

Research Article

Integrating Digital Innovation and Green Practices for Advancing Corporate Sustainability in Modern Business Environments

Yanli Yu 

Pingdingshan Polytechnic College, Pingdingshan 467000, Henan Province, China

*Corresponding author: yanliyu345@outlook.com, yuyanli1979099@163.com

Article History:

Received:
25 October 2025
Revised:
22 January 2026
Accepted:
5 February 2026
Published in Issue:
31 March 2026

Abstract

Due to the growing emphasis on sustainability and digitalization in today's business context, there are newly grounds to consider the need to address developing Digital Innovation (DI) alongside green practices to improve firm sustainability. The current research seeks to investigate from DI, which consists of include Artificial Intelligence and Internet of Things, as well as green practices which consists of renewable energy solutions and waste reductions, the constructs of corporate sustainability and business performance. To aid in understanding this relationship, a survey of 200 individuals across the diverse industries was collected then analyzed using descriptive statistics, as well as using correlation and regression approaches. Results indicated the mean of DI (2.9800), Green Practices (2.9793), and Sustainability Outcomes (3.0742) all reflected low levels of implementation. Correlation and regression analyses indicated weak development relationships reflecting of statistically insignificant relationships ($p > 0.05$), indicating that leadership appear to be potentially more influential that other observable factors towards sustainability performance. The research provides insight on how little emerged from the interaction data between digital and green purposes, and puts forth additional implications for future research on how cultural and regulative strategies uniquely influence the change-based nature of sustainable corporate performance.

© 2026 the Author(s). Published by the OICC Press under the terms of the [CC BY 4.0, Creative Commons Attribution License](https://creativecommons.org/licenses/by/4.0/), which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

Keywords: Digital innovation, Green practices, Corporate sustainability, Artificial Intelligence, Internet of Things, Environmental performance

Cite this article: Yu Y., Integrating Digital Innovation and Green Practices for Advancing Corporate Sustainability in Modern Business Environments. Int. J. Energy Environ. Eng., 2026; 17(1): 27-42. <https://doi.org/10.57647/ijeec.2026.1701.02>

1. Introduction

The rise of sustainability and digitalization of the contemporary business world has ensured that the concept of DI and sustainability is significant when it

comes to the sustainability of the corporations [1], [2]. This drive to find the models that could unite these two factors is getting stronger as the industries are struggling to minimize the effects of their presence on the

environment and improve the performance of their activities [3], [4]. The suggested framework will offer a methodological strategy that would assist enterprises to navigate through the process of integrating digital solutions and green practices that will eventually contribute to better performance in the field of environmental sustainability [5]. The ability to implement the DI and green practices is a matter of various factors that comprise the top management support that is required [6], the organizational culture and technological resources that are available [7]. The pressure of the surrounding factors such as regulatory need, market requirement of sustainability also play a significant role in deciding how businesses can interact and adopt the application of green practices [8], [9]. These aspects are paramount in comprehending a long lasting change and how companies can endure within the dynamism of change without losing competitive advantage [10]. The existing strategies such as Technology-Organization-Environment framework [11], Natural-Resource-Based View and models of the Corporate Social Responsibility (CSR), have discussed the problems of DI and sustainability separately [12]. These strategies, though providing an informative bit of information, have been known to overlook the interdependent relationship between the digital and the green initiative [13]. Besides, the models are typically industry or geographically based and hence cannot be used in other business worlds [14]. They also fail to address the power of the organizational culture and leadership appropriately to develop the fusion of such practices [15]. Fig 1 Integration of DI and Green Practices to Corporate Sustainability.

These disadvantages will be eliminated in the proposed framework since it offers a holistic framework of DI, green practices, and corporate sustainability. It also incorporates the variables like culture within the organization, leadership and external pressures which are not part and parcel of the existing models. The framework provides companies with a comprehensive guide of sustainable change with the mutuality of green

and digital initiatives. The peculiarity of this study is that it is easily generalizable and applicable in any field and area to provide effective implications to the sustainability of corporate organizations in the long-term.

1.1. Research Aim

The aim of the study will be to explore the adoption of digital innovation, that is, AI, IoT, and automation, and the adoption of green practices, i.e., the introduction of renewable energy and the reduction of waste, can make a corporation more sustainable in the conditions of the present business era. The research project aims to determine the contribution made by this integration to the enhanced environmental performance, operation and business performance in the long term with an objective of making feasible recommendations that can be adopted by the firms that would aim at achieving a balance between the environmental responsibility and proactive utilization of technology.

1.2. Research Objective

- ✚ To determine what influence the incorporation of DI and green practice has on the result of the corporate sustainability.
- ✚ The objective of this study is to investigate the impact of DI in enhancing both operational and environmental performance, along with a recommendation for future studies to incorporate additional performance factors.
- ✚ Identify the challenges associated with the use of green methods and digital innovation in companies and propose recommendations for future studies to explore and understand these obstacles more deeply.
- ✚ To have business-level recommendations, it was necessary to come up with a framework that could be capable of correlating the DI, green practices, and corporate sustainability.

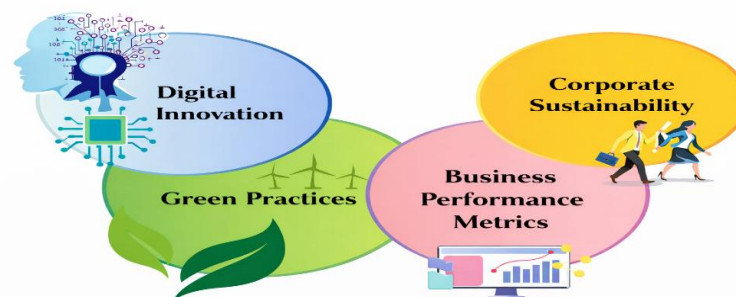


Figure 1. Integration of DI and Green Practices for Corporate Sustainability

1.3. Research Hypotheses

- **Hypothesis 1:** Incorporating Digital Innovation (DI) into business operations enhances sustainability results, leading to better corporate sustainability.
- **Hypothesis 2:** Companies adopting Green Practices and Digital Innovation (DI) are likely to enjoy better sustainability results than companies that adopt either alone.
- **Hypothesis 3:** Digital Innovation (DI) and Green Practices combination benefits overall business performance, in terms of reflected sustainability results, although their effects on profitability and competitiveness were not directly assessed within this research.
- **Hypothesis 4:** Implementation success of Digital Innovation (DI) and Green Practices is associated with the long-term focus of a company towards sustainability objectives, in terms of total sustainability performance results.

1.4. Research Organization

- ✓ Section 2: An extensive literature review, studying the related research and theories.
- ✓ Section 3: Discussion of the proposed methodology, such as the research design and method of data collection.
- ✓ Section 4: Results presentation and analysis, and provide the insight, based on the results.
- ✓ Section 5: Conclusion, key conclusions and recommendations on possible direction of further research.

