Green it Adoption as CSR – Insights from Indian it Companies

Nisha U, Mohsina Amreen A, S. Firdouse Jahan

Abstract

In today's business landscape, the fusion of Information Technology (IT) and Corporate Social Responsibility (CSR) is redefining how companies balance growth with sustainability. A key element of this shift is the adoption of Green Information Technology (GIT) strategies, aimed at reducing the environmental footprint of IT processes. This study investigates the adoption of Green Information Technology (GIT) strategies within Indian IT companies as part of their Corporate Social Responsibility (CSR) efforts. The research aims to map GIT adoption trends, identify key motivations and barriers, and assess the impact on organizational performance and CSR outcomes. A mixed-methods approach, combining surveys and case studies, was used to analyze data from 35 Indian IT firms.

Findings reveal that larger, financially robust companies lead GIT adoption, driven by sustainability commitments and internal readiness. Key strategies include energy-efficient data centers and cloud computing, though smaller firms face barriers like high costs and limited awareness. Government incentives and industry collaboration are highlighted as crucial enablers for wider GIT adoption.

Case studies of major IT firms—Infosys, Wipro, HCL, and TCS—demonstrate that early investment in green technologies leads to operational efficiency, cost savings, and enhanced corporate reputation. The study concludes that successful GIT implementation strengthens CSR, improves environmental stewardship, and enhances business competitiveness, particularly with government and industry support. This research provides actionable insights for policymakers and industry leaders, emphasizing the importance of collaboration in driving sustainable practices across the Indian IT sector.

Keywords: Corporate Social Responsibility (CSR), Environmental sustainability, Energy-efficient data centers, Green Information Technology (GIT), Indian IT companies

JEL Classification: Q56 , M14, L86 , O33

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INTRODUCTION

The rapid growth of Information Technology (IT) has transformed modern business practices, enabling unprecedented levels of connectivity, efficiency, and innovation across the globe. However, this technological revolution has also led to growing concerns over its environmental impact, prompting businesses worldwide to seek more sustainable practices. In light of the pressing challenges posed by climate change, resource depletion, and environmental degradation, companies are increasingly recognizing their role in fostering a greener, more sustainable future. This shift is being driven by Corporate Social Responsibility (CSR), a framework through which organizations demonstrate their commitment to addressing societal and environmental issues (Agarwal & Malhotra, 2015).

One of the key elements of CSR is the adoption of Green Information Technology (GIT), a set of strategies designed to mitigate the environmental impact of IT operations. GIT encompasses a range of initiatives, from energy-efficient infrastructure and eco-friendly hardware to the development of sustainable software solutions (Gupta & Sharma, 2019). These initiatives not only align with global sustainability goals but also resonate with stakeholders who are increasingly prioritizing environmental responsibility in their business dealings. As India's IT sector continues to expand and gain international prominence, the adoption of GIT practices in this sector has become particularly significant (Jayakrishna & Rejitha, 2016).

As sustainability becomes a central concern on the global corporate agenda, many organizations are recognizing the importance of reducing their carbon footprints, conserving resources, and minimizing waste. In the IT sector, this has led to the adoption of various environmental practices, including energy-efficient equipment, renewable energy investments, and cleaner industrial processes. Green CSR, which emphasizes environmental responsibility, aims to reduce the negative impact of business activities on future generations (Agarwal & Malhotra, 2015).

While the environmental benefits of GIT adoption are clear, much of the research to date has focused on organizational factors, with limited attention given to the cognitive and attitudinal drivers behind these changes (Molla, 2008). This research seeks to fill that gap by examining how individual, social, and organizational factors influence IT professionals' attitudes toward GIT in Indian companies, and how these attitudes can shape more effective CSR practices. The study is guided by the Belief-Action-Outcome (BAO) framework, which explores how beliefs about GIT translate into actionable CSR initiatives.

By focusing on the Indian IT industry, this research aims to provide deeper insights into how companies in a rapidly developing economy are integrating environmental considerations into their business practices. The findings will not only contribute to the global conversation on sustainable business practices but will also offer practical guidance for industry leaders, policymakers, and academics who are keen to understand the intersection of technology, CSR, and environmental stewardship.

KEY OBJECTIVES OF THE STUDY

- **Mapping GIT Adoption Trends**: Analyzing the prevalence and nature of GIT strategies adopted by Indian IT companies, including the extent of integration and the types of initiatives undertaken.
- **Identifying Motivations and Barriers**: Investigating the driving forces behind the adoption of GIT strategies and the challenges that organizations encounter in implementing these initiatives.
- **Assessing Impact on CSR and Organizational Performance**: Evaluating the perceived

impact of GIT strategies on an organization's CSR standing and overall performance, including financial, reputational, and operational dimensions.

REVIEW OF LITERATURE:

The adoption of Green Information Technology (GIT) strategies within Corporate Social Responsibility (CSR) frameworks is gaining prominence globally and in India. This review synthesizes key findings, focusing on motivations, challenges, and outcomes of environmentally responsible practices in the IT sector.

Global Perspectives on GIT and CSR: Globally, GIT adoption is linked to enhanced reputation, stakeholder engagement, and financial performance. Kumar (2021) highlights the growing expectation for businesses to address environmental concerns alongside economic goals. Mouakket and Aboelmaged (2023) identify management support and resource commitment as critical drivers of GIT adoption in emerging economies, while Rothenberg (2018) emphasizes competitive advantages tied to robust environmental performance. Collaborative green policies have also been shown to enhance corporate image and market positioning (Luthra et al., 2020; Yadav et al., 2020).

CSR in the Indian Context: India's CSR landscape has evolved significantly, particularly after the 2013 Companies Act mandate. Agarwal and Malhotra (2015) underscore the cultural and institutional factors shaping CSR initiatives. Vethirajan et al. (2020) trace CSR's shift from philanthropy to strategic sustainability, highlighting transparency and collaboration as key challenges. Vikyath (2022) notes that major IT companies like TATA and Infosys are increasingly integrating environmental management into their CSR efforts.

