

Green Information Systems and Sustainability Practices of Industries in South South Nigeria

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Abstract—Green information system is gaining traction among companies, not just for its obvious environmental benefit, but for competitive advantage and profitability in the long run. This study investigates the application of green information systems (GIS) and its impact on sustainability practices of companies operating in South South Nigeria. The population consisted of manufacturing and engineering firms operating in South South Nigeria. The sample size is 100 respondents consisting of executives and key personnel from companies operating in the region. A mixed research design method is employed for the study. A structured questionnaire was used for the quantitative study, while document analysis and in-depth interview formed part of the qualitative analysis. Descriptive statistics and regression analysis was used for the data analyses. Findings of the study showed that there is low level of awareness and adoption of Green IS by industries in South south Nigeria. The study recommended that strong government efforts are needed with policies targeting proactive industrial, innovation and energy policies targeting green IS adoption.

Index Terms—Green IS, Awareness, Adoption, Sustainability practices, challenges of adoption of Green IS

I. INTRODUCTION

The south south region, generally referred to as the Niger delta region of Nigeria is experiencing unprecedented increase in investment in capital projects in recent years as a result of increasing demand for infrastructure to service the oil and gas activities in the area and to develop the host communities. There is a new thinking however, which requires individuals, firms and societies to find models, metrics and tools to articulate sustainable pathways to growth. Developing a standard measure contributes to achieving sustainability in all forms. thus, measurement of sustainability practices of companies has been instituted to assess the extent to which companies comply with the pillars of sustainability. Different industries including the the oil and gas industry have been

under enormous pressure to alter their institutional practices with respect to the environment and society. Institutions and individuals are intentionally re-evaluating their activities and functions so that not only future generations can survive, but that they too can be profitable, while being socially responsible. The advocacy has been on creating and supporting a new system that will allow people of the present and future generations to support economic viability, healthy ecosystems, and a more equitable social framework as an alternative (Mitrovic, 2015). This alternative has its origin in the concept of sustainability.

Brundtland (1987) defines Sustainability as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. This definition is related to the triple bottom line, a broad conceptualization of organizational performance comprising economic, environmental, and social dimensions (Kleindorfer *et al.* 2005; Porter & Kramer 2006). An economically sustainable company should be able to produce goods at the minimum cost, while an environmentally sustainable company avoids the over-use of depleting resources or, as an alternative, privileges the use of resources that have less potential for depletion (Tsoulfas & Pappis, 2006); then a socially sustainable system should ensure, among other things, fair distribution of opportunities, adequate provision of social services, and gender equity (Harris, 2003; Böhringer & Jochem, 2007). Balancing these three components best serves a firm’s long-term profitability and existence. For businesses, a shift to a sustainable business process demands business alignment with sustainability goals (Cardoso & Carvalho, 2010). Many firms have reaped financial benefits by committing to sustainable business practices (Miller, 2020).

Curry and Donnellan (2015) opined that business sustainability requires information on the use, its creation, flows, and manipulation, along with monetary information on environment-related costs, earnings, and savings. Relevant and accurate data, information, metrics, and Key Performance Indicators (KPIs) are important keys to support sustainable practices. These types of information are essential to understanding the causal relationships between the various actions that can be taken (as in the case of the built environment that has many stakeholders) and their impact on sustainability performance. Several environmental and sustainability studies have suggested that the smart use of Information technology (IT) and Information systems (IS) can substantially help green the planet (Melville, 2010; Watson *et al.*, 2008). These technologies are changing the behaviour of businesses and consumers. Technology and Information Systems (IS), for example, make it easier to track organizational resource use and productivity, benchmark across facilities, products, and production lines, as well as make a comparative analysis of raw material consumption, the energy required, and waste generation (Esty & Winston, 2006). IS put emphasis on integrating IT solutions and business processes to meet the information needs of businesses and other enterprises (Kroenke, 2015). IS helps to support enterprises’ operations, management, and decision-making processes (Bulgacs, 2013).