2. Related Works

Sun et al. [16] have emphasized the growing importance of environmental stewardship in business and provided examples such as GHRM, CSR, and GPI which are touted as sustainability providers. To a certain degree, other researchers have also triumphed three in a bid to raise eco-friendly results and performance of the organization together. The NRBV and institutional theory give insight into situation as it depicts synergistic outcomes of eco-friendliness and business success through green practices in today's corporate world. Le et al. [17] point out that CSR inclines sustainability, especially in case of SMEs. The paper specifically addressed issue of environmental strategy use and green innovation as a mediator between CSR and corporate sustainability. At least a couple of studies were cited that supported view that CSR when combined with green

strategies and green innovation could bring about environmental and business changes in a positive manner. The paper attempts to support idea that in long run, business practices that are sustaining can be a source of growth and profit in a competitive market. Le [18]. give priority to green strategies, CSR, and green innovation as factors that are going to support sustainability of SMEs at top. The previous one is built on direct effect of CSR and green innovation as mediators on performance of corporate green strategy. The cited research reports believe that merger of these green factors will not only improve environment but also create competitive advantage and be a source of long-term sustainability and thus give a complete approach to economic development of any developing country through business. Basheer et al [19]. present to Mazid idea that CSR is most significant factor affecting Environmental Performance and sustainability among literature on CSR. The research claims that CSR needs to incorporate renewable energy, corporate culture, and green knowledge factors to achieve maximum level of corporate environmental performance (CEP). The research also indicates CSR as a significant mediator between sustainability activities and the environment. Under moderation of the moderating state, CSR with sustainability relationship key has a moderating effect on relationship between CSR and CEP; thus notion of sustainability has to be low on corporate side to deliver long-term responsible businesses. Fosu et al. [20] highlight the crucial part played by corporate image and social performance renovation via green innovation. The stakeholder theory has been a common ground to argue how the different stakeholders' expectations might affect chosen environmental CSR activities and, in turn, benefits of real social and ethical values for improving the company's image and even overall performance in a market. Wiredu et al. [21] TMS, GSCM and SCCA are three interlinked factors that form the basis of companies' environmental performance improvement. The prior studies conclude that TMS is a function of IP and on the other hand, IP is a function of TMS. Moreover, GSCM practice is often referred to as link that connects organizational pressures to environmental outcomes. The subsequent research underscores that supply chain greening must not only lead to long-term sustainable competitive advantage and environmental outcomes but also be regarded as an integral part of them. Xie et al. [22] describes the concept of stakeholder pressures, environmental ethics, and environmental awareness in the green innovation development and environmental performance improvement. According to some of the studies, a regulatory, customer and competitor pressure may stimulate the companies to implement sustainable practices, but it is environmental

ethics and environmental consciousness that may more likely support need to develop green products and processes Zhu et al. [23] presents that the practice of sustainable supply chain management (SSCM) is progressively becoming imperative to increase operations besides environmental performance. The literature attests to the fact that the practices of SSCM are enabled by corporate social responsibility (CSR). It is made of two-dimensional internal CSR and external CSR that determine the sustainability of organizations. The literature also mentions that, big data analytical capabilities (BDAC) brokering between SSCM practices and the better performance. Another context in which these relationships may be explored is a combination of two theories, i.e., the stakeholder theory and the dynamic capability theory. Fu et al. [24] explain, role of green finance in sustainable development is increasingly becoming high especially on climate change and carbon neutrality. Themes such as large investments in operations of low carbon, a strong regulatory framework, and ESG determinants as perceived by investment houses cannot be separated. They have also said that field of impact investing, institutional ownership and communication strategies is one of the elements of interest that can arouse green finance through research. Through coordinated effort, proper policy framework and transparency will form center stage when development towards sustainable economic development and realization of climate goals should be achieved. Ye and Dela. [25] introduces new economies with aim of attaining sustainable business success to introduce green economy. Due to constraints of natural resources, business should focus on green investment, green financing and resources to encourage a green version of sustainable business performance. The research paper is thus attempting to implement green financing and investment into the CSR and sustainable performance of a company. Lutfi et al. [26] emphasize significance of green innovation and technologies in improving the environment in the manufacturing. An example is a study that the practice of green management accounting can be used to generate sustainability results when supported by top management, and when stakeholders are involved by being coercive, normative or mimetically. The other research that observes green technology urges manufacturing companies to adopt green technology to have environmental gains when in developing economies. Chen et al. [27] identifies viability of goals of sustainability, as an amendment in viability of such initiatives upon environmental regulations being a prerequisite element to green finance initiatives. Over past three decades, studies show that areas where there are good economic patterns tend to have sound green finance and industrial green

transformation systems.

2.1. Research Gap

- There is limited information concerning how the DI and green practices can be appropriately integrated to facilitate corporate sustainability.
- The literature at hand often focuses on specific sectors or specific areas and, therefore, there is a knowledge gap on the overall application of the same to various business contexts.
- The literature is more inclined to explore DI and green practices separately instead of predicting their impact on the sustainability on a global scale.
- The aspect of leadership and organizational culture as a source of motivation factor to incorporate DI and green practices have not been fully researched.
- The long-time effect of integrating DI and green practices to corporate sustainability and environmental performance remains unclear.

3. Methodology

The chosen research method will then be utilized to picture digital innovativeness and green practices in a way that they can be used to enhance corporate sustainability and business performance. The first step of this process is the design of survey, which will consider quantitative approach for obtaining numerical data. The size of the target respondents is estimated to be around 200-300 sampling and will include industry representatives that will assure the quality and variety of information. The information and data that will be gathered from survey on DI (e.g., AI, IoT, automation) and green practices (e.g., renewable energy, waste) will constitute independent variables (IV). The central issue of research is to determine their impact on dependent variables (DV) and business performance measures (e.g., cost savings, ROI) of sustainable business practices). The collected data will undergo analytical techniques described with descriptive statistics, correlation analysis, and regression analysis to comprehend relationship between the variables. This process will also provide a broad outline as to how businesses will be able to contribute practically to environment and their financial gains by integrating both digital and green strategies. Fig 2 illustrates the overall proposed work.

3.1. Survey Design

The proposed research will adopt the quantitative research design because it is the only way to measure the effects of combining DI with green practices on corporate sustainability. The survey will target companies that are already using both digital and green technologies like renewable energy and waste reduction besides IoT and automation. Moreover, it will measure the extremely significant outputs like operational efficiency, environmental impact, and business

performance basing on cost savings, ROI, and sustainability measures. Thus, it will be able to guarantee that the research is capable of sufficiently dealing with the effect of the merger of the two factors on the sustainability of different sectors.

3.2. Data Collection

The managers and decision-makers of the companies that have adopted digital technologies and green practices will be the ones to fill out the questionnaires. They are the right respondents because they are the ones who actually carry out the sustainability programs in their firms. The survey will target businesses across various sectors such as manufacturing, technology, retail, and energy to ensure that there is an equal understanding of the integration of digital and green practices in different sectors. The study will adopt a sample of 200 participants in the sample size, the sample will be used to deliver a trustworthy representation of the companies that have already embraced these tactics.

✓ Sampling Technique

The sampling technique purposive sampling. This is the method you are using to enroll participants in accordance with their specific role (managers and decision-makers) in companies that have adopted digital technologies and green practices. This ensures that the respondents are aware of and responsible for the sustainability projects within their firms.

✓ Industry Representation

By specifying the target industries (e.g., manufacturing, technology, retail, and energy), you set that the survey will encompass a broad group of companies, which aligns with the goal of acquiring a representative sample across various sectors.

✓ Instrumentation and Validity/Reliability

The items from the survey were borrowed from previously validated scales in DI (digital innovation) and green practices, such that the questions are actually measuring the desired topics (content validity). Cronbach's alpha will be employed to test the reliability of the survey, with an acceptable threshold of ≥ 0.70 , such that the survey items are reliably measuring the same things.

1. Validation

The survey items are derived from well-established, validated scales which have previously been demonstrated to measure digital innovation and environmental practices, thus ensuring that the survey is measuring what it is intended to measure.

2. Reliability

Cronbach's alpha will be utilized to verify whether the survey measures the same thing consistently. A

coefficient of ≥ 0.70 means that the items in the survey are consistent and provide identical results.

3.2.1. Survey Questions

The survey will be adjusted in such a way that it gives the data regarding the specific digital technologies utilized in companies (such as AI, IoT, automation) and how the technologies contribute to sustainability. It also shall gather the data of the green practices which are under adoption i.e., use of renewable energy, lessening of waste and other environmental sustainability practices. Energy saving, reduction in carbon emission and the management of waste will be some of the key sustainability indicators that will be analyzed. Cost saving, ROI and customer satisfaction are also the measures of business performance that will be measured to obtain a bigger picture of the impact of the introduction of DI and green practices.

