the rewards of this costly and risky endeavour is essential to assessing whether they can sustainably adhere to a green strategy. The present research delves into, how eco-friendly technological advancements shape the connection between organizations and the environment, aiming to uncover practical combinations that support both business success and environmental sustainability. Additionally, environmental management behaviour plays a moderating role in shaping the relationship between green innovation and overall organizational success. The findings of this study offer valuable insights, highlighting the need for professionals and policymakers to firmly embed green innovation practices within their organizations to boost both business performance and environmental sustainability. A sample of 210 people including industry professionals working in different organizations was surveyed to explore the factors that show the impact of green IT on organizational performance and found that Energy Efficiency, Cost Reduction, Waste Reduction, and Innovation are the factors that show the impact of green IT on organizational performance.

KEYWORDS: Sustainable development, Environmental sustainability, Green Innovation, Business performance, Technological advancements.

INTRODUCTION
Information and communication technology (ICT) first emerged in the United States and other advanced nations like the United Kingdom, France, Russia, South Korea, and Japan. Today, many organizations are increasingly integrating eco-friendly practices into all areas of their operations, driven by the growing global awareness of environmental issues. Luthra & Mangla. (2018), stated despite so many challenges, its adoption in developing countries was delayed due to various challenges, including social, economic, and environmental barriers. Eco-friendly IT practices, like adopting energy-saving hardware and software, can greatly cut down on power usage, which in turn

helps lower electricity costs and decrease harmful greenhouse gas emissions. In many developed nations, such practices are now governed by established guidelines, legal frameworks, and strict regulations that organizations are required to follow. Innovation is still a fairly fresh idea that focuses on unconventional methods for carrying out various business tasks. According to Chuang & Huang. (2018), green IT, in particular, is often used as a measure of an organization's overall commitment to environmental responsibility. It plays a vital role in helping companies reduce pollution, conserve energy, and find new uses for waste materials through recycling. Green innovation can take shape through both product development and improvements in business processes. With the sharp rise in energy use and the substantial surge in CO2 emissions from companies, there has been growing concern and focus on sustainability within both society and organizations in recent years. Therefore, embracing Green IT as a long-term sustainable approach can create a win-win situation for both internal stakeholders and external investors, benefitting the organization as well as its broader network. To address current environmental challenges, adopting Green IT is seen as a sensible and responsible move for companies that can also enhance their financial performance. Sikder et.al. (2023), discussed that such information technology involves the thoughtful design, production, usage, and disposal of computers, servers, and various related devices in an efficient and environmentally responsible manner, aiming to minimize ecological impact. The growing pressure on the environment and unpredictable weather changes have led to a series of crises, highlighting the urgent need to create systems and technologies that support more sustainable ways of living and doing business. The worldwide push for sustainability across industries, production methods, and daily living has sparked continuous efforts to create eco-friendly products, technologies, and services. Through this research work, we will also discuss how, such ongoing movement and sustainable practices hold the potential to lower global greenhouse gas emissions and promote a cleaner, cooler planet. While Information technology in organizations does have environmental implications, its ability to foster innovation, boost productivity, and support growth also positions it as a powerful tool for enhancing a company’s environmental performance.

LITERATURE REVIEW

According to Baumgartner & Rauter. (2017), Organizational sustainability refers to achieving environmental objectives while also delivering lasting value to the company's shareholders and broader stakeholder community. Therefore, businesses do hold a significant social responsibility to support the well-being of their employees and the communities where they operate. Information technology refers to the tools, systems, infrastructure, and processes that provide the necessary environment for handling various forms of information such as voices, text, data, images, and video by enabling their creation, storage, transmission, processing, and sharing. The idea of green IT first gained its attention during the early 1990s when the United States Environmental Protection Agency (EPA) introduced Energy Star - a voluntary labelling initiative designed to highlight products that deliver exceptional energy efficiency. Lee & Min. (2015), argued that businesses and organizations who choose IT products within the organizational performance can cut costs and lower their carbon footprint. Later on, the EPA also supported the creation of the Electronic Product Environmental Assessment Tool (EPEAT) and a related product database, helping IT purchasers easily identify environmentally friendly technology options. Organizations do face growing expectations from both the governments and the public to minimize their environmental footprint. Javaid et.al. (2022), Green IT do help optimize resource usage, cut down on waste and emissions, and boost recycling efforts. These practices also support businesses in meeting regulatory requirements. They can play a key role towards a company's environmental, social, and governance (ESG) efforts, and many organizations now include their eco-friendly IT practices as part of their ESG reporting to promote transparency and accountability. Corporate IT systems generate significant greenhouse gas emissions and play a role in accelerating climate change. Organizations do need to monitor and lower these emissions,

