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ARTIFICIAL INTELLIGENCE CAPABILITIES AND ORGANIZATIONAL SUSTAINABILITY OF RETAIL OUTLETS IN PORT HARCOURT: A DRIVE FOR RENEWABLE HOPE IN SMART ECONOMIES

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ABSTRACT

The study examined artificial intelligence capabilities and organizational sustainability of retail outlets in Port Harcourt. The objectives of the study were to examine the relationship between dimensions of artificial intelligence capabilities such as CCTV analytics, chatbots and automated processing; and measures of organizational sustainability in terms of Environmental sustainability and Economic sustainability of retail outlets in Port Harcourt. Thus, the study was anchored on Diffusion of Innovation theoretical foundation. The study adopted the cross-sectional survey research design. The accessible population of the study was Sixteen (16) retail outlets currently operating in Port Harcourt. The entire population was used as the study sample. Thus, the study was census research which involves using the entire population rather than drawing a sample from it. Structured questionnaire served as the instrument for data collection. A total of sixty-four (64) copies of the validated questionnaire were distributed to the targeted audience. The researcher was able to retrieve fifty-six (56) copies of the entire validated questionnaire distributed. Arithmetic mean and standard deviation were used for the research question analyses, while the test of hypotheses was done using Spearman rank order correlation with the aid of SPSS Version 24.0. It was found that there is a significant positive relationship between artificial intelligence capabilities and organizational sustainability of retail outlets in Port Harcourt. It was concluded that leveraging artificial intelligence powered tools such as CCTV analytics, chatbots and automated processing, retailers can enhance operational efficiency, improve customer experiences and gain valuable insights into market trends. Consequently, it was recommended that operators of retail outlets should utilize automated system to track inventory level, reduce waste and optimize stock replenishment.

Keywords: Artificial intelligence Capabilities, organizational sustainability, environmental sustainability, Economic Sustainability and Retail outlets, Port Harcourt

Introduction

In the evolving landscape of global commerce, organizational sustainability has become a critical focus for retail outlets striving to maintain competitiveness, profitability, and social legitimacy. Sustainability in this context extends beyond environmental concerns, encompassing social equity, economic resilience, and ethical governance (Jones & David, 2023; Lee & Johnson, 2023). Retailers are increasingly pressured by consumers, regulators, and investors to adopt practices that minimize environmental impact, foster social wellbeing, and ensure transparent operations. Thus, organizational sustainability of retail outlets refers to the ability of retail businesses to operate in ways that ensure long-term economic success while simultaneously minimizing environmental impact and promoting social responsibility. Recent research of Smith et al. (2024) highlights that sustainability initiatives in retail not only contribute to corporate social responsibility goals but also enhance brand reputation, customer loyalty, and financial performance. Retail outlets are adopting strategies such as sustainable sourcing, waste reduction, energy-efficient operations, and community engagement programs to integrate sustainability into their business models (Chen & Xu, 2023). Moreover, technological innovations such as digital tracking of supply chains and AI-driven inventory management are facilitating more sustainable practices across retail operations (Patel & Robinson, 2022). Hence, environmental sustainability, economic sustainability are considered here as measures of organizational sustainability.

Environmental sustainability has emerged as a central concern for retail outlets aiming to reduce their ecological footprint while meeting the growing demands of environmentally conscious consumers. Retail businesses, traditionally characterized by high energy consumption, packaging waste, and extensive supply chains, are now re-evaluating their operations to minimize environmental harm (Patel & Robinson, 2022). Environmental sustainability in retail encompasses efforts such as reducing carbon emissions, adopting renewable energy sources, minimizing waste through recycling and circular economy practices, and promoting sustainable product offerings (Chen & Xu, 2023).

Economic sustainability means the ability of a business to make profit, reduce costs, use resources properly and continue operating successfully. In retail outlets, Artificial Intelligence can help by predicting customer demand, managing stock, automating tasks and improving decisions. This can reduce waste and costs, improve productivity and increase income (Heins, 2023; Wamba et al., 2024).

