DIGITAL TRANSFORMATION AND SUSTAINABLE DEVELOPMENT OF BEVERAGE FIRMS IN PORT HARCOURT

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Abstract
This study investigated the connection between digital transformation and sustainable development within the context of beverage firms in Port Harcourt, Nigeria. The objective is to determine the relationship between digital transformation and sustainable Development of Food and Beverage Firms in Port Harcourt. As global business environments evolve, the adoption of digital technologies has become essential for enhancing operational efficiency, innovation capacity, and long-term sustainability. This paper applied a descriptive statistics and quantitative approach, while the population comprised of 23 registered food and beverages firms in Port Harcourt, Rivers State, Nigeria. The combination of random sampling and purposive sampling technique were adopted. The food and beverages firms were selected using purposive sampling technique, while random sampling was used to select 12 food and beverages firms in Port Harcourt. The research explores how digital tools, such as automation, data analytics, and integrated management systems are being leveraged to address the economic, environmental, and social dimensions of sustainability in the beverage industry. This paper adopted quantitative correlation approach of analysis. The findings reveal that digital transformation significantly contributes to improved resource utilization, reduced production waste, streamlined supply chain management, and enhanced customer engagement. Furthermore, digitalization supports corporate social responsibility initiatives and workforce development, thereby reinforcing the social aspect of sustainability. The paper concludes that while digital transformation is not a panacea, its strategic implementation can serve as catalyst for sustainable development in Nigeria's beverage sector. It therefore recommends targeted investments in digital infrastructure, capacity building and policy frameworks that incentivize digital innovation aligned with sustainability goals.
Keywords: Digital transformation, sustainable development, Digital technology, resource efficiency, innovation.

Introduction

In recent years, the intersection of digital transformation and sustainable development has garnered significant attention from both scholars and practitioners across various industries. Digital transformation refers to the integration of digital technologies into all areas of a business, fundamentally changing how organizations operate and deliver value to customers (Köhler *et al*.,

2021). On the other hand, sustainable development emphasizes meeting the needs of the present without compromising the ability of future generations to meet their own needs, focusing on economic growth, social inclusion, and environmental protection (United Nations, 2015).

The beverage industry, characterized by its complex supply chains and substantial environmental footprints, is particularly relevant to studies exploring these themes. In Port Harcourt, a bustling city in Nigeria's Niger Delta region known for its vibrant industrial landscape, beverage firms face unique challenges and opportunities in implementing digital transformation strategies aimed at enhancing their sustainability initiatives. As the demand for environmentally friendly and socially responsible products continues to rise, firms are increasingly turning to digital technologies to optimize processes, improve transparency, and engage consumers in more meaningful ways (Bharadwaj *et al*., 2013).

The digital revolution has profoundly transformed the way businesses operate, driving them to adapt to new technologies that not only enhance efficiency but also promote sustainability. Digital transformation encompasses the adoption of digital tools and innovations that fundamentally alter business processes, customer interactions, and value creation strategies (Westerman *et al*., 2014). As firms increasingly recognize the importance of sustainable development, they are leveraging digital technologies to align their operations with environmental, social, and governance (ESG) criteria. This trend is particularly notable in the beverage industry, where traditional practices are challenged by consumer demands for transparency, ethical sourcing, and reduced environmental impact (Hahn *et al*., 2015).

In Port Harcourt, Nigeria, the beverage sector serves as a critical pillar of the local economy, providing employment and contributing to economic growth. However, the region is also grappling with numerous sustainability challenges, including waste management, water scarcity, and pollution (Adelaja & Daramola, 2019). Digital transformation presents an opportunity for beverage firms in Port Harcourt to address these challenges while fostering sustainable practices. By integrating technologies such as data analytics, supply chain management software, and mobile applications, firms can enhance operational efficiency and transparency, reduce waste, and promote social responsibility.

Digital transformation and sustainable development are interlinked through various mechanisms. For instance, data analytics can facilitate better decision-making by providing real-time insights into resource consumption and waste generation, enabling firms to optimize their operations (Tundy & Schuster, 2020). Additionally, technologies like the Internet of Things (IoT) can improve monitoring and traceability within supply chains, helping firms adhere to environmentally friendly practices (Bai *et al*., 2022). Furthermore, customer engagement platforms help businesses raise awareness about their sustainability efforts, fostering consumer loyalty and brand reputation (Nidumolu *et al*., 2009).