along with managing the harmful e-waste that contaminates the environment. Adopting Green IT practices can be an effective element within a company's larger climate action plan. Qiao et.al. (2024), findings stated that green Information technology shows employees that they are part of a responsible and values-driven organization, which can boost their morale and encourage long-term commitment. Embracing sustainable technology also opens doors to smarter, more efficient work practices. The usage of green technology helps build a positive reputation, enhancing how the public views and values a company's brand. Despite so many benefits, it offers certain challenges for an organization like the upfront investment required to adopt new green technologies and initiatives can be high. Upgrading or replacing outdated legacy IT systems may also involve significant expenses. Figuring out where to begin with green IT can be challenging. Since energy is consumed across all areas of IT in organizational performance, it's often tough to determine which systems should be prioritized first. Though, IT systems are intricate, minimizing their environmental impact demands a sense of responsibility- something that can only be achieved through proper monitoring. Tracking tools help gather insights on energy consumption and other key sustainability indicators. Businesses can utilize smart sensors to monitor the energy efficiency (PUE) of their data centres and measure greenhouse gas emissions, helping them move toward more eco-friendly data centre operations. Cloud service providers also offer tools that allow users to view energy usage through easy-to-access dashboards. Green IT is expected to receive growing focus as leaders, staff, investors, customers, and other stakeholders increasingly acknowledge the urgent effects of climate change and recognize that investing in environmental sustainability is both essential and valuable for the future. Afsar et.al. (2020), asserted certain leaders in the IT industry are making conscious efforts to become more environmentally responsible. For example, major cloud service providers like AWS, Google, and Microsoft have pledged to cut down their carbon emissions and offer eco-friendly cloud solutions. AWS has announced its goal to run entirely on renewable energy by 2025. It has also partnered with Google and Microsoft in the Climate Neutral Data Center Pact and aims to achieve net-zero carbon emissions across all its operations by 2040. Microsoft's Azure cloud has maintained carbon neutrality since 2012 and is targeting fully renewable-powered data centres by 2025. The company has set an ambitious goal to become carbon-negative by 2025. The company has set an ambitious goal to become carbon-negative by 2030, and by 2050, it aims to eliminate from the environment all the carbon it has ever generated through its energy consumption. Google's cloud platform has been fully powered by renewable energy since 2017. By 2019, the organization successfully redirected almost all waste from its data centre operations away from landfills. Looking ahead, Google aims to run all its data centres with zero carbon emissions by 2030. It also provides the Carbon Sense software suite, allowing users to track and manage their carbon footprints. The above-mentioned tech giants do have both financial and ethical responsibility to reduce their carbon emissions. They are actively working toward sustainability through several key initiatives, which include: developing more energy-efficient hardware, Supporting the shift towards renewable energy sources, Using advanced cooling techniques in data centres to cut energy use, and promoting responsible e-waste recycling practices by streamlining and enhancing the efficiency of IT infrastructure. These efforts do reflect their commitment to a greener, more sustainable digital future. Vinoth & Kiruthiga. (2014), studied that green IT aims to make better use of resources, reduce energy usage, and cut down on electronic waste, all while sustaining or even enhancing the overall effectiveness of organizational operations. The performance and efficiency of data centres are heavily shaped by the software systems that handle data management. Advanced software-driven strategies like virtualization and workload optimization play a key role in, managing and reducing energy usage within these facilities. The rise of cloud services marks a significant change in how resources are used. Unlike conventional physical servers, cloud platforms function virtually, promoting the efficient sharing of resources. Although this model helps reduce energy consumption, it's equally important to examine the wider environmental impact of emissions and production processes throughout the entire lifecycle of these technologies. The move