Economic and Environmental sustainability are important parts of organizational sustainability. Economic sustainability is concerned with the ability of a retail outlet to make profit, control costs, use its resources wisely and remain in business over time. Environmental sustainability, on the other hand, is concerned with reducing waste, saving resources and carrying out business activities in ways that have less negative effect on the environment. Artificial Intelligence capabilities can help retail outlets achieve these goals by improving decision-making, reducing unnecessary costs, making better use of resources and improving daily business activities. Therefore, studying Artificial Intelligence capabilities and organizational sustainability among retail outlets in Port Harcourt can help to explain how the use of Artificial Intelligence can support profitable business operations, responsible use of resources and long-term business survival (Wamba et al., 224; Zhang & Dong, 2026).

Artificial intelligence (AI) has rapidly become a transformative force in the retail sector, offering powerful capabilities that enhance operational efficiency, personalize customer experiences, and optimize decision-making processes. In retail outlets, AI applications range

from demand forecasting and inventory management to personalized marketing, dynamic pricing, and customer service automation (Zhou & Patel, 2023). AI-powered recommendation engines, automated checkout systems, and intelligent inventory systems are becoming standard tools for leading retailers seeking to stay competitive in a highly dynamic market (Chen & Brown, 2023). Moreover, advancements in generative AI and predictive analytics have opened new opportunities for real-time personalization and hyper-local marketing strategies (Lopez, *et al.,* 2022). So, capabilities of artificial intelligence manifest in terms of CCTV analytics, chatbots and automated processing.

Closed-circuit television (CCTV) analytics has become an essential tool for retail outlets seeking to enhance security, optimize store operations, and improve customer experiences. CCTV systems are now integrated with advanced analytics technologies such as artificial intelligence (AI), machine learning, and computer vision to extract valuable insights from video data in real time (Patel & Chen, 2023). These technologies enable retailers to monitor customer movements, detect unusual activities, manage queues, optimize store layouts, and even analyze shopper demographics and behavior patterns (Li & Thomas, 2024). However, the deployment of CCTV analytics also raises concerns about customer privacy, data security, and ethical usage. As regulations around surveillance and data handling become stricter, retailers must navigate these challenges carefully to maintain customer trust and compliance (Brown *et al*., 2023). Nevertheless, when implemented responsibly, CCTV analytics offers a powerful means for retail outlets to enhance both operational and strategic decision-making.

Chatbots have become an increasingly vital tool for retail outlets aiming to enhance customer engagement, streamline service operations, and personalize the shopping experience. Powered by artificial intelligence (AI) and natural language processing (NLP), chatbots can simulate human conversation, offering instant support for product inquiries, order tracking, customer feedback, and personalized recommendations (Singh & Lee, 2023). By operating 24/7 across digital channels, chatbots help retailers improve response times, reduce customer service costs, and gather valuable consumer insights (Patel *et al.,* 2022). Retailers are increasingly integrating advanced chatbots capable of sentiment analysis, multilingual support, and proactive outreach into their omnichannel strategies (Gonzalez & Smith, 2024).

In retail outlets, automation encompasses a wide range of processes such as inventory management, checkout operations, replenishment systems, customer service interactions, and supply chain logistics (Patel & Brown, 2023). Thus, it has become a cornerstone of modern retail operations, offering solutions that enhance efficiency, accuracy, and customer satisfaction. For instance, cashier-less stores, automated kiosks, and AI-powered stock monitoring systems have become increasingly common in both large retail chains and boutique outlets (Chen & Johnson, 2022). Automation enables real-time decision-making based on data insights, helping retail businesses adapt quickly to changing consumer demands and market conditions (Kumar & Singh, 2023). This background necessitated the study.