GIT Adoption in Indian IT Companies : The Indian IT sector, a major economic driver, is witnessing a growing focus on sustainability. Gupta and Sharma (2019) report increased adoption of energy-efficient technologies and waste reduction practices. Khuntia et al. (2018) highlight the dual benefits of GIT investments in profitability and energy conservation, urging further exploration of their environmental and financial impacts.

Challenges in GIT Adoption: Despite its benefits, GIT adoption faces hurdles like high initial costs, resistance to change, and lack of standardized metrics (Bhaskar & Sinha, 2016; Bansal et al., 2018). Krishnadas and Pillai (2021) emphasize the need for cultural and process-oriented approaches to ensure the sustainability of Green IT initiatives.

RESEARCH GAP

While global research on GIT adoption is extensive, studies specific to Indian IT companies remain limited. This review identifies a need to explore the motivations, challenges, and outcomes of GIT adoption in the unique socio-economic context of India. By addressing this gap, the study aims to provide insights for both academic research and practical implementation, fostering the alignment of technology, CSR, and environmental sustainability.

CONCEPTUAL FRAMEWORK: MODEL FOR GIT ADOPTION IN INDIAN IT COMPANIES

In developing this conceptual framework for Green Information Technology (GIT) adoption in Indian IT companies, we draw on the findings of Mouakket and Aboelmaged (2019) , used TOE approach and identified organizational factors such as management support and resource commitment as significant determinants of GIT adoption in emerging economies.

However, Developing a model for Green Information Technology (GIT) adoption in Indian IT companies involves considering various factors that influence the decision-making process. Below is a conceptual framework for GIT adoption, taking into account the unique

characteristics of the Indian IT sector:

1. **Organizational Drivers:**
    a. **Regulatory Compliance:** The extent to which companies comply with environmental regulations and standards set by national and international bodies.
    b. **Stakeholder Pressures:** Influence from stakeholders, including customers, investors, and employees, who increasingly prioritize environmentally responsible practices.
2. **Organizational Readiness:**
    a. **Leadership Commitment:** The commitment of top leadership to environmental sustainability and GIT adoption.
    b. **Resource Availability:** The availability of financial and human resources dedicated to GIT initiatives.
    c. **Innovation Culture:** The organization's culture regarding innovation and willingness to adopt new, environmentally friendly technologies.
3. **Technological Factors:**
    a. **Availability of Green Technologies:** The presence and accessibility of technologies that support GIT, including energy-efficient hardware, eco-friendly software, and sustainable data center solutions.
    b. **Cost of Implementation:** The financial implications associated with adopting GIT, considering the initial investment and long-term operational costs.
4. **Environmental Impact Assessment:**
    a. **Carbon Footprint Measurement:** The organization's ability to measure and assess its carbon footprint and overall environmental impact.
    b. **Waste Reduction Strategies:** Implementation of strategies to minimize electronic waste and promote responsible disposal practices.
5. **Organizational Culture and Employee Involvement:**
    a. **Employee Awareness and Training:** The level of awareness and training provided to employees regarding GIT practices.
    b. **Incentives for Green Behavior:** The existence of policies and incentives that encourage employees to contribute to GIT initiatives.
6. **Collaboration and Industry Networks:**
    a. **Partnerships and Collaborations:** Involvement in collaborative efforts with other organizations, industry groups, or government agencies to promote GIT practices.
    b. **Industry Benchmarking:** Comparison of GIT practices with industry benchmarks and best practices.
7. **Performance Measurement and Reporting:**
    a. **Key Performance Indicators (KPIs):** Defined KPIs for evaluating the success and impact of GIT adoption.
    b. **Transparency and Reporting:** The extent to which organizations communicate their GIT efforts to internal and external stakeholders.
8. **Government Support and Policies:**

a. **Government Initiatives:** The presence of supportive government policies, incentives, and initiatives that promote GIT adoption.

b. **Regulatory Environment:** The overall regulatory environment and its alignment with environmental sustainability goals.

9. **Risk Management:**

a. **Identification and Mitigation of Risks:** The organization's ability to identify and address potential risks associated with GIT adoption, including technological, financial, and operational risks.

RESEARCH METHODOLOGY

The research design for this study integrates both quantitative and qualitative approaches, with an empirical focus on understanding the adoption of Green Information Technology (GIT) strategies as part of Corporate Social Responsibility (CSR) in IT companies. A judgmental sampling technique was used to select a sample of 35 companies, targeting individuals who are knowledgeable and actively involved in implementing green strategies within their organizations.

Data was collected using a structured survey or questionnaire, which consisted of two main sections. Part I captured respondents' demographic profiles, while Part II focused on the green strategies adopted by IT companies. The questionnaire comprised approximately 35 questions, incorporating both closed-ended and open-ended items. Primary data for the quantitative analysis was collected from the closed-ended questions, while the open-ended responses provided insights for qualitative analysis. Additionally, several case studies are also analysed in this research paper In addition to primary data, secondary data was sourced from relevant books, journals, and websites to support the research. The data was analyzed using tools such as percentage analysis, data visualization, and Structural Equation Modelling (SEM) with AMOS software to explore relationships between variables. The questionnaire employed a Likert scale to gauge respondents levels of agreement or disagreement with various statements related to GIT strategies, ensuring a robust understanding of the perspectives on green IT practices across the sample.

DATA ANALYSIS AND INTERPRETATION:

1. PERCENTAGE ANALYSIS:

From the below descriptive statistics on company characteristics it can be inferred that company size reveal a mean of 2.66, indicating a trend towards larger organizations, though small and medium-sized companies are still present. The standard deviation of 0.68 suggests moderate variability in company sizes. The mean years of operation is 3.23, indicating most companies have been operational for over 20 years, demonstrating the stability needed for successful GIT adoption. Similarly, GIT implementation has been ongoing for an average of 5 years (mean 3.23), with moderate variability in adoption across companies. Revenue analysis shows an average of ₹1000 crore, with a standard deviation of 1.01, highlighting the prevalence of high-revenue firms that likely have the financial capacity to invest in GIT strategies. Overall, the sample is predominantly comprised of large, established companies with substantial revenue and extenxive experience in GIT implementation.