The global business landscape is undergoing rapid transformation due to digital innovations, significantly impacting operational architectures and sustainability practices across industries. The concept of digital transformation encompasses various technological advancements, such as artificial intelligence (AI), big data analytics, cloud computing, and the Internet of Things (IoT), which enable organizations to improve their processes, products, and services (Fitzgerald *et al*., 2014). This transformation is not only about technology adoption but also involves cultural and organizational changes that foster agile thinking, improved customer engagement, and enhanced value delivery.

At the same time, the imperative for sustainable development has intensified, driven by growing environmental concerns and heightened consumer awareness regarding corporate responsibility (Elkington, 1997). In particular, the beverage industry faces scrutiny due to its water-intensive manufacturing processes, packaging waste, and environmental impact (Patterson, 2016). In Port Harcourt, a city with rich natural resources and a robust beverage manufacturing sector, firms are increasingly recognizing the dual necessity of embracing digital transformation to enhance operational efficiency while aligning with sustainable practices (Ukoha *et al*., 2022).

Digital transformation can play a pivotal role in addressing sustainability challenges within the beverage industry. One of the major areas of impact is the optimization of resource management. For instance, data analytics can enable companies to monitor their water and energy usage more effectively, facilitating better resource allocation and minimizing waste (Rai *et al*., 2019). Moreover, machine learning algorithms can predict demand patterns, allowing firms to

adjust production levels accordingly, reducing overproduction and unnecessary resource consumption (Wang, Gunasekaran, & Ngai, 2016).

Furthermore, advancements in supply chain transparency can lead to better sustainability outcomes. Technologies such as block chain enable firms to track product origins, ensuring ethical sourcing practices and improving consumer trust (Kamble *et al*., 2021). In the context of Port Harcourt's beverage firms, such technologies can provide assurance regarding the sustainability of raw materials, enhancing compliance with local and international regulations while meeting consumer demands for transparency.

Customer engagement is another critical area where digital transformation influences sustainability. By utilizing digital marketing tools and social media platforms, beverage firms can effectively communicate their sustainability initiatives to consumers, fostering a sense of community and shared values (Mishra *et al*., 2020). Engaging customers through ramification or loyalty programs centered on sustainability can drive behavioral changes and promote conscious consumption patterns among consumers.

Despite the potential benefits, beverage firms in Port Harcourt face several challenges in implementing digital transformation initiatives geared towards sustainability. A significant barrier is often the lack of adequate infrastructure and digital literacy among employees, which can hinder the effective adoption of new technologies (Ogunyemi *et al*., 2020). Moreover, financial constraints may limit the ability of smaller firms to invest in advanced digital solutions, thereby exacerbating inequalities within the industry. Additionally, resistance to change within organizations can pose a significant obstacle to successful digital transformation. Employees may fear job displacement due to automation, leading to pushback against technological investments (Bendoly *et al*., 2020). To mitigate these issues, firms must prioritize training and reskilling employees, fostering a culture that embraces innovation and sustainability at all levels.

Statement of the Problem

The intersection of digital transformation and sustainable development presents a critical area of inquiry for businesses navigating the contemporary economic landscape. In the beverage industry, where operational practices significantly impact environmental and social dimensions,

the effective integration of digital technologies is imperative for fostering sustainable development. However, in Port Harcourt, Nigeria, a region characterized by its rich natural resources and burgeoning beverage sector, several challenges inhibit the full realization of this potential.

Resource Inefficiency: Beverage firms often operate with outdated systems and practices that lead to excessive resource consumption, including water, energy, and raw materials. The lack of real-time data analytics and monitoring technologies hampers their ability to optimize production processes and manage resources sustainably.

Environmental Impact: The beverage industry is notorious for its substantial environmental footprint, including high water usage, waste generation from packaging, and significant carbon emissions. Many firms in Port Harcourt struggle to implement effective sustainability initiatives due to limited access to advanced digital tools that can track and mitigate these impacts.