Green information system (Green IS) refers to the design and implementation of information systems that contribute to sustainable business processes. Green IS has a greater potential than green IT because it tackles a much larger problem. It can make entire systems more sustainable compared to reducing the energy required to operate information technologies. Green IS offers opportunities for organizations to improve productivity, reduce costs and enhance profitability. Thus, not only does Green IS support information creation, it supports its processing and management. Thus, data, software, connectivity, storage and sharing are all components of Green IS. Expanding the focus to environmental sustainability includes considering its integrated nature and sets of systems (including people, processes, software, and information technologies) to support individual, organizational, environmental and social goals. Information in general and Green IS in particular, can play an important control role through support of environmental management systems, life cycle analysis and design of environment practices (Sarkis, *et al.*, 2013).

This study which is a response to the call to initiate research in IS which can make an important contribution to knowledge at the nexus of information, organizations, and the environment (Melville, 2010), will survey the level of awareness of Green IS as well as the extent of adoption of Green IS by industries in South-South, Nigeria and establish a relationship between Green IS adoption and the sustainability of firms. It will also examine the factors affecting the adoption of Green IS by construction firms in that zone.

II. STATEMENT OF THE PROBLEM

Although information systems have always played an integral role in the industrial world, the industries and engineering companies in Nigeria still lag in crucial aspects. The problem arises from the fact that the development and application of business sustainability is still not well understood either in Akwa Ibom or nationally. Most organizational and even industry wide innovation in the past two decades have been largely driven by information technology. Business models among firms have not been in par with the technological advances that have emerged as powerful tools that can be applied to work more efficiently in industries (Mitrovic, 2015).

Beyond supporting eco-friendly structures, Green IS provides significant economic growth and energy efficiency to industries. However, Green IS having not been fully accepted by stakeholders in South South Nigeria and Nigeria in general. This, in effect is inhibiting large scale adoption of Green IT/IS. The unintended consequences is that industries will continue to support waste, harm the environment, innovate much slower than other States and Nations around us. Work will remain cumbersome and industries that would not compete based on new technologies and IS, will struggle to become socially conscious and environmental friendly.

Research Questions

The following research questions are stated for the study

1. What is the level of awareness of green Information system (Green IS) among industries in South South Nigeria?
2. What is the extent of implementation of Green IS among industries in South South Nigeria?
3. What is the relationship between Green IS integration and industries' sustainability practices in South South Nigeria?

Objectives of the research

The purpose of the study is to ascertain the extent of implementation of green information systems by building and construction companies for sustainability of infrastructural development in Akwa Ibom State. Specifically, the study will seek to

1. Access the level of awareness of green Information system (Green IS) among industries in South South Nigeria.
2. Ascertain the extent of implementation of Green IS among industries in South South Nigeria.
3. Establish the relationship between Green IS integration and industries' sustainability practices in South South Nigeria.

III. LITERATURE REVIEW

Theoretical framework

Institutional Theory – First introduced in the field of sociology, Institutional theory seeks to explain how organizations become homogeneous under social pressures (Chen *et al*, 2009). The concept that best addresses the process of homogenization is isomorphism (Chen *et al*, 2009). After its inception, the concept of isomorphism was “moved” from the society level to the organizational field level by DiMaggio and Powell (DiMaggio and Powell, 1983; Svejvig, 2013). They also categorized the isomorphism into three mechanisms (coercive isomorphism, mimetic isomorphism and normative isomorphism) through which institutional isomorphic change can occur. Institutional theory has been applied to explain IS and IT adoption in many studies (Jensen *et al*, 2009; Svejvig, 2013). The theoretical viewpoint of institutional theory also shows promise for understanding how organizations may embrace sustainability (Boudreau, 2008). Several studies have addressed corporate, social and environmental sustainability through the lens of institutional theory. Green IS adoption, as one step towards corporate sustainability, has been studied using institutional theory, as well (Gholami, 2013). Although institutional theory could be applied at multiple levels, in this research, we use it to primarily capture the external pressures motivating organizations to adopt Green IS.