3.2.2. Survey Method

The survey will be distributed through the internet, the email, LinkedIn, and other professional networks, where it will be directed to the appropriate persons in the appropriate sectors. The survey questionnaire will include a Likert scale (1 to 5) to establish the perception of the respondents on the digital and green practices in the context of sustainability in their company. This will allow the study to quantify the impact level as well as locate trends in various industries and practices.

3.2.3. Ethical Compliance

One of the main ethical guidelines that this study follows is that each and every participant must give informed consent before being able to take part in the survey. The responses of the participants will be kept secret, and the information collected will be used only for the study. Moreover, the research still observes and acts up to ethical standards that give the participants the right to privacy and protection against any kind of harm and mistreatment during the research process.

3.3. Selection of Variables

Selection Variables- the factors that interest and determine the identifying and choosing of independent and DV. These factors help in figuring out the size of research and automatically collect the data. The research has decided to use DI and Green Practices as IV and Corporate Sustainability Outcomes and Business Performance Metrics as the DV due to their relevance with corporate sustainability. The intention behind this variable selection is to investigate how the interface between the technological innovations and green

practices influences both environmental and business performance.

3.3.1. Independent Variables

IV are the factors that have an impact on or let change happen to other factors. The main sources of the research are DI and Green Practices. DI can be defined as a combination of new technologies (AI, automation, IoT), which might help businesses to become more efficient in their operations, thus consuming less energy and, in general, being more sustainable, the whole duration of their sustainability quest. The renewable energy usage, waste management and resource efficient practices are among the environmental practices that Green Practices have been adopting. It is believed that combined effect of practices and innovations would be quite significant on both performance of businesses and environmental performance.

✓ Digital Innovation

The DI is central to enhancing business operation and environmental sustainability. The implementation of AI, IoT, and cloud computing, also enable the companies to

optimize their operation and make the processes more efficient, waste reduction, and energy consumption. Specifically, AI can be employed in the improved management of energy spending, and IoT can provide real-time resources monitoring, reducing wastes. DI is a force of operational efficacy and it aids companies in attaining their sustainability goals and simultaneously become profitable.

✓ Green Practices

Environmental impact minimization of business includes green practices. These measures include: use of renewable energy, use of efficient energy consumption and minimization of waste through sustainable practice. The practices will not only allow the companies to contribute to the environment preservation, but it will also ensure that they comply with the constantly narrowing environmental laws and will help them to gain a good image. Green practices are included into the business strategies required by the companies whose operations should be aligned with the sustainability goals and achieved long-term growth.

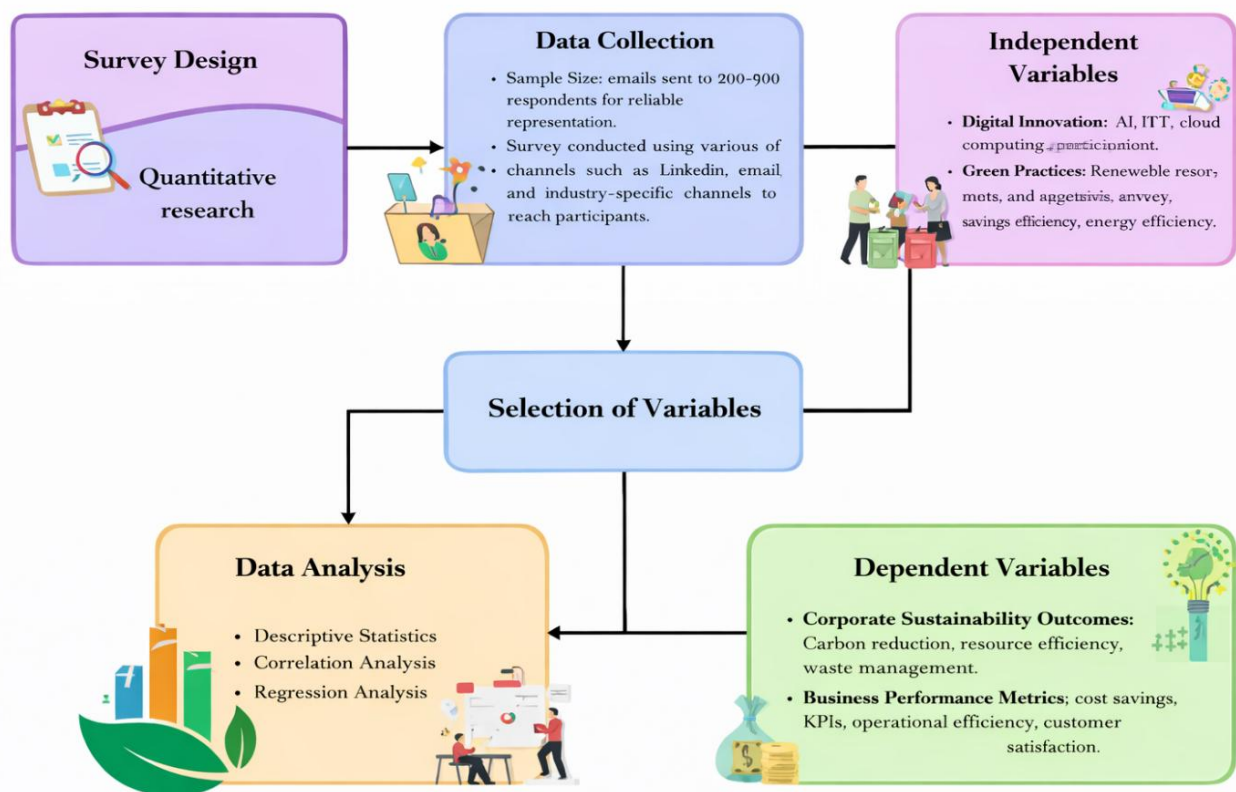


Figure 2. Overall proposed work

3.3.2. Dependent Variables

DV are the consequence of change of IV. In this case, Corporate Sustainability Outcomes and Business Performance Metrics are DV. Corporate Sustainability Outcomes may include quantifiable outcomes in reductions to carbon emissions, energy consumption and resource use. These are the outcomes indicating that the organization has achieved its sustainability objectives. Business Performance Metrics provide evidence of the integration between digital and green practices influencing financial performance, such as whether there are cost savings, return on investment (ROI), and whether operational efficiencies were realized. Business Performance Metrics also consider cost-effectiveness as it relates to sustainability strategies or practices.

✓ Corporate Sustainability Deliverables

Corporate sustainability outcomes are used to measure the performance of a company in adopting DI and green practices to ensure that it is sustainable. These include carbon emission cut down, efficiency and waste management of resources. To keep track of these outcomes, businesses would be able to evaluate the efficiency of their sustainability policies and would be able to understand how they impact the environment. Being capable of making significant improvements in these areas signifies that the company is experiencing significant improvement in the path of sustainability.

✓ Business Performance Measures

The business performance measures are on the degree to which the integration of the digital and green practices can be correlated with the overall performance of the enterprise. This entails the measurement of the financial outcomes in terms of cost saving (due to efficient operations), improved ROI (due to sustainable investments), and improved customer satisfaction (due to activities that are environmentally conscious). The businesses can use the metrics to gauge the physical payoff of integrating sustainability practices and it goes to demonstrate that sustainability practices are not only associated with environmental benefits as far as environment is concerned, but also bottom-line benefits to the business. Hypotheses and Relationships between Digital Innovation, Green Practices, and Corporate Sustainability are presented in Fig 3.

3.4. Data Analysis

Data analysis will play a crucial role in understanding the interplay of digital innovation, green practices and their implications for corporate sustainability and business performance measures/outcomes. In this part, the dispersion of the data that was gathered through the survey will involve several statistical methods. It will

initiate with computation of descriptive statistics to give a summary of the item scores and then the correlation analysis will follow to find out strength and direction of the relationship between the variables. Eventually, regression analysis will then be performed to ascertain the strength and direction of significance in the relationship with IV (DI, green practices) and DV (sustainability outcomes, business performance). This would allow testing of hypotheses and consideration of trends and conclusions regarding relationship between DI and green practices that would lead to corporate sustainability progress.