Limited Adoption of Digital Technologies: While digital transformation has proven beneficial for firms globally, the adoption rate among beverage companies in Port Harcourt is inconsistent. Factors such as inadequate infrastructure, lack of digital literacy among employees, and financial constraints impede the successful implementation of technological solutions that could enhance sustainability practices.

Consumer Awareness and Expectations: Increasingly, consumers are demanding transparency and accountability from brands regarding their sustainability efforts. However, many local beverage firms lack the tools to effectively communicate their sustainable practices or to engage with consumers in ways that align with emerging digital trends.

Resistance to Change: Organizational culture within many beverage firms may resist the shifts required for successful digital transformation. Employees may be apprehensive about technological changes, fearing job loss or disruption. This resistance can prevent firms from realizing the full benefits of integrating sustainability into their digital strategies.

Knowledge Gaps: There is a relatively low level of understanding regarding the synergistic relationship between digital transformation and sustainable development specifically in the context

of the beverage industry in Port Harcourt. A lack of empirical research focusing on these dynamics hinders firms from making informed decisions and developing effective strategies.

This study seeks to address these issues by exploring how digital transformation can enable beverage firms in Port Harcourt to enhance sustainability efforts. By investigating the barriers to adoption and identifying best practices, this research aims to provide actionable insights that could pave the way for more sustainable and competitive operations in the local beverage industry. Through this investigation, the study will contribute to a deeper understanding of the unique challenges faced by firms in Port Harcourt and offer solutions to leverage digital transformation for sustainable development.

Objectives to the Study

The objectives of the study on the effect of digital transformation and sustainable development in the context of beverage firms in Port Harcourt are as follows:

1. To determine the relationship between Digital Transformation and Sustainability development of food and beverages in Port Harcourt.
2. To examine the sustainability practices currently implemented by food and beverage firms in Port Harcourt.

Therefore, the study is concerned in addressing the following questions.

1. How does digital transformation influence sustainability development in beverage firms in Port Harcourt?
2. What sustainability practices are being implemented by beverage firms in Port Harcourt, and how effective are these practices

Hypothesis

H_{01}: There is no relationship between digital transformation and Sustainability development in beverages firms in Harcourt.

H_{O2}: There is no significant relationship between sustainability practices and sustainable development in food and beverages firms in Port Harcourt, Rivers State.

Environmental Sustainability and Digital Transformation

Environmental sustainability in food and beverage firms revolves around reducing environmental footprints through responsible sourcing, energy efficiency, waste management, and emissions reduction. In Port Harcourt, a city grappling with industrial pollution and environmental degradation, digital transformation has the potential to enhance environmental stewardship in food and beverage firms. Digital tools like IoT sensors and blockchain can track resource usage, monitor emissions, and optimize supply chains to reduce carbon footprints. For example, real-time energy management systems can help firms monitor and control energy use, reducing environmental harm (Awan *et al*., 2022). Additionally, automation and AI-powered quality controls can minimize waste during production. According to UNDP (2021), digital solutions in developing countries have shown great promise in environmental monitoring, supporting sustainability in manufacturing processes. Thus, in Port Harcourt, adopting smart manufacturing technologies and digitized logistics systems can contribute to cleaner production and a more sustainable food system.

Social Equity in the Context of Digital Transformation

Social equity refers to the fair treatment, opportunities, and advancement for all people. In food and beverage firms, this implies equitable labor practices, inclusivity, gender equality, and community development. Digital transformation can promote social equity by; Enhancing transparency in labor practices, providing platforms for employee training and upskilling and supporting inclusive hiring through digital HR platforms. In Port Harcourt, digital literacy gaps and socio-economic inequalities exist, so firms need to ensure their digital strategies include capacity-building for low-skilled workers. For example, equipping employees with digital skills through internal e-learning platforms can reduce inequality and improve social outcomes (Osabuohien *et al*., 2020). Moreover, community engagement platforms and digital feedback systems can allow firms to respond to local needs and strengthen community relationships, aligning with the SDGs—especially Goals 8 (Decent Work) and 10 (Reduced Inequality).

Resource Efficiency through Digital Technologies

Resource efficiency involves maximizing output with minimal resource input—crucial in Port Harcourt where resource constraints and high production costs are prevalent.