Descriptive Statistics					
	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Company size	35	1.00	3.00	2.6571	.68354
Years Of Operation	35	1.00	4.00	3.2286	1.08697
Git Implementation Years	35	1.00	4.00	3.2286	.94202
Revenue	35	1.00	4.00	3.4286	1.00837

Table 1- Descriptive Statistics Of Company Characteristics And Git Implementation

From the below percentage analysis on specific GIT strategies that respondents company adopted, it can be identified that a significant majority of companies (65.7%) have adopted digital solutions to reduce paper usage, emphasizing their commitment to sustainability through digital transformation. More than half (54.3%) have implemented energy-efficient servers and data centers, highlighting the focus on energy efficiency and cost savings. Nearly half (48.6%) are using cloud computing to reduce physical infrastructure, demonstrating efforts to lower environmental impact. While e-waste management is the least adopted strategy (42.9%), its importance for sustainable disposal and recycling is acknowledged. Overall, companies prioritize digitization, energy efficiency, and cloud solutions, reflecting a clear focus on sustainability and cost-effectiveness through Green IT.

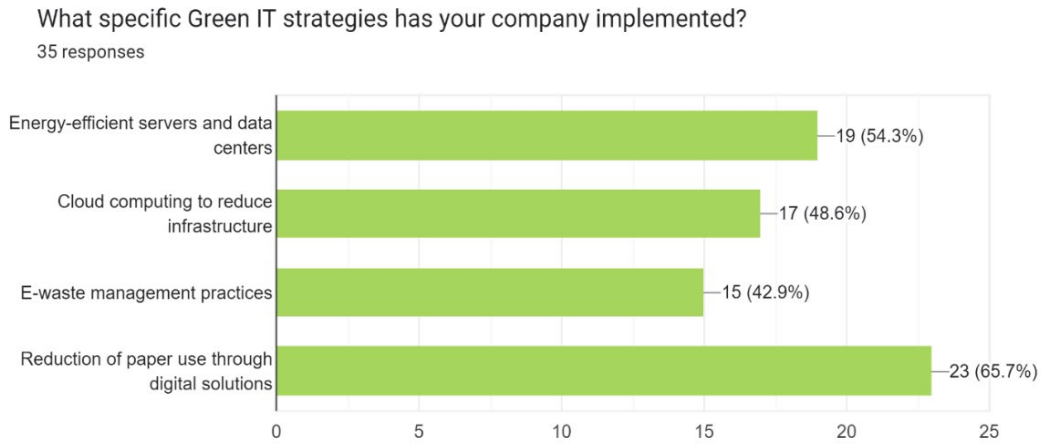

Fig. 1- Percentage Analysis Showing The Git Strategies The Companies Has Implemented

In the below fig. 2 The pie chart illustrates the percentage of companies involved in collaborative networks that promote environmental sustainability within the IT industry. Around, **91.4% (in blue)** of the respondents affirm that their company is part of such collaborative networks. And **8.6% (in red)** of the respondents state that their company is not involved in these networks.This suggests that a significant majority of companies surveyed are actively engaged in environmental sustainability efforts through collaborative networks, while a small minority are not. This may indicate a broad acceptance of sustainability practices within the IT sector.

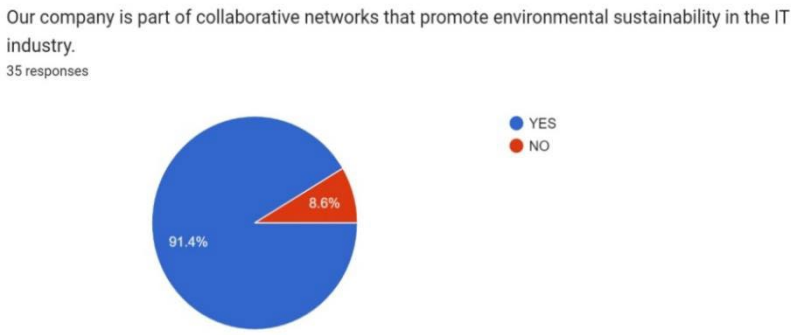

Fig. 2 - Percentage Analysis Showing Whether The Company Is Part Of Collaborative Network That Promotes Sustainability

From the below fig.3 it could be observed that The key resources for advancing Green IT adoption include training and knowledge sharing (65.7%), access to affordable green technologies (62.9%), and government incentives (54.3%). These reflect the need for enhanced education, financial support, and affordable technologies. Collaboration with industry peers is also valued by 51.4% of companies. However, government regulations are seen as the least helpful (2.9%), suggesting a preference for supportive measures over regulatory pressure in fostering Green IT adoption.

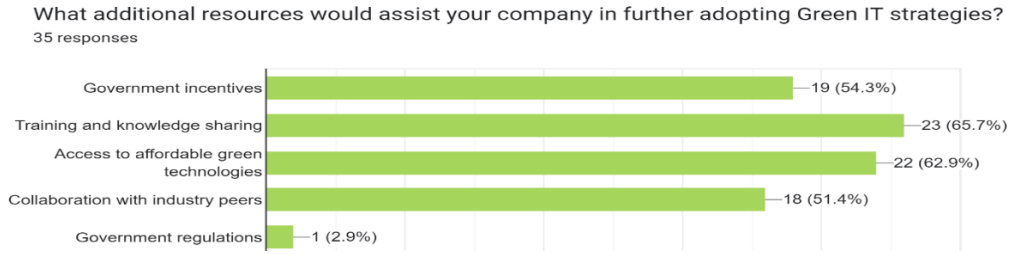

Fig. 3 - Percentage Analysis On The Additional Resources Required For The Compnay In Further Adopting Git Strategies

ONE WAY ANOVA

H1: There is relationship between environmental certifications to gain global market and companies revenue categories.