3.4.1. Quantitative Analysis

Quantitative research methods are employed to analyze and interpret data statistically while exploring the connections between different factors. The researchers are planning to carry out a study that would be purely quantitative to assess percentage of digital innovations (like AI, IoT) and green practices (like renewable energy, waste management) effected on sustainability performance and business performance. Especially quantitative methodology gives opportunity to detect measurable trends, formulate and validate a hypothesis and even make generalizations about whole population from which sample has been taken. The analysis of data will be based on numbers and locations of different practices in digital and green sectors will be identified more accurately concerning their impact on sustainability goals.

✓ Descriptive Statistics

Descriptive statistics presents a summary definition and a description of the characteristics contained in a dataset along with a graphical visualization of variables and their distributions. The main reason for this is to facilitate the discovery of patterns, trends, and data points that deviate from the norm. In current analysis, it will be necessary to figure out overall respondents' estimations and see if we have data distributions, the opinions on digital technologies and green practices in the firms. The mean is a mean to present a single mean value as a description for all the measured variables of interest. The mean is one way of measuring central tendency, and calculation is shown in Eq. (1)

$$\mu = \frac{1}{N} \sum_{i=1}^N X_i \quad (1)$$

Where, μ represents mean, N represents number of considered observations, and X_i is value of individual observation. The median is defined as the midpoint of a sequence of values that has been ranked either ascending or descending.

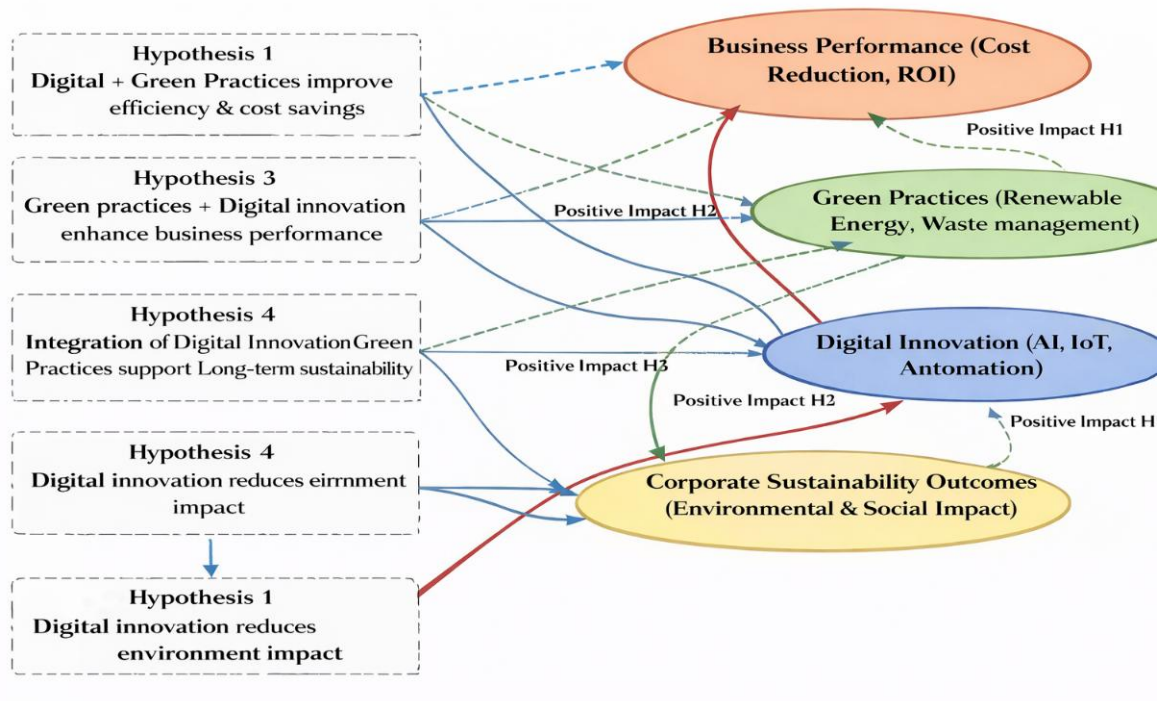


Figure 3. Hypotheses and Relationships between Digital Innovation, Green Practices, and Corporate Sustainability

The median is also beneficial in understanding the central value as it is not as sensitive to outliers as mean is, and as a result, central values are more reliable. Mode. Mode is that value that is most frequent of occur in data set. Mode is used as a determination of most repeated response or tendency when categorical data is primary concern. Standard deviation (SD) is measurement of variation or dispersion of data. Higher SD are indicative of data that is more dispersed from mean, and lower SD indicate that data is more similar to average is presented in Eq. (2)

$$\sigma = \sqrt{\frac{1}{N} \sum_{i=1}^N (X_i - \mu)^2} \quad (2)$$

In this study, SD is denoted as σ , number of observations is denoted as N , data points are denoted as X_i i, and mean of dataset is denoted as μ . These descriptive statistics will help to determine distribution of responses as well as statistical outcomes, as they will be used in interpreting the findings to provide some context to analyzing data. Correlation analysis examines strength and direction of relationship between two or more variables. This method is important for understanding relationship between DI and green practices, and between corporate sustainability and business performance. A Pearson correlation coefficient will be

used in this study to examine whether variables are related linearly or not. A Pearson correlation coefficient will be used to determine whether relationship between two variables is perfect positive linear, or otherwise. The possible values of -1 to $+1$, $r = +1$ represents perfect positive linear relationship, -1 represents perfect negative linear relationship, and 0 represents no linear relationship. The formula for Pearson correlation coefficient is presented in Eq. (3).

$$r = \frac{\sum_{i=1}^N (X_i - \mu_X)(Y_i - \mu_Y)}{\sqrt{\sum_{i=1}^N (X_i - \mu_X)^2 \sum_{i=1}^N (Y_i - \mu_Y)^2}} \quad (3)$$

In which, X_i and Y_i are two values of interest of a variable that is being compared, μ_X and μ_Y are means of two variables, and N is number of observations. A positive value of r means that bigger one variable is, bigger other variable is as well (e.g., the more digital innovation, more sustainability outcomes). Conversely, a negative value of r means that there is an inverse relationship between two variables (e.g., increase in costs of DI can generate decreased profitability). As r gets closer to a value of 0 , linear relationship between variables weakens. The correlation analysis offers insight into IV which have a more/less significant impact on results of sustainability and business performance indicators (DI or green practices).

✓ **Regression Analysis**

Regression analysis is used to model relationship between one DV and one or more IV. It is useful to understand effects of changes in IV (e.g., digital innovation, green practices) on dependent DV (e.g., corporate sustainability outcomes, business performance). For example, simple linear regression is conducted there is one IV and one DV. Using this example, we could assume the following model, which can be written to express relationship between DI and business performance, as seen in Eq. (4)

$$Y = \beta_0 + \beta_1 X + \epsilon \tag{4}$$

Where Y is DI is IV, X is business performance variable dependent, β_0 is constant, β_1 is coefficient of IV, or change in Y per unit change in X , ϵ is the error. The value of coefficient β_1 (internet) lets us know how strong and in which direction is the relationship between the IV and DV. A positive result means there is a positive correlation (more advanced the digital innovation is improvements are made in the business performance), negative result is inverse. Multiple linear regression is applied in case (1) there are more IV than (2) there is more than one DV is given in Eq. (5)

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \epsilon \tag{5}$$

where, Y is DV (e.g., business performance), and X_1, X_2, \dots, X_n are IV (e.g., digital innovation, green practices) and $\beta_1, 2, n$ are the coefficients and ϵ is the error term. Multiple regression would be useful in determining which of the IV work most effectively as explanatory variables on the DV when statistically controlling for effects of other variables. After regression analysis is completed, the coefficient of determination (R^2) will also be determined to examine whether the IV explain variability of DV. The coefficient of determination (R^2) is computed as in the equation below Eq. (6)

$$R^2 = 1 - \frac{\sum_{i=1}^N (Y_i - \hat{Y}_i)^2}{\sum_{i=1}^N (Y_i - \bar{Y})^2} \tag{6}$$

Where Y_i is observed value where \hat{Y}_i is predicted value and \bar{Y} is mean values. The larger value of R^2 (strength of closeness to 1 better), more percentage of variability in DV that IV can explain.