Literature Review

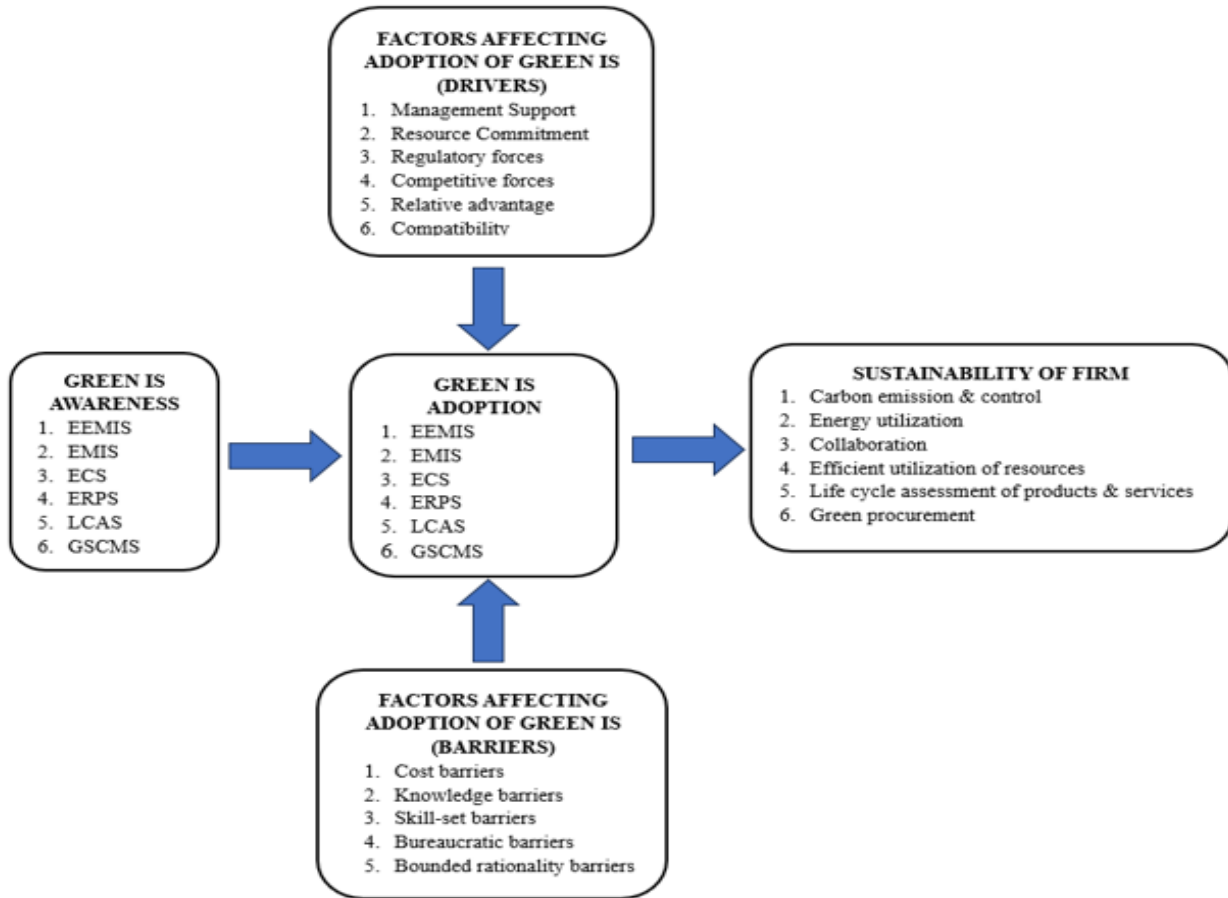


Fig. 1: Conceptual framework

Sustainability and Sustainability Dimensions for Industries

Industries consume a lot of energy and natural resources, which has brought serious environmental problems, such as air pollution and the destruction of natural resources (Xie, *et al.*, 2020). Research conducted by Xingwei, *et al.*, (2022) estimated that the construction sector alone contributed 23% of air pollution, 50% of climate change, 40% of water pollution, and 50% of landfill waste pollution. The consumption of raw materials and the destruction of the environment by the industries have surged to the point where companies are forced to take responsibility, re-evaluate and reorganize their operations (Pan *et al.*, 2020). This is why, in recent years, sustainability has become one of the most important performance-related issues within the construction industry (Zhong & Wu, 2015, Yilmaz & Bakis, 2015) and companies are increasingly asked to translate its strategic sustainability objectives into concrete actions (Ugwu & Haupt, 2007).

Sustainability is the process of living within the limits of available physical, natural and social resources in ways that allow the living systems in which humans are embedded to thrive in perpetuity (Mead, 2019). Business sustainability on the other hand, is the practice of operating a business without impacting the environment negatively (Mead, 2019). A green business functions in the best interests of the local and global environment, meaning it supports the community and

economy dependent on a healthy planet. An environmentally aware business considers more than just profits — it considers its impact on society and the environment.