From the ANOVA table it can be inferred that, Since the p-value is 0.029 i.e less than 0.05, the null hypothesis is rejected at the 5% level regarding the relationship between environmental certifications and companies revenue categories. Hence, there is a significant difference among companies revenue categories concerning their environmental certifications. This indicates that companies with varying revenue levels tend to approach environmental certifications differently, potentially influenced by their resources and market strategies. Based on the One-Way ANOVA results, the significant difference suggests that higher revenue firms may be more likely to pursue environmental certifications to gain access to global markets.

ENVIRONMENTAL CERTIFICATIONS					
	Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Between Groups	5.033	3	1.678	3.511	.029
Within Groups	12.902	27	.478		
Total	17.935	30			

Table 2 One way ANOVA

ANALYSIS OF MOMENT STRUCTURES (AMOS)

H2: A comprehensive framework exists in which organizational drivers positively influence organizational readiness, which in turn enhances technological factors. These technological factors contribute to effective risk management, leading to a positive environmental impact. This environmental impact subsequently improves performance measurement and reporting, which fosters a supportive organizational culture. Finally, this culture positively influences government support and policies, ultimately enhancing collaboration and industry networks.

Model Explanation:

The below model suggests that Organizational Drivers positively influence Organizational Readiness, which in turn impacts Technological Factors. These technological factors lead to better Risk Management, which affects Environmental Impact. Improved environmental impact leads to Performance Measurement and Reporting, which then impacts Organizational Culture. A strong organizational culture affects the Government Support and Policies, which eventually leads to better Collaboration and Industry Network.

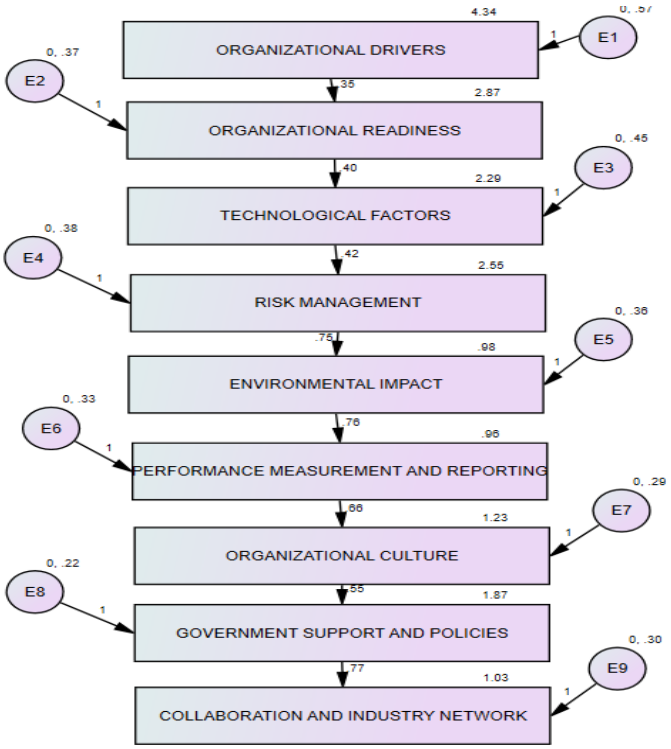

Fig. 4 - Factors Influencing Git Adoption In India

CMIN:

CMIN/DF is the minimum discrepancy divided by its degrees of freedom whose ratio should be close to 1 for correct models. While Wheaton et al. (1977) suggests a ratio of approximately five or less 'as beginning to be reasonable. Here the value is 3.437 which is less than 5. Hence the model is a good fit.

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	26	96.234	28	.000	3.437
Saturated model	54	.000	0		
Independence model	9	222.446	45	.000	4.943

Table 3 CMIN

Baseline Comparisons: The NFI (Normed Fit Index) indicates that model being evaluated has a discrepancy that is way between the terribly fitting independence model and the perfectly fitting saturated model.CFI (Comparative Fit Index) is revised form of NFI that is not very sensitive to sample size. Itcompares the fit of a target model to the fit of an independent, or null, model.

Model	NFI	CFI
Default model	.567	.615
Saturated model	1.000	1.000
Independence model	.000	.000

Table 4 NFI and CFI

NFI and CFI values close to 1 indicate a very good fit. The NFI obtained in the model 0.567 and CFI value 0.615 showcases a good model fit.

Regression Weights:

			Estimate	S.E.	C.R.	P
Organization Readiness	<---	Organization Drivers	.346	.138	2.503	.012
Technology Factors	<---	Organization Readiness	.402	.176	2.290	.022
Risk Management	<---	Technology Factors	.423	.149	2.834	.005
Environental Impact	<---	Risk Management	.754	.149	5.066	***

			Estimate	S.E.	C.R.	P
Performance Measurement	<---	Environental Impact	.756	.124	6.084	***
Organization Culture	<---	Performance Measurement	.660	.111	5.929	***
Government Initiative	<---	Organization Culture	.552	.105	5.240	***
Industry & Collaboration	<---	Government Support & Policies	.773	.147	5.264	***

Table 5 Regression weights

The model shows that **organizational drivers** positively influence **organizational readiness**, which in turn enhances **technological factors**. These technological factors improve **risk management,** leading to a significant boost in **environmental impact.** This increased environmental impact strongly affects **performance measurement,** which then enhances **organizational culture**. A positive organizational culture promotes **government support and policies,** which ultimately boosts **industry collaboration.** All these relationships are statistically significant, illustrating a clear, positive pathway for successfully adopting **Green Information Technology (GIT).**

THEMATIC ANALYSIS

The responses provided reflect the diverse perspectives on the adoption of Green Information Technology (GIT) strategies within the Indian IT sector, especially as a form of Corporate Social Responsibility (CSR). In this analysis, we explore the recurring themes, insights, challenges, and possible solutions as expressed by respondents. The goal is to uncover factors that influence GIT adoption and offer recommendations for fostering a stronger culture of sustainability in Indian IT companies.

1.1 Government Role in Driving GIT Adoption

A recurring theme in the responses is the importance of **government initiatives** in promoting GIT adoption. Many participants believe that the government should take proactive steps, such as launching awareness campaigns and providing **incentives** for companies that adopt green IT practices. Tax benefits, subsidies, or other forms of financial support can make GIT adoption more attractive, especially for small and medium-sized enterprises (SMEs).