Table 1. Descriptive Statistics for Key Variables

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
Demographic_Information	200	1.20	4.00	2.5880	0.51923	0.270
Digital_Innovation	200	1.8	4.14	2.9800	0.50126	0.251
Green_Practices	200	1.43	4.71	2.9793	0.5811	0.338

Table 2. Summary Statistics for Digital Innovation, Green Practices, and Sustainability Outcomes

	Mean	Std. Deviation	N
Digital_Innovation	2.9800	0.50126	200
Green_Practices	2.9793	0.58111	200

Table 3. Pearson Correlation for Digital Innovation, Green Practices, and Sustainability Outcomes

		Digital_Innovation	Green_Practices	Sustainability_Outcomes
Digital_Innovation	Pearson Correlation	1	-0.063	-0.048
	Sig. (2-tailed)		0.378	0.496
	N	200	200	200
Green_Practices	Pearson Correlation	-0.063	1	0.002
	Sig. (2-tailed)	0.378		0.975
	N	200	200	200
Sustainability_Outcomes	Pearson Correlation	-0.048	0.002	1
	Sig. (2-tailed)	0.496	0.975	
	N	200	200	200

4. Results and Discussion

DI is weakly related and statistically insignificant to the result of green practices and corporate sustainability. Even though all the variables were positive, the correlation and regression were used to analyze the results obtained by the variables and did not provide any significant direct business performance or sustainability results. This is informed by the fact that these two variables, digital innovation, and green practices, do not play an important role in sustainability in this sample. Other initiatives that could be more influential in determining the achievement of long-term sustainability goals include organizational culture, leadership, and external pressures. These are other aspects that should be risked out in subsequent research. The provided data illustrates the statistical consideration of the primary variables of the research are presented in [Table 1](#). Under Demographic Information, the sample size would be 200, with 1.20 as the lowest and 4.00 as the highest, a mean of 2.5880, and SD of 0.51923, which states that there is a low variation of the demographic responses. The average DI is 2.9800 with a minimum of 1.86 and maximum 4.14 with small SD of 0.50126 meaning that all the responses are clustered around the mean. Mean On the same note Green Practices has a mean of 2.9793 with a range of 1.43 to 4.71, SD of 0.58111 which is a bit more variable in the responses. The overall variance of these variables is low or relative and this suggests that

there exist a set of responses that are relatively fixed across the dataset. [Table 2](#) presents the descriptive statistics of Digital Innovation, Green Practices the SD in DI case is 0.50126, and the mean is 2.9800, which implies that the responses are quite centered around the mean. The other mean and SD of Green Practices are very close (2.9793 and 0.58111 respectively) thus a little more variability of the responses can be identified in terms of digital innovation. Finally, the Outcomes of Sustainability mean is 3.0742, therefore is larger than the other two variables and the SD of the variable is 0.54494 which means that the responses have a low distribution, however they are still centred on the mean. The sample size is similar in all three variables, 200, which is proportionate to each of the key areas. The values refer to the fact that the respondents present mediocre to high levels of concurrences when it comes to DI and green practices and sustainability outcomes. The correlation analysis indicates the relationship between the Digital Innovation, Green Practices, and Sustainability Outcomes are indicated in [Table 3](#). The partnership between the DI and the Green Practices has a correlation of -0.063 with a p-value of 0.378 and the association is very weak and statistically insignificant. Similarly, the correlation between DI and Sustainability Outcomes is -0.048 and p-value is 0.496 indicating that the relationship is insignificant and non-significant therefore negative.

Table 4. Correlation Matrix for Demographic Information, Digital Innovation, Green Practices, and Sustainability Outcomes

		Demographic_Information	Digital_Innovation	Green_Practices	Sustainability_Outcomes
Pearson Correlation	Demographic_Information	1.000	-0.070	0.014	-0.030
	Digital_Innovation	-0.070	1.000	-0.063	-0.048
	Green_Practices	0.014	-0.063	1.000	0.002
	Sustainability_Outcomes	-0.030	-0.048	0.002	1.000
Sig. (1- tailed)	Demographic_Information		0.163	0.420	0.337
	Digital_Innovation	0.163		0.189	0.248
	Green_Practices	0.420	0.189		0.487
	Sustainability_Outcomes	0.337	0.248	0.487	
N	Demographic_Information	200	200	200	200
	Digital_Innovation	200	200	200	200
	Green_Practices	200	200	200	200
	Sustainability_Outcomes	200	200	200	200

Table 5. ANOVA for Regression Model

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.327	3	0.109	0.401	.752
	Residual	53.324	196	0.272	-	-
	Total	53.651	199	-	-	-

The relationship between Green Practices and the Sustainability Outcomes is 0.002, p-value of 0.975, which is nearly a justification of the nullity of the relationship and the lack of any significant relationship between the two. The p-values of all the cases exceed the standard significance level of 0.05 that confirms that there are no statistically significant relationships between these variables in this sample. These results suggest that DI and green practices in this dataset are not strong in determining the impacts of sustainability. Table 4 below indicates the Pearson correlation value and p-value of the interrelations between the Demographic Information and DI, as well as between green practices and Sustainability outcomes. The correlation of Demographic Information and DI is -0.070 and p-value 0.163, indicating weak and insignificant relationship, with negative correlation. The Demographic Information and Green Practices (0.014) is again a very weak correlation and the p-value is not statistically significant (0.420). Sustainability Outcomes is also not significantly correlated with Demographic Information (-0.030, p = 0.337). DI is negatively related to Sustainability Outcomes (-0.048, p = 0.248), and DI is positively related to Green Practices (-0.063, p = 0.189). Finally, the relationship between Green Practices and Sustainability Outcomes is marginally small (0.002, p = 0.487). Overall, no significant relationships are obtained, that is all relationships were not significant. Table 5 presents the ANOVA results of the regression model used to examine the relationship between digital innovation, green practices, and the sustainability outcomes. The value of the Sum of Squares in the Regression row is 0.327, and the degrees of freedom (df) is 3; the mean square value is 0.109. The F-value is 0.401, and the p-value is 0.752; that is, there is no significant model from a statistical sense since that p-value is more than the normal significance level of 0.05. The Sum of Squares for the Residual row = 53.324, the 196 df obtained giving the Mean Square =0.272. This is the figure of 53.651 with the total variation in the data of 199 df. The p-value is large, and it indicates that the model does not allow to account much of the variance of the DV, and consequently, there is no significant relationship between the two variables being examined. The