Eco-friendly and sustainable strategies in industries and management have emerged as one of the most significant areas of the sustainability movement aside the fossil fuel industry. Sustainability has progressively become imperative to organizational practice as a result of rapid utilization of natural resources and the perceive shortages and costs. Cramer and Karabell (2010) maintained that in order for businesses to survive and thrive in this twenty first century, they not only have to measure its success in their financial aspects but instead to work towards discovering a formula to incorporate sustainability measures as part of their performance. Businesses will have to ensure they have sustainable components to achieve competitive advantage or face suffocation and die a natural death.

Green Information System

Green information system (Green IS) refers to the development and implementation of information systems to support or enable eco-environmental sustainability procedures (Bokolo & Noraini, 2015). Green IS operation consisting of application and collective group telepresence applications to allow distant conference and minimize the harmful environmental impacts linked with travelling. Green IS initiates aims to track and monitor ecological variables such as pollution, waste, water consumption, poisoning, carbon footprint. Green IS has two broad implications from this definition as pointed out by Lee (2020). These are developing and maintaining Information systems minimizing impacts on environments; and using Information Systems to develop and maintain organizational practices in an environmentally friendly way.

A green information system (also known as a sustainable information system) refers to the use of information technology (IT) to support environmentally sustainable business practices. This can involve using IT to reduce energy consumption and greenhouse gas emissions, minimize waste, and increase efficiency. A GIS can be used in a variety of ways, such as:

1. Energy management: A GIS can help an organization to monitor and manage its energy consumption, and identify areas where energy usage can be reduced.
2. Waste management: A GIS can help to track and manage waste, and identify opportunities for waste reduction and recycling.
3. Green procurement: A GIS can be used to track the environmental impact of the products and services an organization purchases, and to make informed decisions about purchasing more sustainable options.
4. Telecommuting: A GIS can enable employees to work remotely, reducing the need for transportation and office space.

(Lee, 2020).

Practitioners have proposed Green IT as a technological solution to support environmentally friendly business practices. Commenting on the potential, multi-level application and pervasiveness of Green IS, Brooks, *et al* (2010) averred that to understand and study sustainability comprehensively, one must consider that Green IS involves power consumption and management,

manufacturing practices, data center design and operations, management systems and operational efficiencies. Green IS impacts on overall business model and management systems. In short, they conceptualized Green IS as a multi-faceted phenomenon that encapsulates all that have been described, as well as having the potential to include other facets not specifically mentioned. Green IS has a greater potential in research and practice than Green IT because it tackles a much larger problem: it can make entire systems more sustainable compared to just reducing the energy required to operate information technologies (Boudreau *et al.*, 2007).

Zeng, *et al.* (2020) examined the role of IS in the sustainable development of enterprises. The study conducted a systematic literature network analysis to review 132 articles that discuss current trends in the IS discipline. Based on a citation network analysis, the study discovered three main research domains (sustainable competitive advantage, environmental sustainability, and sustainable online social communities), and two emerging research domains (the role of IS in developing countries and sustainable information infrastructures). Furthermore, a main path analysis was conducted to understand the knowledge structure of each research domain. The results found that the sustainable competitiveness of enterprises is improved by the synergy between IS and other resources within the enterprises.

Esezobor (2016) in his research work on the Transition to Sustainable Construction Practices in Nigeria, explored the extent to which the construction companies in Nigeria take into account and apply sustainability principles in project management activity, with the view to developing a strategy for change to improve sustainability practices. Nine projects from three multinational construction companies were selected for the study in four main geopolitical zones in Nigeria. A total of 204 questionnaires were studied using descriptive statistical analytical techniques. The study revealed that the performance of socio-environmental sustainability is low in the practices of many companies. The low sustainability performance is attributed to low levels of commitment by key stakeholders in the construction sector, such as clients, construction companies, and regulatory agencies to sustainable principles; rather, they focus on quality and timely delivery.

Chan *et al* (2017) work on critical barriers to green building technologies adoption in developing countries, with Ghana as a case study, helped identify barriers to the adoption of green technologies in the construction industry of developing countries. While 20 barriers were identified as critical, the top 3 most critical barriers identified were: higher costs of green building technologies, lack of government incentives, and lack of financing schemes. The study also showed that while the most critical barriers to green building technologies adoption in the developing country of Ghana mostly vary from those in the developed countries of the US, Canada, and Australia, higher costs of green building technologies remain a top barrier in all the countries.