Key Insights:

- **Incentivizing Adoption**: Several respondents recommended that tax exemptions and green adoption incentives should be introduced by the government. This suggests that financial considerations are crucial for companies contemplating GIT adoption.
- **Awareness Campaigns**: The government can lead educational campaigns to spread awareness of GIT's significance and benefits. This indicates a gap in understanding of GIT principles, which could be filled through public sector intervention.

Quotes:

- "*Government should give awareness to the people about the uses and advantages of GIT adoption."*

- *"Government incentives or exemptions in taxation."*

1.2 Awareness and Education Gaps

The lack of awareness about GIT and its environmental benefits was a prominent issue raised by respondents. Many suggested that training programs, workshops, and awareness sessions could help bridge this gap, particularly at the grassroots level. Respondents highlighted that while large tech companies have started adopting GIT practices, smaller firms and individual employees are often unaware of the full benefits of GIT.

Key Insights:

- **Grassroots Awareness**: There is a perceived disconnect between corporate awareness at large IT firms and the lack of understanding among employees, customers, and smaller organizations.
- **Hands-On Experience**: Practical experience and on-the-ground training sessions are necessary to make employees and businesses more comfortable with GIT technologies.

Quotes:

- *"Conducting training and awareness sessions. Regular workshops and bootcamps to make it familiar among peers."*
- *"While large tech companies have embraced GIT, there is still a gap in awareness and hands-on experience at the grassroots level."*

1.3 Corporate Social Responsibility and Private Sector Leadership

Several respondents pointed to the responsibility of the private sector to lead GIT adoption, particularly as part of their Corporate Social Responsibility (CSR) efforts. R&D in green technologies was seen as a priority, particularly through collaborations between the private sector and government. Companies can play an essential role in driving innovation and developing cutting-edge solutions that could pave the way for wider GIT adoption.

Key Insights:

- **CSR and GIT Synergy**: IT companies should integrate GIT strategies into their CSR objectives, making it part of their core mission to contribute to environmental sustainability.
- **Innovation through R&D**: There is a call for collaborative research between the government and IT companies to develop green technologies and provide solutions that reduce the environmental footprint of the tech industry.

Quotes:

- *"R&D in green technologies through government funding and collaboration with private sector players is crucial for developing cutting-edge solutions."*
- *"Having crafting experiments with employees can keep them active for GIT as well as improve GIT adoption."*

1.4 Operational Changes to Support GIT

A smaller but important number of respondents discussed how daily operational changes could support GIT adoption. This includes reducing the use of plastics, limiting unnecessary travel, and minimizing the overall carbon footprint of business activities. Simple, actionable changes in operations can collectively make a significant impact on the environment.

Key Insights:

- **Plastic Reduction**: Reducing the use of single-use plastics and implementing waste reduction strategies can support broader sustainability goals.
- **Reducing Travel**: Companies could explore remote work and virtual meetings to minimize travel, which can significantly reduce their carbon emissions.

Quotes:

- *"Reduction in plastic usage in daily operations, reduction in travel."*

2. Challenges to GIT Adoption

The qualitative responses revealed several challenges:

- **Lack of Awareness**: Many respondents pointed out the low level of awareness among both companies and individuals regarding GIT and its benefits.
- **Cost Barriers**: For SMEs, the cost of implementing GIT strategies and technologies may be prohibitive without adequate government support.
- **Gaps in Training**: Practical experience and hands-on training are currently insufficient, creating barriers to understanding and utilizing GIT technologies effectively.

The responses suggest that while larger tech companies are adopting GIT, there is a significant gap in awareness and implementation at the grassroots level, particularly in smaller firms and among individual employees. The role of the government in providing financial incentives and regulatory frameworks is crucial for accelerating GIT adoption. Additionally, IT companies must take on a leadership role in promoting GIT as part of their CSR initiatives, ensuring sustainability is a core business priority.

Overall, fostering a culture of sustainability within the Indian IT sector requires a multi-stakeholder approach. This includes government action, corporate responsibility, employee education, and a willingness to adopt green practices in daily operations. A more informed, incentivized, and collaborative ecosystem will accelerate the adoption of Green Information Technology in India.

Case Study Analysis: Green Information Technology (GIT) as a CSR Strategy in Indian IT Companies

1. Infosys – Leading the Charge in Green IT and Sustainability
Infosys, is one of India's leading IT services companies, has been a pioneer in adopting sustainability and Green IT (GIT) practices. The company, headquartered in Bengaluru, has consistently been at the forefront of innovation and sustainability, integrating green technologies into its operations. As part of GIT initiatives Infosys has implemented several green IT strategies as part of its broader corporate social responsibility (CSR) agenda:

- **Energy-Efficient Data Centers**: Infosys has made significant strides in reducing its energy consumption through the use of energy-efficient technologies in its data centers. The company reduced its per capita electricity consumption by 44% over the last decade by upgrading to energy-efficient servers, employing advanced cooling technologies, and optimizing energy use through real-time monitoring.
- **Carbon Neutrality**: In 2020, Infosys became one of the first global companies to achieve **carbon neutrality** across Scope 1, 2, and 3 emissions. This milestone was achieved through a combination of energy efficiency measures and a significant investment in renewable energy.

- **Renewable Energy**: Currently, 44% of Infosys's energy consumption is sourced from renewable energy, primarily from solar installations. The company aims to increase this to 50% in the coming years.
- **Green Buildings**: Infosys has been a leader in the construction of LEED-certified green buildings, which reduce energy consumption and environmental impact. Many of its campus facilities in India are now net-zero energy buildings, demonstrating how green architecture can contribute to sustainability.

The significant challenge that Infosys faced was in driving GIT adoption, such as the high initial capital investment for energy-efficient infrastructure and renewable energy systems. Additionally, educating employees and clients about the importance of green IT initiatives posed an obstacle.