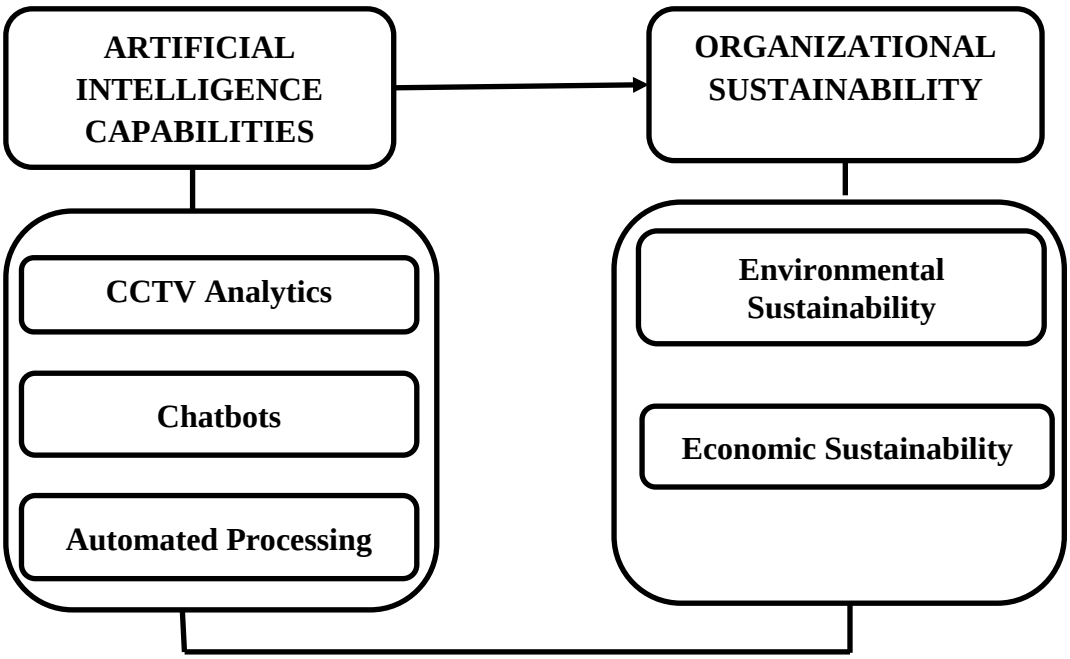
Statement of the Problem

Despite growing awareness of sustainable business practices, many retail outlets continue to struggle with achieving organizational sustainability. Poor environmental sustainability is evident through excessive resource consumption, inadequate waste management practices, and minimal investment in eco-friendly initiatives. Retailers often fail to integrate green technologies or adopt sustainable supply chain models, leading to increased environmental

degradation and loss of consumer trust. Many retail outlets experience declining profitability, inefficient cost structures, and limited capacity to invest in long-term sustainability efforts. Financial instability not only threatens the survival of retail businesses but also undermines their ability to innovate and implement necessary environmental and social initiatives.

Moreover, high levels of waste generation remain a significant concern. Inefficient inventory management, overproduction, unsold goods, and inadequate recycling programs contribute to substantial operational waste. This not only increases operational costs but also contradicts growing regulatory and consumer demands for responsible environmental stewardship. To this end, it seems the retail outlets fail to adequately incorporate artificial intelligence (CCTV analytics, chatbots and automated processing) in their daily operation. The study sought to find out.

Conceptual Framework



Conceptual Framework Showing Relationship between Artificial Intelligence Capabilities and Organizational Sustainability Source: Chen and Brown (2023); Li and Thomas (2024); Lee and Johnson (2023); Patel and Robinson (2022).

The purpose of the study was to examine the relationship between artificial intelligence capabilities and organizational sustainability of retail outlets in Port Harcourt. Specifically, the study objectives were:

1. To determine the relationship between CCTV analytics and environmental sustainability of retail outlets in Port Harcourt.
2. To ascertain the relationship between chatbots and financial health of retail outlets in Port Harcourt.
3. To investigate the relationship between automated processing and zero waste initiative of retail outlets in Port Harcourt

Research Questions

Following the objectives of the study, these research questions were posed:

1. What is the relationship between CCTV analytics and environmental sustainability of retail outlets in Port Harcourt.?
2. What is the relationship between chatbots and financial health of retail outlets in Port Harcourt?
3. What is the relationship between automated processing and zero waste initiative of retail outlets in Port Harcourt?

Research Hypotheses

Based on the research questions posed above, the following null hypotheses were tested at 0.05 level of significance.