regression analysis result shows that; the unstandardized coefficient of DI is equal to -0.073 with standard error of 0.074, t -value = -0.992 with a p-value = 0.322, is not significant when the outcome of the regression of the DI against the DV is presented in Table 6. Similarly, the coefficient of green practices is not standardized and has a standard error of 0.064 and t-value of 0.141 and p-value of 0.888 and its effect is not significant too. The unstandardized coefficient of sustainability is not standardized at -0.032 with t-value of -0.469 and p-value of 0.640, and it is evident that there is no significant effect to attain the results of sustainability. According to the collinearity statistic, multicollinearity is nonexistent as tolerance values are large (between 0.994 and 0.998), and the VIF values are also small (between 1.002 and 1.006), thus, the variables are not highly related. Table 7 indicates the IV of regression model according to collinearity diagnostics. The first dimension has eigenvalue of 3.928 and condition index of 1.000 or no multicollinearity occurs since the proportions of variance of Digital innovation, green practices, and Sustainability outcomes are all 0.00. The second dimension has eigenvalue of 0.035 and condition index of 10.605 and variances proportion of 0.72, 0.16 and 0.09 respectively representing Green Practices, DI and Sustainability Outcomes respectively. The third dimension with an eigenvalue of 0.030 and a condition index of 11.394 suggests that DI and Sustainability Outcomes have a low level of impact (0.39 and 0.57 respectively). The value of fourth dimension is 0.007 and index condition is 23.272; this implies that it contains a high number of multicollinearities and the coefficients of all variables are equal. The average of the predicted value is 2.5880 and the fluctuating range is 2.4969 to 2.6900, which indicates that there are no so much fluctuating predictor models represented in Table 8. The SD of 0.040555 tells that the change in the outcomes that are being predicted is very small. The value of the mean of the residuals is 0.00000, and this means that there is no general bias in the model predictions. The value of the residuals varies between -1.42196 and 1.41948 and SD of 0.51765 is low as well as the varying degrees that the predicted value differs with the actual value. The standardized predicted value of the range -2.248 to 2.515 and a mean of 0.000 are the representation of normalized predictions. The standardized residual lies between the range of -2.726 to 2.721 with the range of 0 and SD of 0.992 indicating the dispersion of the standardized residuals. Fig 4 presents the histogram of regression standardized residual that is close to a normal distribution with a peak of 0. The mean of the residuals is 2.80E -15 which is near to 0 and SD is equal to 0.992 showing that the distribution of the values of the residuals are skewed around 0 with low

dispersion. The given form of the bell of the histogram substantiates that the residuals are distributed normally, and the small outliers on the ends do not influence the shape of the distribution considerably, which proves the assumptions of the regression model that the data follow the normal distribution. Normal P-P plot represents the comparison of cumulative probability of the regression standardized residuals which are supposed to be and the one observed is illustrated in Fig 5. The values on the chart are fairly near the diagonal line suggesting that the values of the residuals are normally distributed. The implication of this reliability is that assumptions of the normality of regression model are met. The fact that the residual values are not too far away the normal distribution will mean skewness, or kurtosis of the residuals are not significant which will justify the suitability of the regression model used in this research. The table presents the descriptive statistics of Digital Innovation, Table 9 shows the Green Practices and Sustainability Outcomes. The mean of DI is 2.9800 and SD is 0.50126 which indicate that, the responses are averagely steady around the mean. Similarly, the

average of Green Practices is 2.9793 and SD of 0.58111 that shows that there is a slightly more variance in responses in comparison to digital innovation. The uniformity of the measures is indicated by the N value of 200 of all three variables of the measures. These results show that the respondents have the lowly positive expectations to the digital innovation, green practices, and sustainability outcomes with a slight variation in responses. The correlation between DI and Green Practices is -0.063, and that would be a very weak negative correlation, i.e., the green practices increase slightly as was expected that the too is not significant show in Table 10. The relationship between DI. the correlation between the Green Practices. This is manifested by the fact that according to these findings, the outcomes of sustainability in this dataset do not appear to directly depend on the introduction of DI and green practices. The weak correlations in general indicate that these variables do not have strong relationships in the sample under consideration. The descriptive statistics of the Items Means is presented in the Table 11.

Table 6. Coefficients for the Regression Model

Model		Unstandardized Coefficients		Standardized Coefficients		Collinearity Statistics		
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	2.878	0.373		7.707	0.000		
	Digital_Innovation	-0.073	0.074	-0.071	-0.992	0.322	0.994	1.006
	Green Practices	0.009	0.064	0.010	0.141	0.888	0.996	1.004

Table 7. Collinearity Diagnostics for the Regression Model

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions			
				(Constant)	Digital_Innovation	Green_Practices	Sustainability_Outcomes
1	1	3.928	1.000	0.00	0.00	0.00	0.00
	2	0.035	10.605	0.00	0.16	0.72	0.09
	3	0.030	11.394	0.00	0.39	0.00	0.57
	4	0.007	23.272	1.00	0.46	0.27	0.34

Table 8. Summary Statistics for Predicted and Residual Values

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	2.4969	2.6900	2.5880	0.04055	200
Residual	-1.42196	1.41948	0.00000	0.51765	200
Std. Predicted Value	-2.248	2.515	0.000	1.000	200
Std. Residual	-2.726	2.721	0.000	0.992	200

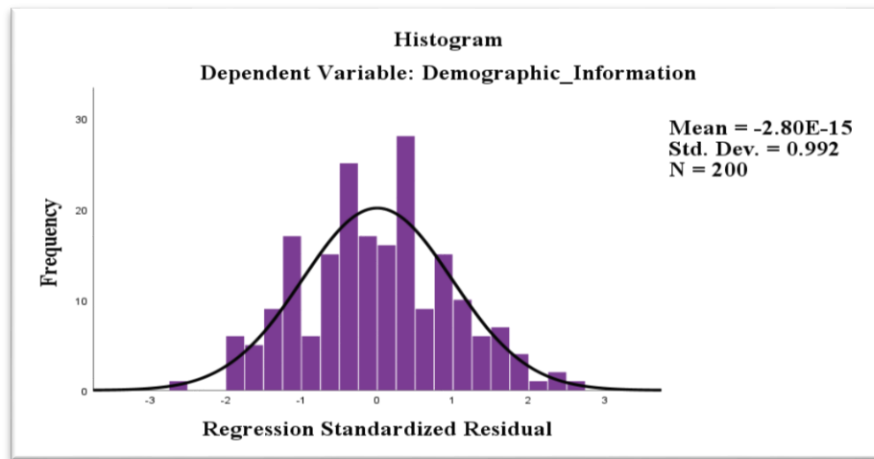


Figure 4. Histogram of Regression Standardized Residual

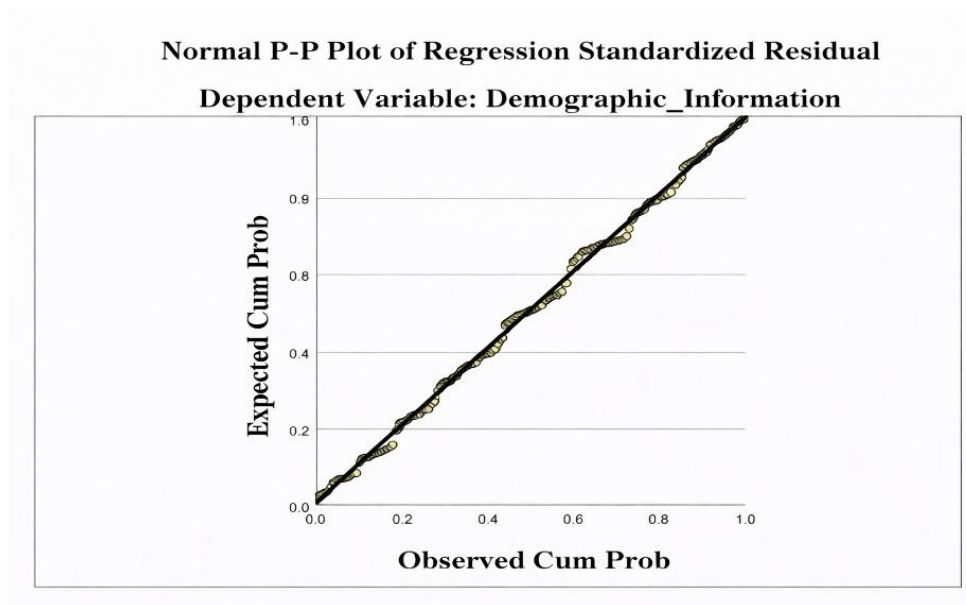


Figure 5. Normal P-P Plot of Regression Standardized Residual

Table 9. Descriptive Summary of Digital Innovation, Green Practices, and Sustainability Outcomes

	Mean	Std. Deviation	N
Digital_Innovation	2.9800	0.50126	200
Green_Practices	2.9793	0.58111	200

Table 10. Correlation Analysis Between Digital Innovation, Green Practices, and Sustainability Outcomes

	Digital_Innovation	Green_Practices	Sustainability_Outcomes
Digital_Innovation	1.000	-0.063	-0.048
Green_Practices	-0.063	1.000	0.002
Sustainability_Outcomes	-0.048	0.002	1.000

Table 11. Descriptive Statistics for Item Means

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.011	2.979	3.074	0.095	1.032	0.003	3

The mean is 3.011 and this indicates that there is a slightly greater response with a mean of 3 on the scale. The minimum score is 2.979 and the maximum score is 3.074 and the range is 0.095 indicating that responses are highly concentrated. The maximum/minimum ratio of 1.032 indicates that the maximum one is somewhat bigger than the minimum one which indicates that there is not a lot of variation. The variance is insignificant 0.003 indicating that means of items are closely concentrated around the average. The second finding reported by the Table is the number of items is 3 and this will ensure that the analysis will be conducted using three distinct items, which will provide a clue to the consistency and stability of the data presented in the variables. The range of responses in these values is relatively low.