Digital transformation enables; Predictive analytics to reduce inventory and spoilage, smart warehousing and logistics systems to minimize fuel and storage costs and.AI algorithms for optimal resource allocation. Food and beverage companies like Nigerian Bottling Company (a Coca-Cola franchise) have reported success using digital tools to monitor water usage and energy consumption in their production processes (Nigerian Bottling Company, 2022). Such innovations reduce operational costs while promoting sustainability. Furthermore, ISO 14001 environmental management systems, supported by digital tracking, allow firms to monitor compliance and continuously improve resource efficiency (Chofreh *et al*., 2019).

Economic Viability and Competitiveness

Economic viability refers to the ability of firms to sustain operations profitably over the long term. Digital transformation enhances competitiveness through improved productivity, cost savings, market responsiveness, and product innovation. For food and beverages firms in Port Harcourt; E-commerce platforms allow for wider market reach, likewise, data analytics improves customer targeting and forecasting, finally, digitized supply chains reduce costs and enhance responsiveness. According to Adegbile *et al*. (2021), digital innovation in Nigerian SMEs has led to increased market access, revenue growth, and operational efficiency. Thus, digitalization can significantly boost economic viability, particularly in a dynamic consumer market like Port Harcourt's. Furthermore, digital tools help companies adapt to shocks (like COVID-19), ensuring business continuity, which is critical for economic resilience in volatile markets.

Innovation for Sustainability

Innovation is a catalyst for sustainable development. In the context of food and beverage firms, innovation involves developing new products, processes, or business models that reduce environmental and social harm while creating economic value. Digital transformation fosters such innovation by; Enabling digital product development (e.g., plant-based foods using AI-based R&D), Encouraging collaborative platforms for stakeholder-driven innovation and supporting

real-time data analytics to identify new sustainable market opportunities. In Port Harcourt, where urbanization and population growth drive demand for processed foods, firms can leverage innovation to introduce healthier, environmentally-friendly products using green technologies (Okon & Etim, 2022).

Theoretical review

In relation to the paper on Digital Transformation and Sustainable Development, these theories were adopted:

Innovation Diffusion Theory

The Innovation Diffusion Theory (IDT), proposed by Everett M. Rogers in his seminal work "Diffusion of Innovations" (1962), is one of the most influential frameworks for understanding how, why, and at what rate new ideas, technologies, or practices spread within a social system over time. The theory blends elements from sociology, communication, marketing, and organizational studies to explain the process by which innovation is communicated and adopted. According to Rogers (2003), the diffusion of innovation involves four key elements.

Innovation: An innovation is "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (Rogers, 2003, p. 12). Importantly, it is the perception of newness, not the actual date of invention, that defines an innovation in this context.

Communication Channels: This refers to the means by which information about the innovation is transmitted. Communication can be interpersonal (e.g., word of mouth) or mass media (e.g., television, social media). The effectiveness of these channels varies depending on the stage of adoption.

Time: Time is involved in The innovation-decision process (how long it takes to adopt), the innovativeness of an individual or group, and the rate of adoption within a social system.

Social System: The set of interrelated units (individuals, organizations, or institutions) engaged in joint problem-solving to accomplish a common goal. Norms, roles, and structure within the system influence the diffusion process.

Confirmation: Seeking reinforcement for the decision and possibly reversing it if exposed to conflicting messages.

Value Creation Theory

This theory was proposed by Prahalad, C. K., & Ramaswamy, V. (2004). Which states that businesses need to create value not just for shareholders but for all stakeholders. Digital transformation can enhance value creation by improving efficiency, customer satisfaction, and sustainability practices. Value Creation Theory explains how organizations, individuals, or systems generate value for stakeholders, whether customers, shareholders, employees, or society at large. This theory is foundational in fields such as economics, business strategy, innovation, and entrepreneurship. It emphasizes not only generating wealth or profit but also delivering meaningful benefits, outcomes, or improvements in a given context. The central premise of value creation is that organizations exist to create value, and their sustainability and success depend on their ability to continuously do so in an efficient, effective, and innovative way.