towards centralizing computing power is gaining momentum, especially among large corporations. This approach is often, commended for its positive environmental impact, as major cloud providers can manage energy use more effectively and implement Green IT solutions on a broader scale. On one hand, this shift can enhance energy efficiency and help shrink the tech industry's carbon footprint, supporting global climate action. Large-scale data centres maximize server performance, utilize cutting-edge cooling technologies, and lower overall energy usage. They also enter into green energy agreements and fund renewable energy initiatives, further reducing their ecological footprints. According to Wenten et.al. (2024), the adoption of clean energy options like solar, wind, or hydro-power can significantly cut dependence on fossil fuels. Integration of such sustainable sources into everyday operations for running organizations or data centres helps lower carbon emissions and supports a shift toward more responsible and eco-friendly energy use. Programs like the Web Sustainability Guidelines (WSG) 1.0 have been introduced to support organizations in strengthening their green IT initiatives. These guidelines provide a detailed roadmap for making websites and digital products more environmentally sustainable. Shuja et.al. (2017), mentioned green IT efforts can greatly lower operating expenses by making efficient use of resources. Adopting such practices allows growth without a matching rise in energy use or resource demands. This approach makes it easier, to scale the organization's activities smoothly while still keeping operations efficient and sustainable. Strengthen the organization's reputation and boost its competitive edge. Rathore. (2018), acknowledged that today's consumers are more likely to support environmentally responsible companies which put sustainability at the forefront. These technologies are designed to carefully balance innovation with environmental responsibility.

OBJECTIVE

1. To explore the factors that show the impact of green IT on organizational performance

METHODOLOGY

A structured questionnaire, particularly designed for the present study is used to conduct the study survey on a sample of 210 people that includes industry professionals working in different organizations. The study aims to explore the factors that show the impact of green IT on organizational performance. The present study is empirical in which data collection is done through the "Convenient sampling method" and data is analysed with the help of "Exploratory Factor Analysis (EFA)".

FINDINGS

In the total population of the study survey, the males contributed 56.2% and the rest 43.8% are female. 33.8% of the respondents are below 38 years of age, 41.4% are between 38 to 48 years and the rest 24.8% are above 48 years of age. 30.0% are working for less than 5 years, 38.1% for 5-8 years and the rest 31.9% are working for more than 8 years. 20.0% of respondents are working in the technology sector, 20.0% in the pharmaceutical industry, 20.0% in the manufacturing sector, 20.0% in finance and 20.0% in the retail industry.

"Table 1 General Details of Respondents"

"Variables"	"Respondents"	"Percentage"
Gender		
Male	118	56.2
Female	92	43.8
Total	**210**	**100**
Age (years)		

Below 38 years	71	33.8
38-48 year	87	41.4
Above 48 years	52	24.8
Total	**210**	**100**
Work experience (yrs)		
Less than 5	63	30.0
5-8	80	38.1
More than 8	67	31.9
Total	**210**	**100**
Industry		
Technology sector	42	20.0
Pharmaceuticals	42	20.0
Manufacturing	42	20.0
Finance	42	20.0
Retail	42	20.0
Total	**210**	**100**

“Exploratory Factor Analysis”

“Table 2 KMO and Bartlett's Test”

“Kaiser-Meyer-Olkin Measure of Sampling Adequacy”		.848
“Bartlett's Test of Sphericity”	“Approx. Chi-Square”	3131.234
	“df”	105
	“Sig.”	.000

The KMO value in Table 2 is 0.848 and the “Barlett’s Test of Sphericity” is significant.

“Table 2 Reliability Statistics”

“Cronbach's Alpha”	**“N of Items”**
.918	15

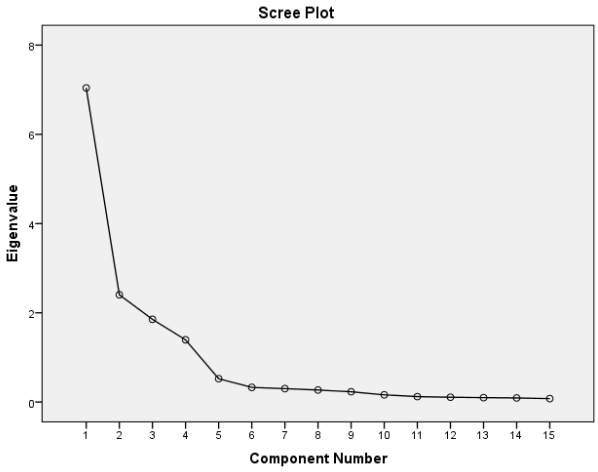
The overall reliability is 0.918 for the 4 constructs comprising fifteen items.