Table 12. Descriptive Statistics for Variable Summary

Mean	Variance	Std. Deviation	N of Items
9.0335	0.824	0.90794	3

Table 12 indicates that the mean of the three items is high as indicated by the statistics of 9.0335. The SD is 0.824 that indicates that the responses lowly different. This means that the values are distributed about the mean relatively. SD of 0.90794 than in turn substantiates this medium scale distribution of the responses that are quite close to the mean though with some form of variation. The items used are 3 in total and the result of the analysis provided gives information about the consistency or variability of responses to the three variables. Overall, the figures support the presence of minor variation around the mean score, in which the scores are very close to the mean, but still, they are very heterogeneous in terms of responses. As shown in Fig 6, the DI measures slightly above 3.0, which suggests a slight positive score of digital innovations being implemented in terms of sustainability. The Green Practices mean is also exactly 3.0, similar to the DI mean, so there is a similar perspective for firms about sustainability efforts. The average of the Sustainability Outcomes is also noticeable closer to 3.0, which indicates a more of an ambivalent position toward their impact of these practices on sustainability objectives. The value of SD is also low and the values are close to lower than 0.5 providing strong evidence of consistency as there is no large difference to confirm responses of Digital Innovation, Green Practices, and Sustainability Outcomes. The similar means and SD for each item demonstrates that higher number of respondents to have alignment in their responses for each measures accentuates the low and consistent levels of agreement for the intersection of DI

integrated with green practices to develop sustainability outcomes.

4.1. Discussion

The research found that DI and green practices were not the leading factors of sustainability outcomes, and only slight correlations were seen. The study proved Hypothesis 1 and Hypothesis 2 wrong while, on the contrary, granting partial support to Hypothesis 3. The absence of sustainability advantages from DI and environmentally-friendly methods could be due to some unrecognized factors including organizational culture, leadership, and external pressures. This study goes against the trend of earlier research that reported positive results; thus, it concludes that these factors alone cannot be the cause. Among the limitations are self-report bias, a small sample size, and the demand for more precise sustainability metrics, with future research** being necessary to uncover the impact of other variables.

5. Conclusion and Future work

The research took the properties of how digital innovation and green practices can be aligned to achieve corporate sustainability in modern businesses. The results showed that both digital innovation (AI, IoT) and green practices (renewable energy, waste management) can contribute to the degree of sustainability, but the research did not differentiate between the relationship of each toward a corporate sustainability outcome. Correlation and regression indicate weak or insignificance between digital innovation and green practices in determining sustainability outcomes and business performance. These results would indicate there are other determinants related to sustainability outcomes, such as leadership, organizational culture, and external pressures that a more impactful to determining the outcome of sustainability. The average scores of DI (2.9800), green practices (2.9793), and sustainability outcomes (3.0742) show moderate agreement and small SD meaning the industry is only agreeing in one direction. However, the Pearson correlation test and regression analysis results showed that the three variables do not have significant correlations and the p-values in each case was >0.05 indicative of very weak correlations. It would also be advantageous to include/integrate other relevant aspects, such as organizational culture, leadership commitment and external regulatory forces, Future research needs to broaden the performance variables to be explored to include profitability and customer satisfaction, thus being able to deliver a complete evaluation of the effects of digital innovation and green practices. Moreover, it is recommended that a thorough barrier assessment be

carried out to determine the obstacles to the implementation of these strategies. Besides, including the external factors such as market conditions and regulations in the framework will lead to a wider and deeper insight into corporate sustainability.

5.1. Limitations

- ✓ The research did not cover other variables of performance such as profitability and satisfaction of customers, which might have given a more complete picture of how digital innovation and green practices influence business performance.
- ✓ The research did not cover the constraints of applying green practices and digital innovation, for instance, financial or organizational constraints, which might influence their successful execution.

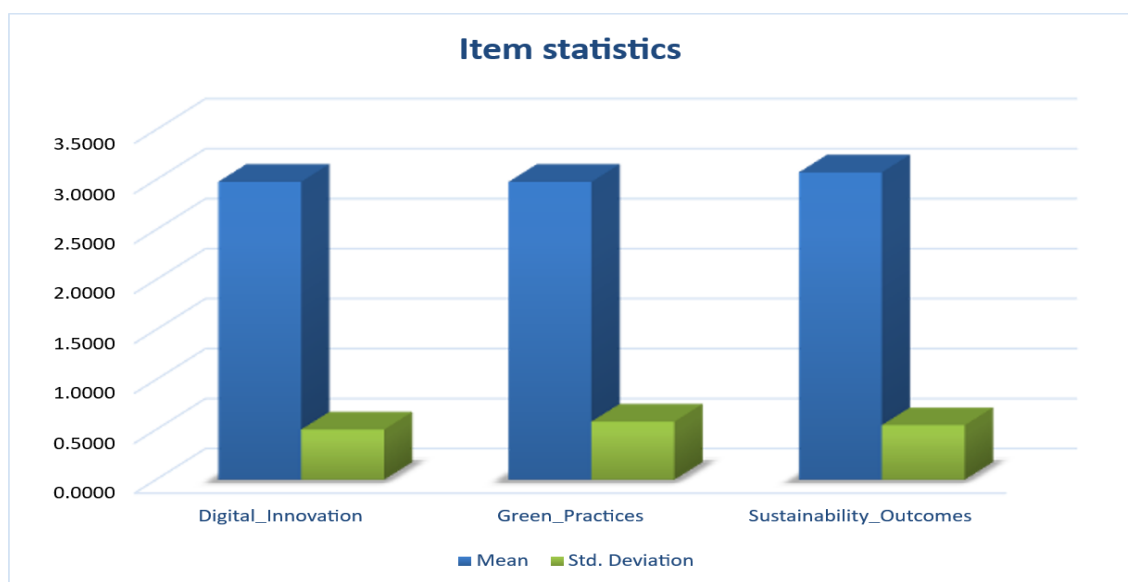


Figure 6. Item Statistics for Digital Innovation, Green Practices, and Sustainability Outcomes

Declarations

Data Availability

<https://forms.gle/NYKHwtsqNCnFiUAq9>

Ethical Approval

This study did not involve human participants, animals, or sensitive personal data requiring ethical approval.

Consent to Participate

Not applicable.

Consent to Publication

Not applicable.

Competing Interests

The author declares no competing interests.

Authors Contribution

All authors have contributed equally to prepare the paper.

Availability of data and materials

The data that support the findings of this study are available from the corresponding author, upon reasonable request.