Outcomes:

- **Environmental Impact**: Infosys achieved carbon neutrality and continues to focus on reducing its overall energy footprint.
- **Cost Savings**: Through energy efficiency initiatives and a reduction in overall energy consumption, the company saw cost savings amounting to millions of dollars over a decade.
- **Reputation and Leadership**: Infosys's green IT strategy has elevated the company's global reputation as a leader in sustainability. It is also recognized as one of the most socially responsible companies in the IT sector.

Infosys exemplifies how companies can integrate GIT into their broader CSR strategies, highlighting the economic and environmental benefits of green technology. This case showcases the importance of long-term planning, executive leadership, and a commitment to sustainable development. Moving forward Infosys is aiming for vision 2030.

2. Wipro – Green IT as a Key Element of Sustainability and CSR

Wipro, another major player in the Indian IT landscape, has integrated GIT as a core component of its sustainability and CSR framework. The company focuses on a multi-pronged approach to reducing environmental impact, including energy efficiency, responsible resource management, and green product development. The GIT Initiatives taken by Wipro are:

- **Energy Efficiency in IT Infrastructure**: Wipro has adopted energy-efficient practices across its IT operations. It uses advanced cooling systems in its data centers and has implemented server virtualization to reduce energy use. By minimizing its data center footprint, Wipro reduced its carbon emissions significantly.
- **E-Waste Management**: Wipro has established a strong e-waste recycling program in India, working with certified vendors to ensure the safe disposal and recycling of electronic waste. This initiative is a key part of the company's environmental responsibility.
- **Green Computing Solutions**: Wipro offers green IT services to its clients, including energy-efficient hardware and sustainable software solutions. These solutions help clients reduce their energy use and environmental impact, enhancing Wipro's position as a provider of eco-friendly technologies.

One of the main challenges for Wipro was the lack of industry-wide standards for e-waste management and sustainable technology. Additionally, while large clients were keen to adopt green technologies, many smaller clients were hesitant due to cost concerns.

Outcomes:

- **Sustainability Recognition**: Wipro has been recognized globally for its leadership in sustainability and green IT practices. The company has been included in the Dow Jones Sustainability Index for multiple consecutive years, underscoring its dedication to corporate social responsibility.
- **Operational Efficiency**: The adoption of energy-efficient IT infrastructure led to significant **cost savings** and a reduction in operational carbon emissions.
- **Client Engagement**: Wipro's green IT solutions have been well-received by clients, particularly those in industries focused on reducing their carbon footprint, such as financial services and healthcare.

Wipro's green IT strategy demonstrates the potential for CSR initiatives to extend beyond internal operations to client solutions. By focusing on responsible IT operations and offering green IT services, Wipro successfully aligned its business growth with its environmental goals.

HCL Technologies – Green Data Center Transformation
HCL Technologies, a global IT services company headquartered in Noida, India, has committed to reducing its environmental footprint through energy-efficient data centers and cloud adoption. Green IT has become a cornerstone of its CSR strategy, aligning with the company's goal of reducing its carbon footprint. The GIT Initiatives taken by HCL technologies are:

- **Green Data Centers**: HCL Technologies built energy-efficient data centers using advanced cooling techniques and energy management systems. These facilities reduce the energy used for server cooling and improve overall operational efficiency.
- **Server Virtualization**: HCL has embraced virtualization as a key strategy to reduce the number of physical servers required in its data centers. This resulted in a 30% reduction in energy consumption across its IT infrastructure.
- **Renewable Energy Integration**: HCL has also invested in renewable energy sources, including solar power, to reduce its reliance on conventional energy sources. This shift is part of the company's long-term strategy to become carbon neutral.

The challenge faced by the company was the high upfront costs associated with building green data centers and integrating renewable energy presented significant challenges. Moreover, ensuring that clients supported these green initiatives required significant customer education efforts.

Outcomes:

- **Energy Efficiency**: The green data centers led to a 30% reduction in overall energy use, reducing the company's operational costs and carbon footprint.
- **Cost Benefits**: Over time, HCL Technologies realized significant savings through reduced energy consumption and more efficient data center operations.
- **Positive Brand Image**: HCL's commitment to green IT helped enhance its reputation as a socially responsible company, appealing to environmentally-conscious clients and stakeholders.

HCL Technologies focus on data center efficiency and renewable energy showcases the financial and environmental benefits of adopting GIT strategies. This case demonstrates the importance of investing in green technologies as part of a company's long-term sustainability plan.

Tata Consultancy Services (TCS) – Sustainable IT for a Greener Future
TCS, a part of the Tata Group and one of the largest IT services companies in the world, has made sustainability a core part of its operational philosophy. Its Green IT strategy is embedded in both its internal processes and the solutions it offers to clients. The GIT Initiatives of TCS are:

- **Energy Optimization and Power Management**: TCS implemented smart power management solutions in its data centers, reducing power consumption across its global operations. This included the adoption of server virtualization and cloud computing to consolidate resources and lower energy use.
- **Sustainable IT Solutions for Clients**: TCS has developed energy management software and other sustainable IT solutions for its clients, helping them reduce energy consumption and improve efficiency.
- **Green Building Practices**: TCS implemented green building standards in its offices, with many of its facilities achieving LEED certification. This includes using energy-efficient lighting, optimized HVAC systems, and sustainable materials.

While TCS experienced fewer challenges due to its scale and resources, one of the key hurdles was ensuring that its green IT solutions were cost-effective for smaller clients. Additionally, the company needed to continuously innovate to maintain its position as a leader in sustainability.

Outcomes:

- **Environmental Impact**: TCS reduced its power consumption by 45% across its global operations, demonstrating its commitment to sustainability.
- **Client Engagement**: TCS's focus on sustainable IT solutions helped the company win large clients in sectors that prioritize sustainability, including banking, insurance, and healthcare.
- **Corporate Recognition**: TCS's sustainability initiatives have garnered global recognition, further solidifying its position as a leader in CSR and Green IT.