Ho_1: There is no significant relationship between CCTV analytics and environmental sustainability of retail outlets in Port Harcourt.

Ho_2: There is no significant relationship between chatbots and economic sustainability of retail outlets in Port Harcourt.

Ho_3: There is no significant relationship between automated processing and economic sustainability of retail outlets in Port Harcourt.

Literature Review

Theoretical Review

This study anchored on Roger's (1962) Diffusion of Innovation Theory. Roger's Diffusion of Innovation Theory explains the processes involved in the adoption of innovations such as new technologies, techniques, and procedures and well as the resultant effects of such steps on organizational processes. The diffusion of innovation theory assumes that:

i) In a social system, there will always be a disparity in the level and time at which individuals within a given social system adopt new ideas, techniques, and technology.

ii) Individuals and arms of institutions that adopt innovations early will naturally outperform late adopters and the laggards.

The implication of this theory is that as individuals advance in the use of sophisticated devices, there will naturally be a disparity on how productivity is enhanced by both category of people in the society. While some individual are digitally compliant and digitally literate enough to carry out online operations, there are still those who still find it difficult to operate simple smart phones. The fact is that while those with digital skills interface with better productivity, others are bedeviled with low productivity while those who embrace and adopt emerging digital work environment enjoy speed, efficiency and high level effectiveness in coping with socio-personal functions others are battling with job stress.

Conceptual Review

Concept of Artificial Intelligence Capabilities

Over the years, artificial intelligence (AI) has evolved from a theoretical concept to a key driver of technological innovation, impacting numerous industries, including healthcare, finance, transportation, and telecommunications. AI systems are typically powered by algorithms and data that enable them to learn from experience and adapt over time, making them more efficient and effective in solving complex problems (Goodfellow, et al., 2016). These systems are often categorized into narrow AI, which is designed for specific tasks, and

general AI, which is still largely theoretical and aims to replicate human-like cognitive abilities.

Artificial intelligence's influence on organizational operations is particularly significant in sectors that rely on large-scale data analysis and automation, such as telecommunications, where it is used to enhance customer service, optimize network management, and drive innovation (Dwivedi, 2021). The integration of Articles Intelligence allows for smarter decision-making, cost reduction, and the creation of personalized experiences, improving both operational efficiency and customer satisfaction. As Articles Intelligence technologies continue to advance, their potential to transform business processes and societal structures grows, leading to discussions on ethical considerations, regulation, and the future role of Artificial Intelligence in the workforce. Understanding AI's impact and its applications is crucial for organizations aiming to stay competitive in the digital age.

So, to say, artificial intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions (Russell & Norvig, 2021). AI enables telecommunication firms to deliver personalized customer experiences through chatbots, virtual assistants, and recommendation systems. By analyzing customer interactions and preferences, AI tools like predictive analytics improve service quality and reduce churn rates (Rust & Huang, 2014). AI plays a critical role in maintaining network infrastructure by identifying potential issues before they occur. Machine learning algorithms analyze network performance and predict outages, ensuring higher service reliability and reducing downtime. AI-powered chatbots and virtual agents help telecom companies handle customer queries efficiently. These systems can resolve common issues instantly, freeing up human agents for complex tasks and improving overall customer satisfaction (Chatterjee, 2020).

Operationally, artificial intelligence capabilities is the ability of retail businesses to leverage AI technologies to enhance operational efficiency, improve customer experiences, optimize decision-making, and drive sustainable growth.Artificial intelligence (AI) capabilities are revolutionizing retail operations by enhancing customer experience, streamlining processes, and improving decision-making. AI tools such as machine learning and natural language processing allow retailers to offer personalized recommendations, optimize pricing strategies, and manage customer relationships more effectively. For instance, AI-driven recommendation systems analyze customer behavior to suggest relevant products, thereby increasing conversion rates and customer satisfaction. According to Grewal *et al.* (2021), personalization powered by AI can significantly enhance customer engagement and loyalty, which are critical for sustained retail success.