Conflict of interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

- [1] Shahzad, M.A., Jianguo, D., & Junaid, M. (2023). Impact of green HRM practices on sustainable performance: mediating role of green innovation, green culture, and green employees' behavior. *Environmental Science and Pollution Research*, 30(38), 88524–88547. DOI: <https://doi.org/10.1007/s11356-023-28498-6>
- [2] Jan, A.A., Lai, F.W., Siddique, J., Zahid, M., & Ali, S.E.A. (2023). A walk of corporate sustainability towards sustainable development: a bibliometric analysis of literature from 2005 to 2021. *Environmental Science and Pollution Research*, 30(13), 36521–36532. DOI: <https://doi.org/10.1007/s11356-022-24842-4>

- [3] Elkhwesky, Z., Salem, I.E., Varmus, M., & Ramkissoon, H. (2022). Sustainable practices in hospitality pre and amid COVID-19 pandemic: looking back for moving forward post-COVID-19. *Sustainable Development*, 30(5), 1426–1448. DOI: <https://doi.org/10.1002/sd.2304>
- [4] Rahman, M.D.H., Tanchangya, T., Rahman, J., Aktar, M.A., & Majumder, S.C. (2024). Corporate social responsibility and green financing behavior in Bangladesh: towards sustainable tourism. *Innovation and Green Development*, 3(3), 100133. DOI: <https://doi.org/10.1016/j.igd.2024.100133>
- [5] Azam, T., Songjiang, W., Jamil, K., Naseem, S., & Mohsin, M. (2022). Measuring green innovation through total quality management and corporate social responsibility within SMEs: green theory under the lens. *The TQM Journal*, 35(7), 1935–1959. DOI: <https://doi.org/10.1108/TQM-05-2022-0160>
- [6] Bari, N., Chimhundu, R., & Chan, K.C. (2022). Dynamic capabilities to achieve corporate sustainability: a roadmap to sustained competitive advantage. *Sustainability*, 14(3), 1531. DOI: <https://doi.org/10.3390/su14031531>
- [7] Javeed, S.A., Teh, B.H., Ong, T.S., Chong, L.L., Abd Rahim, M.F.B., & Latief, R. (2022). How does green innovation strategy influence corporate financing? corporate social responsibility and gender diversity play a moderating role. *International Journal of Environmental Research and Public Health*, 19(14), 8724. DOI: <https://doi.org/10.3390/ijerph19148724>
- [8] Busch, T., et al. (2024). Moving beyond ‘the’ business case: how to make corporate sustainability work. *Business Strategy and the Environment*, 33(2), 776–787. DOI: <https://doi.org/10.1002/bse.3514>
- [9] Su, R., Obrenovic, B., Du, J., Godinic, D., & Khudaykulov, A. (2022). COVID-19 pandemic implications for corporate sustainability and society: a literature review. *International Journal of Environmental Research and Public Health*, 19(3), 1592. DOI: <https://doi.org/10.3390/ijerph19031592>
- [10] Yasin, R., Huseynova, A., & Atif, M. (2023). Green human resource management, a gateway to employer branding: mediating role of corporate environmental sustainability and corporate social sustainability. *Corporate Social Responsibility and Environmental Management*, 30(1), 369–383. DOI: <https://doi.org/10.1002/csr.2360>
- [11] Hossain, M.B., Nassar, S., Rahman, M.U., Dunay, A., & Illés, C.B. (2022). Exploring the mediating role of knowledge management practices to corporate sustainability. *Journal of Cleaner Production*, 374, 133869. DOI: <https://doi.org/10.1016/j.jclepro.2022.133869>
- [12] Yan, X., Espinosa-Cristia, J.F., Kumari, K., & Cioca, L.I. (2022). Relationship between corporate social responsibility, organizational trust, and corporate reputation for sustainable performance. *Sustainability*, 14(14), 8737. DOI: <https://doi.org/10.3390/su14148737>
- [13] Li, W., Bhutto, M.Y., Waris, I., & Hu, T. (2023). The nexus between environmental corporate social responsibility, green intellectual capital and green innovation towards business sustainability: an empirical analysis of Chinese automobile manufacturing firms. *International Journal of Environmental Research and Public Health*, 20(3), 1851. DOI: <https://doi.org/10.3390/ijerph20031851>
- [14] Manninen, K., & Huiskonen, J. (2022). Factors influencing the implementation of an integrated corporate sustainability and business strategy. *Journal of Cleaner Production*, 343, 131036. DOI: <https://doi.org/10.1016/j.jclepro.2022.131036>
- [15] Ardito, L. (2023). The influence of firm digitalization on sustainable innovation performance and the moderating role of corporate sustainability practices: an empirical investigation. *Business Strategy and the Environment*, 32(8), 5252–5272. DOI: <https://doi.org/10.1002/bse.3415>
- [16] Sun, J., Bhutta, M.K., & Sarfraz, M. (2024). Green business in the digital age: sustainable performance in an era of technological advancement and leadership transformation. *Current Psychology*, 43(41), 32168–32187. DOI: <https://doi.org/10.1007/s12144-024-06723-w>
- [17] Le, T.T., Tran, P.Q., Lam, N.P., Tra, M.N.L., & Uyen, P.H.P. (2024). Corporate social responsibility, green innovation, environment strategy and corporate sustainable development. *Operations Management Research*, 17(1), 114–134. DOI: <https://doi.org/10.1007/s12063-023-00411-x>
- [18] Le, T.T. (2022). How do corporate social responsibility and green innovation transform corporate green strategy into sustainable firm performance? *Journal of Cleaner Production*, 362, 132228. DOI: <https://doi.org/10.1016/j.jclepro.2022.132228>
- [19] Basheer, M.F., Hassan, S.G., Ali, A., Sabir, S.A., & Waemustafa, W. (2025). The influence of renewable energy, humanistic culture, and green knowledge on corporate social responsibility and corporate environmental performance. *Clean Technologies and Environmental Policy*, 27(3), 1407–1426. DOI: <https://doi.org/10.1007/s10098-024-02889-w>
- [20] Fosu, E., Fosu, F., Akyina, N., & Asiedu, D. (2024). Do environmental CSR practices promote corporate social performance? the mediating role of green innovation and corporate image. *Cleaner Responsibility and Consumer*, 12, 100155. DOI: <https://doi.org/10.1016/j.clrc.2023.100155>
- [21] Wiredu, J., Yang, Q., Sampene, A.K., Gyamfi, B.A., & Asongu, S.A. (2024). The effect of green supply chain management practices on corporate environmental performance: does supply chain competitive advantage matter? *Business Strategy and the Environment*, 33(3), 2578–2599. DOI: <https://doi.org/10.1002/bse.3606>
- [22] Xie, J., Abbass, K., & Li, D. (2024). Advancing eco-excellence: integrating stakeholders’ pressures, environmental awareness, and ethics for green innovation and performance. *Journal of Environmental Management*, 352, 120027. DOI: <https://doi.org/10.1016/j.jenvman.2024.120027>
- [23] Zhu, C., Du, J., Shahzad, F., & Watoo, M.U. (2022). Environment sustainability is a corporate social responsibility: measuring the nexus between sustainable supply chain management, big data analytics capabilities, and organizational performance. *Sustainability*, 14(6), 3379. DOI: <https://doi.org/10.3390/su14063379>
- [24] Fu, C., Lu, L., & Pirabi, M. (2023). Advancing green finance: a review of sustainable development. *Discover Environmental and Sustainability Development*, 1(1), 20. DOI: <https://doi.org/10.1007/s44265-023-00020-3>
- [25] Ye, J., & Dela, E. (2023). The effect of green investment and green financing on sustainable business performance of foreign chemical industries operating in Indonesia: the mediating role of corporate social responsibility. *Sustainability*, 15(14), 11218. DOI: <https://doi.org/10.3390/su151411218>
- [26] Lutfi, A., et al. (2023). Green environmental management system to support environmental performance: what factors influence SMEs to adopt green innovations? *Sustainability*, 15(13), 10645. DOI: <https://doi.org/10.3390/su151310645>
- [27] Chen, D., Hu, H., & Chang, C.P. (2023). Green finance, environment regulation, and industrial green transformation for corporate social responsibility. *Corporate Social Responsibility and Environmental Management*, 30(5), 2166–2181. DOI: <https://doi.org/10.1002/csr.2476>