TCS's Green IT strategy highlights the importance of aligning business growth with environmental responsibility. The company's commitment to sustainability extends beyond its internal operations, positioning it as a leader in developing sustainable IT solutions for its global client base. As TCS march forward they aim for Net Zero emissions by 2030

These case studies of leading Indian IT companies—Infosys, Wipro, HCL Technologies, and TCS—demonstrate that Green IT adoption can significantly benefit both the environment and business operations. The successful implementation of GIT as part of a company's CSR strategy has led to reduced carbon emissions, cost savings, energy efficiency, and enhanced corporate reputation.

These companies initiatives showcase that early investment in sustainable technologies can deliver long-term benefits. Furthermore, a clear commitment to sustainability, combined with employee engagement, customer education, and government incentives, is crucial for driving Green IT adoption across the Indian IT sector.

FINDINGS

The findings of this research underscore the pivotal role of organizational characteristics, resources, and collaborative efforts in driving the adoption of Green Information Technology (GIT) in the Indian IT sector. The descriptive statistics reveal that GIT adoption is predominantly led by large, well-established companies with significant financial resources.

These firms, characterized by their stability, long operational histories, and average revenue exceeding 1000 crore, are well-positioned to implement and sustain GIT practices. While larger organizations dominate this space, there is evidence of growing participation from smaller firms, indicating a gradual broadening of GIT adoption.

The analysis of GIT strategies highlights a strong inclination toward digitization and resource optimization, with a majority of companies adopting practices such as paper reduction through digital solutions, energy-efficient data centers, and cloud computing. However, e-waste management remains underutilized, reflecting the challenges of proper disposal and recycling. Collaborative networks also emerge as critical enablers, with over 91% of companies participating in sustainability-focused networks, showcasing the sector's collective effort to scale green initiatives.

A significant proportion of companies (65.7%) plan to expand their GIT initiatives within the next 1–3 years, signalling a proactive approach to environmental sustainability. However, uncertainties among the remaining firms suggest potential barriers, such as cost concerns, technological challenges, and unclear benefits. Further analysis identifies training, affordable green technologies, and government incentives as the most critical resources required to enhance GIT adoption. In contrast, regulatory mandates are viewed as less effective, emphasizing the preference for supportive measures over compliance-driven approaches.

The findings from the ANOVA analysis highlight the significant influence of financial resources on sustainability efforts. Larger organizations with higher revenues demonstrate greater capacity and motivation to pursue environmental certifications, leveraging their resources to gain a competitive edge in global markets. The AMOS modeling further illustrates the interconnected factors driving GIT adoption, from organizational readiness and technological capabilities to enhanced collaboration within industry networks. Internal preparedness and risk management emerge as critical drivers, while government support and policies play a vital role in fostering widespread adoption.

Qualitative insights add depth to the findings, revealing key themes that shape GIT adoption. The government’s role is particularly pronounced, with incentives, subsidies, and awareness campaigns identified as essential for overcoming cost and knowledge barriers, especially for SMEs. Awareness and education gaps persist at the grassroots level, emphasizing the need for practical training and workshops to familiarize employees and smaller firms with GIT practices. Private sector leadership, particularly through CSR frameworks, emerges as a crucial factor, as companies integrate sustainability into their core strategies and collaborate with government initiatives. Operational changes, such as reducing plastic usage, adopting paperless practices, and minimizing business travel, are identified as practical steps toward achieving GIT objectives. However, challenges such as high implementation costs, insufficient training, and limited awareness continue to hinder wider adoption.

The case study analysis of leading Indian IT companies, including Infosys, Wipro, HCL Technologies, and TCS, underscores the transformative impact of GIT on both environmental and business outcomes. These companies have achieved energy efficiency, reduced carbon emissions, and cost savings through strategic initiatives like energy-efficient data centers, renewable energy integration, and robust e-waste management. Their leadership in sustainability not only enhances their corporate reputation but also attracts environmentally conscious clients. Early investment in green technologies and collaboration across sectors emerge as critical success factors, supported by ongoing government incentives.

In conclusion, the research highlights the profound impact of financial resources, organizational readiness, and collaborative networks on GIT adoption in the Indian IT sector. While larger firms continue to lead the way, bridging the gap for smaller companies requires

targeted government support, industry partnerships, and widespread training initiatives. Early investments in green technologies have demonstrated substantial environmental, economic, and reputational benefits, underscoring the need for sustained efforts to embed sustainability into the fabric of the IT industry in India.

DISCUSSION

This study explores the adoption of Green Information Technology (GIT) in Indian IT companies, emphasizing the influence of organizational size, financial capacity, and collaboration. The findings highlight that larger companies with substantial financial resources are more likely to implement GIT due to their ability to manage high initial costs. This aligns with prior research suggesting that larger firms are better positioned for sustainability investments.

Digitization and energy-efficient data centers are widely adopted, while e-waste management remains challenging due to disposal complexities. This points to a need for stronger government support and industry collaboration to ensure comprehensive GIT adoption.

Collaboration is critical, with 91.4% of companies involved in environmental networks. However, smaller firms face barriers such as high costs and knowledge gaps, which can be mitigated through increased training, access to affordable green technologies, and enhanced financial incentives.

The SEM analysis underscores the importance of internal readiness and technological capabilities in driving successful GIT initiatives, with government policies playing a supportive role. Qualitative insights stress the importance of government incentives and training programs to bridge knowledge gaps, particularly among SMEs.

Case studies of leading firms reveal the significant benefits of early GIT adoption, including cost savings and enhanced reputations. These findings highlight the need for continued collaboration and targeted support to facilitate broader GIT adoption across the industry.

In conclusion, the adoption of GIT is driven by larger organizations, but smaller firms require focused support. The research suggests that government incentives, affordable technologies, and training are key to overcoming the barriers and ensuring sustainability across the IT sector.