Ifeanyichukwu (2019) studied factors inhibiting the adoption of green building technologies in the construction industry. The study utilizes a convergent mixed methods approach and design, in order to discover which barriers, have the greatest inhibitory influence on the adoption of Green Building Technologies (GBT) in Virginia's construction industry. Analysis of survey and interview responses from 100 industry practitioners in Virginia was used for the study. Findings from the

study identified the five most critical barriers out of 25 barriers and provided insight as to why they inhibit GBT adoption.

Amuda-Yusuf *et al* (2020) carried out research on the barriers affecting the adoption of green building technologies in Nigeria.. Data was collected using questionnaire forms from practitioners who have been involved in green building development in Nigeria. A low level of awareness with regard to sustainability issues and human resources was also identified as barriers to the adoption of green technologies in Nigerian buildings.

Chinomona and Bikissa-Macongue (2022) analyzed the impact of Green IS, Green packaging, and Reverse logistics on logistics performance in the construction industry. The purpose of the study was to analyze the effective Green Supply Chain Management (GSCM) factors which are Green IS, Green packaging, and Reverse logistics necessary to improve the logistics performance of their companies. The study found that construction companies that comply with the different laws and regulations established, develop and implement Green IS, as well as a good Reverse logistics system. Also, these companies are more likely to reduce the environmental impact of their activities while optimizing their economic viability.

IV. RESEARCH METHODOLOGY

The study adopted a quantitative survey approach which enables quantification, description, and evaluation of the factors affecting the adoption of Green IS among construction firms, as well as to measure the level of awareness and extent of adoption of Green IS by construction firms operating in South-south, Nigeria. The population of this study comprises all industries practicing for over 10 years in South-south, Nigeria. A stratified-purposive sampling technique was used to select indigenous and multi-national firms operating in the six states of the South-south geopolitical zone of Nigeria. Using a stratified purposive sampling technique, a total of 100 survey questionnaires were administered. Each state of the six south-south states had a representation of firms operating in the state which consisted of indigenous and multi-national firms. The target respondents were the company's senior management who have the capacity to implement Green IS models in their firms.

The researcher developed questionnaire was used for the study. The questionnaire is titled "Green Information System Awareness, Adoption and Firm's Sustainability Questionnaire (GISAAFSQ)". The GISAAFSQ is a research instrument that was used to assess the level of awareness and extent of adoption of Green IS among firms in South-South, Nigeria. It also evaluated the factors affecting the adoption of Green IS and then assessed the sustainability of the construction firms that have adopted it. The instrument has two sections, with Section 'A' devoted to the demographic characteristics of the respondents. Section 'B' consists of five subsections which attempted to gather information on the level of awareness and extent of adoption of Green IS among firms, evaluate the extent to which the barriers and drivers affecting Green IS adoption, and then assess the sustainability of the construction firms which have adopted Green IS. The GISAAFSQ is designed with a 5-point rating scale.

The research instrument developed by the researcher was face validated by three experts in the Department of Public administration, Akwa Ibom State University, Akwa Ibom State. The experts assessed the questionnaire to ensure that the items of the instrument are actually measuring what it intends to measure and that they are clearly stated. All the inputs of the assessors were used to make the final version of the instrument.

The instrument was trial tested on 20 firms that are not part of the sample but are in the study area. The scores obtained from the trial test was subjected to Cronbach alpha reliability analysis to determine the reliability index. This gave a value of .85, indicating a high reliability index and fitness of the instrument for use in the study.

Data for the study was collected using a questionnaire over a period of 2 months. The researcher distributed and collected the questionnaire through emails and physical visits to the offices of the firms. The researcher made use research assistants in reaching out to firms in remote locations in south-south, Nigeria.

Method of Data Analysis

The data generated from the questionnaire were analyzed using Mean, Standard Deviation, and simple regression analysis. The Means will be used to provide the averages of the responses obtained and their corresponding standard deviations which will show the variations from the average responses.

Presentation of findings

Research question 1: What is the level of awareness of green Information system (Green IS) among industries in South South Nigeria?