“Table 3 Total Variance Explained”

“Component”	**“Initial Eigen values”**			**“Rotation Sums of Squared Loadings”**		
	“Total”	**“% of Variance”**	**“Cumulative %”**	**“Total”**	**“% of Variance”**	**“Cumulative %”**
1	7.041	46.938	46.938	3.447	22.977	22.977
2	2.404	16.024	62.961	3.359	22.395	45.372
3	1.854	12.359	75.320	3.310	22.070	67.442
4	1.394	9.296	84.616	2.576	17.174	84.616
5	.523	3.487	88.103			
6	.328	2.186	90.289			
7	.301	2.004	92.294			
8	.269	1.792	94.085			
9	.231	1.537	95.623			
10	.161	1.076	96.699			
11	.121	.808	97.506			

12	.108	.723	98.229			
13	.098	.654	98.884			
14	.091	.605	99.488			
15	.077	.512	100.000			

In a “principal component analysis”, 15 variables were grouped into 4 factors, explaining the variance as follows: 22.977%, 22.395%, 22.070%, and 17.174%, respectively. Together, these factors account for a total variance of 84.616%.



“Scree Plot”

“Table 4 Rotated Component Matrix”

“S. No.”	**“Statements”**	**“Factor Loading”**	**“Factor Reliability”**
	Energy Efficiency		**.943**
1	Use of energy-saving hardware and software	.900	
2	Tracking tools that help to gather insights on energy consumption	.887	
3	Utilization of smart sensors to monitor the energy efficiency (PUE) of data centres	.869	
4	Tools that allow users to view energy usage through easy-to-access dashboards	.868	
	Cost Reduction		**.935**
5	Advancements offer the combined benefits of cost-effectiveness and ethical responsibility	.885	
6	Choosing IT products within the organizational performance to cut costs	.857	
7	Reduced electricity usage	.856	
8	Promoting less paper consumption	.848	
	Waste Reduction		**.928**
9	Finding new uses for waste materials through recycling	.895	
10	Green IT helps optimize resource usage, cut down on waste and emissions	.883	
11	Managing the harmful e-waste that contaminates the environment	.882	
12	Promoting responsible e-waste recycling practices	.823	
	Innovation		**.915**

13	Green innovation to achieve sustainable social development	.880	
14	Green innovation takes shape through both product development	.862	
15	Green IT encourages process innovation, giving organizations a technological edge	.852	

Factor “Energy Efficiency” includes the variables like Use of energy-saving hardware and software, Tracking tools that help to gather insights on energy consumption, Utilization of smart sensors to monitor the energy efficiency (PUE) of data centres, and Tools that allow users to view energy usage through easy-to-access dashboards. Factor “Cost Reduction” consists of variables like Advancements offering the combined benefits of cost-effectiveness and ethical responsibility, Choosing IT products within the organizational performance to cut costs, Reduced electricity usage, and promoting less paper consumption. Factor “Waste Reduction" includes variables like Finding new uses for waste materials through recycling, Green IT helping optimize resource usage, cutting down on waste and emissions, Managing the harmful e-waste that contaminates the environment, and promoting responsible e-waste recycling practices. Factor “Innovation" includes variables like Green innovation to achieve sustainable social development, green innovation takes shape through both product development, and Green IT encourages process innovation, giving organizations a technological edge.

CONCLUSION

This study seeks to explore the key factors that lead to the adoption of Green IT and to examine, how embracing Green IT impacts an organization’s overall performance. Mubarak et.al. (2021), concludes that green Information Technology does play a crucial role in, bridging technological advancement with environmental care. Feng et.al. (2024), at its core, such advancements offer the combined benefits of cost-effectiveness and ethical responsibility, making a strong case for companies to embrace sustainable practices. Advantages are evident-from cutting down on operational expenses to nurturing a mindset of sustainability. However, hurdles like up-front costs, system capability, and resistance to change within organizations require thoughtful planning and gradual implementation to overcome. As technology advances, there’s an increasing belief that bigger and more capable systems will be key to enhancing efficiency and output. Singh. (2023), analysed, however, aligning this progress with environmental responsibility will be crucial in shaping the future of IT infrastructure. Thus, in turn, the above research work would encourage greater awareness of Green IT and help tackle the challenges related to its adoption on a personal level.

The study aims to explore the factors that show the impact of green IT on organizational performance and found that Energy Efficiency, Cost Reduction, Waste Reduction, and Innovation are the factors that show the impact of green IT on organizational performance.

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