RECOMMENDATIONS

Based on the research findings, the following recommendations are proposed to enhance the adoption of Green Information Technology (GIT) in Indian IT companies, particularly focusing on overcoming challenges faced by smaller firms and maximizing the potential benefits of GIT:

1. **Enhanced Government Support:**
   - **Incentives and Subsidies:** The government should expand financial incentives and subsidies specifically targeting small and medium-sized enterprises (SMEs) to alleviate high implementation costs. This can encourage more companies to invest in GIT.
   - **Awareness Campaigns:** Initiate government-led awareness campaigns to educate businesses about the benefits and practices of GIT. Workshops, seminars, and online resources can bridge knowledge gaps, especially for SMEs.
2. **Capacity Building and Training:**
   - **Training Programs:** Develop comprehensive training programs and workshops for employees across all organizational levels to increase awareness and practical understanding of GIT practices. This should include hands-on training in new technologies and operational changes that promote sustainability.

- **Knowledge Sharing Platforms:** Establish platforms for knowledge sharing among companies to facilitate best practices in GIT adoption, encouraging collaboration and learning.

3. **Integration into Corporate Strategy:**

- **CSR Frameworks:** Encourage IT companies to incorporate GIT strategies into their Corporate Social Responsibility (CSR) frameworks. This integration can demonstrate leadership in sustainability and contribute to broader environmental goals.
- **R&D Investment:** Promote investment in research and development of green technologies, encouraging collaboration between the private sector and government initiatives to drive innovation in sustainable practices.

4. **Collaboration and Networking:**

- **Industry Collaborations:** Foster networks and collaborations among IT companies to promote joint initiatives for GIT adoption. Sharing resources, experiences, and successes can help smaller firms access the support they need.
- **Partnerships with Educational Institutions:** Encourage partnerships with universities and training institutes to create specialized programs that focus on green technologies, helping to build a skilled workforce knowledgeable in GIT.

5. **Focus on Practical Steps:**

- **Operational Audits:** Companies should conduct regular audits of their operations to identify areas where waste reduction and energy efficiency can be improved. Simple changes, such as reducing plastic use and minimizing business travel, can make a significant environmental impact.
- **Sustainability Reporting:** Encourage companies to adopt sustainability reporting practices to track progress in GIT adoption, share outcomes with stakeholders, and enhance transparency in their environmental initiatives.

6. **Addressing Barriers:**

- **Overcoming High Costs:** Explore innovative financing options, such as green loans or financing partnerships, to help SMEs manage the upfront costs associated with adopting GIT.
- **Standardizing Best Practices:** Develop standardized metrics and guidelines for GIT practices to simplify implementation processes for companies, particularly for those with limited resources.

7. **Sustainability Hackathons:**

- **Innovation through Collaboration:** Organize hackathons focused on developing GIT solutions, encouraging participation from not only IT companies but also startups, academic institutions, and environmental organizations. These events can spur collaboration and generate innovative ideas, tools, and technologies that address specific challenges in GIT adoption. The outcomes can be incubated further, creating a pipeline for sustainable technological advancements that can be scaled across the industry.

8. **Corporate Sustainability Ambassadors:**

- **Empower Employees as Change Agents:** Establish a program where select employees are designated as “Corporate Sustainability Ambassadors” within their organizations.

These ambassadors can undergo specialized training in GIT practices and sustainability leadership, then serve as liaisons between the management and employees. They can champion green initiatives, facilitate workshops, and lead local sustainability projects, thus fostering a grassroots movement within companies. This empowers employees, making them active participants in the GIT journey and enhancing overall organizational buy-in.

Implementing these recommendations will create a supportive ecosystem for GIT adoption in the Indian IT sector, facilitating collaboration between the government, industry, and educational institutions. By addressing financial and awareness barriers, promoting training, and integrating sustainability into corporate strategies, Indian IT companies can enhance their environmental responsibility while reaping substantial business benefits.

SCOPE FOR FUTURE STUDY:

Future research on Green Information Technology (GIT) adoption in Indian IT companies could explore several key areas. Longitudinal studies could track the long-term impacts of GIT on organizational performance and sustainability. Investigating sector-specific GIT adoption across industries beyond IT could reveal tailored strategies for different contexts. Examining the role of emerging technologies like AI and IoT in facilitating GIT adoption can unveil innovative solutions for sustainability. Additionally, studying consumer attitudes towards GIT can help companies align their strategies with market expectations. And Analysing the effectiveness of government policies and incentives in promoting GIT, particularly for SMEs, could inform better regulatory frameworks. Lastly, cross-cultural studies comparing GIT practices in India with other countries could identify best practices that can be adapted locally, ultimately contributing to a deeper understanding of GIT's complexities and its potential for driving sustainable change.

CONCLUSION

This study provides valuable insights into the adoption of Green Information Technology (GIT) as part of Corporate Social Responsibility (CSR) in Indian IT companies, highlighting the key factors that drive and hinder GIT initiatives. Larger, well-established firms with strong financial capabilities lead the way in GIT adoption, as they are better equipped to manage the high costs and complex operational changes required. However, the study also identifies significant barriers faced by small and medium-sized enterprises (SMEs), including limited financial resources, lack of awareness, and insufficient training.

The findings underscore the importance of internal organizational readiness, technological innovation, and collaboration in driving GIT success. Companies with a solid foundation in these areas are better able to manage risks, enhance their environmental impact, and strengthen industry networks. The research further emphasizes the critical role of government support in promoting GIT through financial incentives, educational initiatives, and industry collaboration. Additionally, case studies of leading Indian IT firms like Infosys and Wipro demonstrate that early adoption of GIT brings tangible benefits, such as energy efficiency, reduced carbon emissions, and improved corporate reputations.

To ensure broader adoption of GIT, especially among SMEs, the study recommends a combination of enhanced government support, capacity building, and integration of GIT into corporate strategies. Collaboration across the IT industry and with educational institutions is crucial for creating knowledge-sharing platforms, facilitating innovation, and driving the long-term success of sustainability initiatives.

In conclusion, the adoption of GIT as a CSR initiative offers significant environmental and business benefits for Indian IT companies. To achieve widespread and sustained adoption, there

is a need for ongoing government support, industry collaboration, and investment in training and innovation. By fostering a culture of sustainability, Indian IT companies can not only contribute to global environmental goals but also enhance their competitive advantage in an increasingly eco-conscious market.

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