Table 1: summary of mean and standard deviation of respondents on the level of awareness of green Information system (Green IS) among industries

	Awareness of Green IS: Are you aware of the following Green IS models available for the Construction Industry?	Mean	Std. Dev	Remark
1	Enterprise Emission Management System (e.g Emitwise and EC3 Tool)	1.80	1.17	
2	Energy Management Information System (e.g EnergyCAP, Wattics and Entronix EMP)	2.30	1.51	
3	Enterprise Collaboration System (e.g JobProgress, Fieldwire, and BIM softwares)	2.15	1.31	
4	Enterprise Resource Planning System (e.g Microsoft Dynamics 365 Business Central, SAP Business One Professional, IFS and Procore)	1.81	0.68	
5	Life Cycle Assessment System (e.g One click LCA, Gabi and Ecochain Mobius)	1.92	0.77	
6	Green Supply Chain Management Systems (e.g green purchasing, green design, and reverse logistics)	1.61	0.83	

7	energy-efficient networking	1.83	1.08	
8	virtualization	1.65	1.12	
9	Cloud computing	1.82	1.12	
10	Data analytics	1.50	0.58	
	Average	1.84	0.28	

Table 1 gives the summary of the mean of respondents on the level of awareness of green Information system (Green IS) among industries. The result shows that all the items have mean responses below 2.50, the weighted mean. This implies that there is a low level of awareness of GIS among industries. The average mean value of respondents is 1.84. The standard deviation is 0.28. the low value of the standard deviation indicates that the responses are close to each other. The result shows that there is a very low level of awareness of green Information system (Green IS) among industries in South South Nigeria.

Research question 2: What is the extent of implementation of Green IS among industries in South South Nigeria?

Table 2: summary of mean and standard deviation of respondents on extent of implementation of Green IS among industries in South South Nigeria

	Awareness of Green IS: Are you aware of the following Green IS models available for the Construction Industry?	Mean	Std. Dev	Remark
1	Enterprise Emission Management System (e.g Emitwise and EC3 Tool)	1.81	1.17	
2	Energy Management Information System (e.g EnergyCAP, Wattics and Entronix EMP)	1.73	1.00	
3	Enterprise Collaboration System (e.g JobProgress, Fieldwire, and BIM softwares)	1.70	0.98	
4	Enterprise Resource Planning System (e.g Microsoft Dynamics 365 Business Central, SAP Business One Professional, IFS and Procore)	1.65	0.95	
5	Life Cycle Assessment System (e.g One click LCA, Gabi and Ecochain Mobius)	1.82	1.19	
6	Green Supply Chain Management Systems (e.g green purchasing, green design, and reverse logistics)	1.56	0.78	
7	energy-efficient networking	1.75	1.08	
8	virtualization	1.83	1.00	
9	Cloud computing	1.80	0.85	
10	Data analytics	1.93	0.98	
	Average	1.76	0.12	

Table 2 presents the summary of the mean and standard deviation of respondents on the extent of implementation of green Information system (Green IS) among industries. The result shows that

all the items have mean responses below 2.50, the weighted mean. This implies that there is a low level of implementation of GIS among industries. The average mean value of respondents is 1.76. The standard deviation is 0.12. The low value of the standard deviation indicates that the responses are close to each other. The result shows that there is a very low extent of adoption of green Information system (Green IS) among industries in South South Nigeria.

Research question 3: What is the relationship between Green IS integration and industries' sustainability practices in South South Nigeria?

Table 3: Summary of relationship between Green IS integration and industries' sustainability practices in South South Nigeria

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	Constant)	29.306	5.903		4.965	.000
	Green_IS	.338	.111	.293	3.038	.003
r=.293, R ² =.086						
a. Dependent Variable: Sustainability_Practices						

Table 3 gives the summary of the regression test for relationship between Green IS integration and industries' sustainability practices. The unstandardized coefficient is .338, indicating a positive linear relationship between Green IS integration and industries' sustainability practices. The result shows that the correlation index is .293, revealing low positive relationship between Green IS integration and industries' sustainability practices. The coefficient of determination (R²) is .086, indicating that only 9% of changes in industries' sustainability practices is attributed to Green IS integration. This implies that there is a low positive relationship between Green IS integration and industries' sustainability practices in South South Nigeria.