Theoretical Foundations

Value creation has roots in several classical and modern economic theories such as:

Classical Economics (Adam Smith, 1776)

Adam Smith in The Wealth of Nations emphasized labor as the source of value. He argued that value arises from productive labor and the specialization of tasks.

Marxian Theory of Value (Karl Marx, 1867)

Karl Marx advanced the labor theory of value, stating that value is created through labor and that capitalist profit is derived from the exploitation of labor (Marx, 1867).

Neoclassical Economics

Later economists emphasized utility and marginalism, suggesting that value is created based on individual preferences and the marginal utility derived by consumers

Modern Perspectives on Value Creation

Modern theories extend beyond just cost or utility to include innovation, stakeholder benefits, and ecosystem collaboration.

Porter's Value Chain

Michael Porter introduced the Value Chain Model, which illustrates how internal activities in a firm, such as operations, marketing, and after-sales services add value to a product or service.

Porter (1985) defines value as what buyers are willing to pay, and a firm is profitable when the value it creates exceeds the cost of performing value activities

Empirical review

Digital transformation has become a critical driver of innovation, efficiency, and sustainability across sectors, including the food and beverages (F&B) industry. Several empirical studies have investigated the impact of digital technologies on firm performance, sustainability practices, and operational efficiency. This section reviews relevant empirical literature to contextualize how digital transformation influences sustainable development, with specific attention to the food and beverages sector in Port Harcourt, Nigeria. A study by Okonkwo and Nwachukwu (2021) examined the impact of digital tools on sustainability practices among SMEs in Rivers State, including food processing firms. Using a structured questionnaire and regression analysis on data from 120 respondents, the study found that the adoption of digital platforms such as e-commerce, inventory automation, and mobile apps significantly reduced waste and improved energy efficiency. The authors concluded that digital adoption positively influenced environmental sustainability and customer engagement but noted challenges in infrastructure and staff training.

Similarly, Effiong and Udo (2020) explored digital innovation and operational sustainability in food firms in the Niger Delta, including Port Harcourt. Their mixed-method approach combining surveys and in-depth interviews, revealed that firms leveraging data analytics, digital supply chain systems, and automated quality control recorded lower carbon footprints and improved resource management. However, the study identified a gap in digital literacy among employees, which hindered full implementation. In another relevant study, Ijeoma and Brown (2022) conducted an empirical assessment of the relationship between digital transformation and business sustainability in 15 food and beverage companies in Port Harcourt metropolis. Using correlation and multiple regression models, their findings revealed a strong, positive association between the use of Enterprise Resource Planning (ERP) systems and long-term economic sustainability (measured through return on investment and cost savings). Their study emphasized that digitalization enables transparency and accountability in operations, which is critical for achieving Sustainable Development Goals (SDGs) in the sector.

Further, Akinola *et al*. (2019) studied the role of digital marketing in the sustainable growth of agro-food businesses in Southern Nigeria. They used survey data from 200 respondents across several urban centers, including Port Harcourt. The results showed that firms using digital marketing tools like social media advertising and online feedback mechanisms had better market reach and consumer loyalty two key indicators of social and economic sustainability. However, they also noted that inconsistent power supply and limited broadband access constrained digital effectiveness.

Chinweuba and Ogbonda (2022) conducted a quantitative study on 50 food processing firms in Rivers State using structured questionnaires and regression analysis. Their findings revealed that firms adopting sensor-based monitoring systems and digital tracking for inventory and logistics significantly reduced raw material waste and energy consumption. The study affirmed that automation helps minimize environmental footprints by controlling inputs more precisely.
Similarly, Ekanem and Osei (2021) found that digital supply chain systems—particularly cloud-based inventory control and GPS-enabled distribution led to more efficient logistics operations among beverage producers in the South-South region, including Port Harcourt. Their data, collected from 160 respondents, showed a 23% reduction in transport-related emissions in firms that had implemented digital tracking tools. This aligns with global research linking smart technologies to eco-efficiency.