Computer vision, robotics, and predictive analytics are being used to automate inventory management, improve demand forecasting, and reduce out-of-stock situations. These capabilities not only lower operational costs but also enable real-time decision-making and better resource allocation. A study by Kumar *et al.* (2021) highlighted that AI-enhanced inventory management can reduce excess inventory by 20–50% while improving stock availability, leading to higher customer satisfaction and reduced wastage.AI contributes to strategic planning in retail by offering deep insights through big data analytics. By analyzing large volumes of customer and market data, AI systems can identify trends, forecast market shifts, and guide product development and marketing campaigns. Retailers leveraging AI for data-driven strategies are better positioned to respond to changing consumer preferences and competitive pressures. As noted by Wamba-Taguimdje *et al.* (2020), AI-driven analytics plays a critical role in enhancing decision quality, agility, and innovation across retail

organizations. Hence, CCTV analytics, chatbots and automated processing are used here as dimensions of artificial intelligence capabilities.

Dimensions of Artificial Intelligence Capabilities

CCTV Analytics

CCTV analytics, also known as video analytics, refers to the use of advanced software and artificial intelligence (AI) to automatically analyze video footage captured by closed-circuit television (CCTV) cameras. These systems extract meaningful information from video data in real time or from recorded footage to support security, operational, and business intelligence objectives. CCTV analytics play a pivotal role in transforming retail outlets from traditional surveillance zones into intelligent, data-driven environments. By integrating video analytics into their security systems, retailers can move beyond passive monitoring to proactive management. CCTV analytics can automatically detect unusual activities, such as shoplifting, vandalism, or loitering, and alert security personnel in real-time, allowing for swift responses that reduce losses and improve safety (Gill, 2020). These systems enhance the effectiveness of loss prevention strategies, reducing reliance on human surveillance and lowering the cost of security operations.

Conceptually, it is the use of advanced software technologies often powered by artificial intelligence (AI), machine learning, and computer vision to automatically analyze video footage captured by closed-circuit television (CCTV) systems. Beyond security, CCTV analytics contribute significantly to understanding customer behavior within retail spaces**.** Video analytics tools can track customer movements, dwell times, and heat maps of frequently visited areas. These insights help retailers optimize store layouts, product placements, and marketing displays to enhance the shopping experience and boost sales (Grewal *et al.*, 2017). For instance, if analytics reveal that customers spend little time in a specific aisle, the retailer may redesign that section or introduce new products to capture attention. This customer-centric approach enables data-informed decisions that increase conversion rates and satisfaction. AI-powered video systems can monitor checkout lines in real time, identifying congestion and automatically alerting staff to open new registers (Zhang *et al*., 2019). This reduces wait times and improves customer experience, which is critical in high-traffic environments like supermarkets or during seasonal sales. Furthermore, during health-related crises such as the COVID-19 pandemic, video analytics have been used for occupancy monitoring and social distancing enforcement, showing the adaptability of this technology to emerging challenges.

Retailers can use video data to assess employee interactions with customers, adherence to safety protocols, and overall productivity (Wamba *et al.,* 2021). These systems can identify peak hours and help with efficient workforce scheduling. Additionally, integrating video analytics with point-of-sale (POS) systems provides a fuller picture of shopper behavior and transaction patterns, leading to better inventory planning and supply chain management. By aggregating and analyzing visual data over time, retailers can identify trends in customer behavior, evaluate the success of marketing campaigns, and predict future demands (Pantano *et al.,* 2020). This long-term intelligence supports innovation in store design and customer engagement strategies. Ultimately, CCTV analytics bridge the gap between physical and digital retail environments, giving retailers a competitive edge through enhanced visibility, operational insight, and customer understanding.

Chatbots

In essence**,** chatbots act as digital assistants that enhance user experience, streamline operations, and reduce the need for human customer service intervention. Thus, Chatbots are software applications designed to simulate human conversation, enabling users to interact with digital systems using natural language through text or voice. Powered by rules, artificial intelligence (AI), or a combination of both, chatbots can understand user inputs, process them, and respond appropriately, often in real-time. By automating customer service, chatbots enable retailers to offer real-time support, reduce waiting times, and handle large volumes of inquiries simultaneously. This is especially important in the digital age, where consumers expect quick and seamless interactions. According to Gentsch (2019), chatbots improve response efficiency and service accessibility, enhancing overall customer satisfaction. They serve as a first point of contact, resolving routine issues and freeing up human agents for more complex tasks.