V. DISCUSSION OF FINDINGS

Level Of Awareness of Green Information System (Green IS) Among Industries in South South Nigeria

The result of analysis shows that there is a very low level of awareness of green Information system (Green IS) among industries in South South Nigeria. Examples of GIS applied in industries are Enterprise Emission Management System, Energy Management Information System, Enterprise Collaboration System, Enterprise Resource Planning System, Life Cycle Assessment System, Green Supply Chain Management Systems, energy-efficient networking, virtualization, cloud computing and data analytics. while industries and corporations have acknowledged the importance of environmental issues, there is still no clear cut direction on moving forward with sustainability. Most firms are simply unaware of the available green information systems and

technologies, their benefits, and how they can be integrated into their organisation. In cases where awareness exists, there seem to be a lack of clear and reliable information about the performance, cost-effectiveness, and environmental impact of different green IS/IT options. This finding is in tandem with Zeng, *et al.* (2020) who assessed the role of IS in the sustainable development of enterprises. The study found that low levels of awareness had a significant impact on Green IS adoption. Fundamental knowledge of the field of Green IS is necessary to ensure realization of green IS integration.

Level Of Implementation of Green Information System (Green IS) Among Industries in South South Nigeria

Findings from analysis reveals that there is a very low extent of adoption of green Information system (Green IS) among industries in South South Nigeria. the low level of adoption were traced to high cost of initial installation and maintenance, lack of trained personnel among others. Organisations fail to endorse their Green IT initiatives due to lack of innovativeness in their approaches and for failing to gather impetus from the respected stakeholders. Green IS/T may not be perceived to be a critical organizational priority. Also, management practices promoting the adherence to Green IS/IT are inactive as well. Organisations who have fully implemented Green IT in one way or the other, face barriers such as lack or inadequate funding, inadequate skills to implement and manage the initiatives, not clear aims as well as inadequate knowledge of the system to support the technical necessities. Adoption has not been on a silver platter for different industries in Nigeria because most attempts have been hindered by factors such as a change in climate, scarcity of needed commodities, and the unstable market nature.

Cost is the initial factor that scares most firms away from adopting Green Information Systems. Adopting this system at the initial stage proves to be very expensive, irrespective of the benefits the firms may stand to enjoy both in the short and long-term. This finding agrees with Esezobor (2016) who explored the extent to which the construction companies in Nigeria take into account and apply sustainability principles in project management. The findings revealed that the performance of socio-environmental sustainability is low in the practices of many companies. The low sustainability performance is attributed to low levels of commitment by key stakeholders in the construction sector, such as clients, construction companies, and regulatory agencies to sustainable principles; rather, they focus on quality and timely delivery.

Relationship Between Green IS Integration and Industries' Sustainability Practices of Industries in South South Nigeria

The result of analysis showed that there is a low positive relationship between Green IS integration and industries' sustainability practices in South South Nigeria. The research showed a low level of Green IS in integration corresponded to a low practice of sustainability among industries operating in south south Nigeria. Consequently, a low positive relationship was observed between Green IS integration and industries' sustainability practices. This finding is supported by Chinomona and Bikissa-Macongue (2022) who examined the impact of Green IS, Green packaging, and Reverse

logistics on logistics performance in the construction industry. The study found that construction companies that comply with the different laws and regulations established, develop and implement Green IS were more likely to reduce the environmental impact of their activities while optimizing their economic viability.

VI. CONCLUSION

This study analysed the emerging environment of green IS among industries operating in south south Nigeria. the level of awarness, extent of adoption, challenges of adoption were explored. The result found low level of awareness corresponding to low level of adoption green IS among firms operating in south south Nigeria. The study concludes that there is a low positive relationship between Green IS integration and industries' sustainability practices in South South Nigeria.

VII. RECOMMENDATIONS

The following recommendations are made

1. Strong government efforts are needed-To benefit from the green IS/IT revolution, government must be at the forefront through proactive industrial, innovation and energy policies targeting green IS adoption.
2. There is need to foster cross-sectorial collaboration to ensure a comprehensive approach to Green IS/IT adoption
3. There is need to strengthen stakeholders' engagement to foster public awareness of the benefits and methodology of implementing Green IS
4. The success of greening industries rests heavily on a skilled and knowledgeable workforce. This workforce needs more than just technical expertise; they need a deep understanding of environmental principles and sustainable practices.

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