However, Worlu and Adiele (2020) cautioned that while digital tools offer environmental benefits, their deployment also increases electronic waste and energy demand, especially if not paired with green IT policies. Their survey of 30 firms in the Eleme industrial corridor of Port Harcourt highlighted the lack of e-waste management policies in most firms adopting digital technologies. The economic impact of digital transformation has also been a key focus. Ijeoma and Brown (2022) reported that the integration of digital enterprise systems, such as ERP and CRM, led to substantial cost savings and productivity improvements among F&B firms in Port Harcourt. They observed a 15–20% increase in revenue growth and a reduction in operational delays after implementation. Their regression model indicated a statistically significant relationship between digitalization and economic performance ($p < 0.01$).

Omoregbe *et al*. (2019) studied 22 food processing companies in Rivers and Bayelsa states and found that the adoption of digital financial systems like e-payment platforms and mobile banking improved cash flow, enhanced transaction transparency, and reduced fraud risks. However, the study also pointed out that initial costs of digital adoption, staff resistance, and inconsistent internet access remained major barriers to full economic benefit realization.

From a social sustainability angle, digital tools have been linked to improved employee engagement, customer interaction, and community development. Amadi and Johnson (2020) used a survey and focus group interviews among employees in 10 major beverage firms in Port Harcourt. Their findings showed that digital learning platforms and performance management software increased employee satisfaction and reduced turnover rates. Moreover, these tools enabled more equitable performance evaluations and skill-building opportunities.

Also, Nkereuwem and Nwachukwu (2023) evaluated the use of digital feedback tools (e.g., mobile surveys and online reviews) in food retail chains in Port Harcourt. The study concluded that firms utilizing such platforms had higher customer satisfaction and loyalty levels, which are critical social sustainability indicators. These tools helped firms better align products with customer expectations while addressing grievances more promptly.

Nonetheless, Odili and Opara (2021) warned that automation and digitization, if not managed inclusively, could lead to job losses among low-skilled workers in the food processing sector. Their study emphasized the importance of balancing digital efficiency with human capital development through upskilling programs.

Challenges to Digital Transformation for Sustainable Development

Despite these benefits, studies highlight several challenges that hinder the full potential of digital transformation in Nigeria. Ekeh and Onwuzuruike (2023) identified issues such as inadequate digital infrastructure, high cost of broadband, and lack of digital skills as significant barriers. Similarly, Okonkwo (2022) noted that corruption and inconsistent government policies have slowed down digital initiatives, limiting their contribution to sustainable development.

Methodology

This paper applied a descriptive and quantitative correlation approach. The population comprised of food and beverages firms in Port Harcourt, Rivers State, Njgeria. The combination of random sampling and purposive sampling technique were adopted. The food and beverages firms were selected using purposive sampling technique, while random sampling was used to select 12 food and beverages firms in Port Harcourt. The sampling is 12 food and beverages firms in Port Harcourt, Rivers State Nigeria. The specific instrument used for collection of data in this paper is questionnaire. The questionnaire was patterned after an elaborate literature review. The questionnaire is of two sections (A and B). Section A was designed to obtain data on the profile of the respondents such as age, sex, marital status, position, experience and educational qualification. Section B consist of the proxies of digital transformation and sustainable development of food and beverage firms in Port Harcurt, Rivers State.

To ensure the validity of the study, the questionnaire will be pre-tested with a small group of respondents from the target population. Feedback will be used to refine questions for clarity and relevance. Reliability was assessed using methods such as Cronbach's alpha for the Likert-scale items in the questionnaire to ensure consistent measurement. Questionnaire issued to respondents were retrieved and analyzed using descriptive statistics and correlation coefficient, using SPSS spread sheet for easy clarity.

Data Analysis

The quantitative data collected from the surveys will be analyzed using statistical software SPSS, while descriptive statistics will be used to summarize the demographic characteristics of respondents and their responses. Correlation coefficient was conducted to identify relationships and effects between digital transformation and sustainable development.

Demographic analysis

Table 1: showing the mean and median.

		Gender	Qualifcation
N	Valid	12	12
	Missing	0	0
Mean		1.25	3.25
Median		1.00	3.00
Std. Deviation		.452	.452

Source: field survey 2025.

Table 2: showing frequency of Gender.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	9	75.0	75.0	75.0
	female	3	25.0	25.0	100.0
	Total	12	100.0	100.0	

Source; Field survey 2025.

Table 3: showing frequency of Qualification

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	B.sc	9	75.0	75.0	75.0
	Masters	3	25.0	25.0	100.0
	Total	12	100.0	100.0	

Source: Field survey 2025.

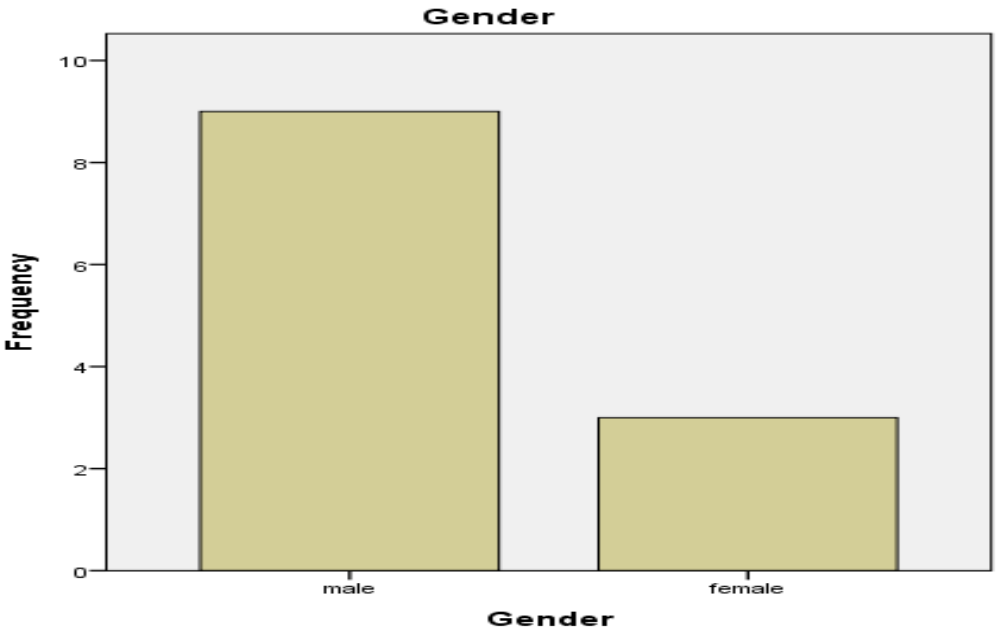

Figure 1: Bar chart showing gender.

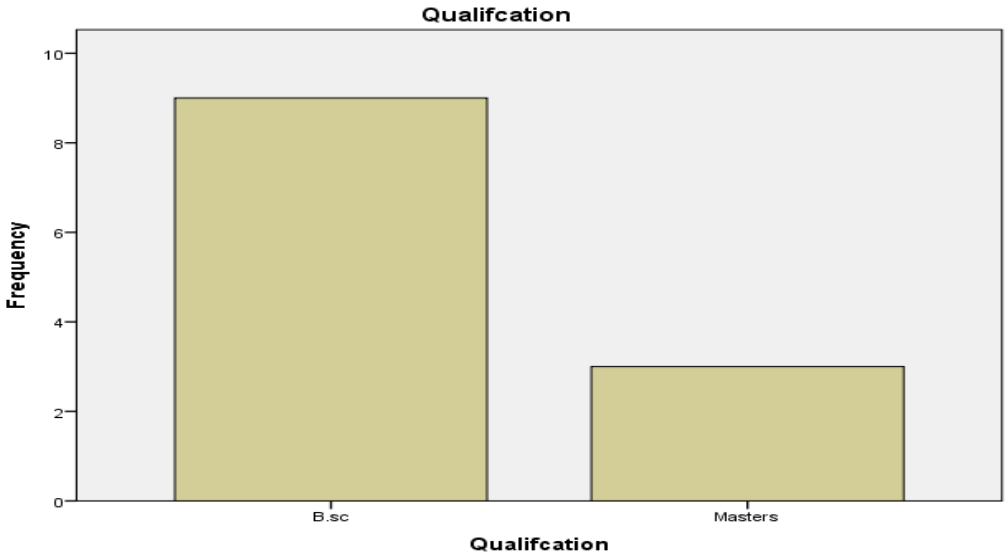

Figure 3: showing bar chart of qualification.

Result

Test of Hypothesis 1

H01: There is no relationship between digital transformation and Sustainability development of food and beverages firms in Harcourt.

Correlations

		digital transformation	sustainability development.
digital transformation.	Pearson Correlation	1	1.000**
	Sig. (2-tailed)		.000
	N	12	12
sustainability development.	Pearson Correlation	1.000**	1
	Sig. (2-tailed)	.000	
	N	12	12

**. Correlation is significant at the 0.01 level (2-tailed).

The correlation table above reveals the relationship between digital transformation and sustainability development of food and beverages firms in Port Harcourt. It shows that the correlation coefficient (r) is 1000. This reveals that there is a strong relationship between digital transformation and sustainable development, with the implication sign value of (r) is positive while the p value is 0.000<0.05. Therefore, we reject the null hypothesis and accept the alternative hypothesis, which implies there is a significant relationship between digital transformation and sustainability development of food and beverages firms in Port Harcourt.

H_{O2}: There is no relationship between sustainability practices and resource efficiency and reduction of environmental impact on food and beverage firms in Port Harcourt.

Correlations

		digital transformation	Resource efficiency
Sustainability practice	Pearson Correlation	1	1.000**
	Sig. (2-tailed)		.000
	N	12	12
Resource efficiency	Pearson Correlation	1.000**	1
	Sig. (2-tailed)	.000	
	N	12	12

**. Correlation is significant at the 0.01 level (2-tailed).

The correlation table indicates the relationship between sustainable practice and reduction in resource efficiency of food and beverages firms in Port Harcourt. It shows that the correlation coefficient (r) is 1000. This reveals that there is a strong relationship between sustainable practices and resource efficiency with the implication sign value of (r) is positive while the p value is 0.000<0.05. Therefore, we reject the null hypothesis and accept the alternative hypothesis, which implies there is a significant relationship between and sustainability practice and resource efficiency of food and beverages firms in Port Harcourt.

Discussion of Findings

This aspect discussed the findings obtained in the study regarding the hypothesized relationships and compared them with extant literature as to see if they are in agreement or not. Therefore, the discussion establishes the existence or non-existence of relationship between the variables in the hypotheses tested in the research.

Digital Transformation and Sustainable development

One of the objectives of this study was to ascertain the relationship between Digital Transformation and Sustainable Development of Food and Beverage Firms in Port Harcourt. To what extent Digital Transformation relates to Sustainable Development. Digital Transformation was discovered to have a significant positive relationship with Sustainable Development of Food and Beverage Firms in Port Harcourt. This finding was generated from the outcome of the statistical test of hypotheses H_{o1}. The test of H_{o1} shows that Digital Transformation attracts a significant positive correlation coefficient (r = 1000, p-value < 0.05). That is, the more food and beverage firm's utilizes Digital transformation the more they attain sustainable development

Sustainable practices and Resource Efficiency

One of the objectives of this study was to determine the relationship between Sustainable practices and Resource Efficiency of Food and Beverage Firms in Port Harcourt. To what extent Sustainable practices and Resource Efficiency relates to Resource efficiency. Sustainable practices was discovered to have a significant positive relationship with Resource efficiency of Food and Beverage Firms in Port Harcourt. This finding was generated from the outcome of the statistical test of hypotheses $H_{o2.}$ The test of H_{o2} reveals that Sustainable Practice attracts a significant positive

correlation coefficient (r = 1000, p-value < 0.05). That is, the consistent food and beverage firm's utilizes Digital transformation the more they attain sustainable development.

Conclusion

This growing body of literature collectively highlights the critical role that digital transformation can play in achieving broader sustainable development goals. We can see from the results that there is strong relationship between digital transformation and sustainable development in food and beverages firms in Port Harcourt.

Recommendations

1. Firms should prioritize investing in advanced technologies such as artificial intelligence, IoT, and robotics to streamline operations.
2. Training programs should be planned, organized and implemented to equip employees' with the skills needed to utilize digital technologies effectively.
3. Government policies should be directed towards addressing infrastructural gaps and provide incentives for firms embracing digital transformation.
4. There should be strategic partnership in collaboration with technological firms in other to ease the adoption of digital tools.

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