Operationally, chatbots are automated software programs often powered by artificial intelligence (AI) designed to simulate human conversation and assist customers in retail environments. AI-powered chatbots use natural language processing (NLP) and customer data to provide tailored product recommendations, promotional offers, and shopping assistance (Huang & Rust, 2021). This personalization fosters a sense of engagement and loyalty among customers. For instance, a chatbot can suggest outfits based on a customer's past purchases or preferences, replicating the personalized service found in physical stores. These intelligent interactions contribute to increased conversion rates and improved customer retention. They automate tasks such as order tracking, returns processing, and appointment scheduling, which reduces the burden on human staff and minimizes human error (Pantano *et al*., 2020). Retailers can deploy chatbots across multiple channels websites, mobile apps, and social media platforms ensuring consistent and round-the-clock support. This omnichannel presence is vital for meeting modern consumer expectations and maintaining a competitive edge in the retail landscape (Chattaraman *et al.*, 2019).

Chatbots can also provide valuable data and insights that inform business strategy. Through analyzing interactions, retailers can gain a better understanding of customer needs, common pain points, and shopping behavior. This data-driven approach enables companies to refine their marketing strategies, improve product offerings, and enhance customer experience (Luo *et al.*, 2019). In essence, chatbots function not only as communication tools but also as data collection and analysis platforms, contributing to evidence-based decision-making. The integration of chatbots supports the scalability and resilience of retail operations. During peak shopping seasons or unexpected spikes in demand, chatbots can manage customer interactions without additional labor costs. They also ensure business continuity in crisis situations, such as the COVID-19 pandemic, when physical stores were closed and digital channels became critical (Wamba *et al.*, 2021).

Automated Processing

Automated processing refers to the use of technology and systems to carry out tasks, operations, or workflows without requiring direct human involvement. It typically involves the use of software, machinery, and AI to streamline repetitive and time-consuming processes, thereby improving efficiency, accuracy, and scalability. Automated processing can be applied across various industries, from manufacturing to retail and finance, and can handle a wide range of functions, including data entry, document management, inventory control, and more. By automating repetitive and time-consuming tasks such as inventory tracking,

billing, and order management, retailers can reduce human error and streamline store operations. This automation enables employees to focus on higher-value tasks like customer service and sales engagement. As Wamba *et al.* (2021) note, automation technologies significantly enhance firm performance by improving the speed and accuracy of retail operations, contributing to both customer satisfaction and cost reduction.

Automated processing facilitates seamless integration between physical and digital retail environments, supporting omnichannel strategies. Systems such as automated online order fulfillment, curbside pickup coordination, and real-time customer notifications help unify in-store and online shopping experiences. As noted by Pantano *et al.* (2020), automation enables retailers to adapt quickly to shifting consumer preferences, especially during crises like the COVID-19 pandemic, when flexible and contactless shopping solutions became critical to maintaining business continuity.

Concept of Organizational Sustainability

The idea of sustainable development was first coined by the Brundtland Commission, in its report "Our Common Future" in 1987. After which numerous multidisciplinary, multifaceted efforts have been made in order to conform to the planetary and social limits and to support a maintainable pattern of human life on earth. The range of such efforts lies in technological advancement in renewable and non-materials to social development through the United Nations guiding principles on business and human rights. An important, although new, member of the sustainability discipline is Sustainability Management. The focus of sustainable management is on analyzing firms' performance based on achieving the triple bottom line: social, environmental, and financial outcomes (Gawel, 2012; Gupta & Kumar, 2013).

Thus, Joseph and Coblentz (2012) describe organizational sustainability as an ongoing process rather than a state of perfection. It is like a plant: it will grow and prosper if watered and cared for, but wither quickly if it is not. Furthermore, organizations are like a body: if one part is ill, the rest will not function like it should. If too many parts fail at once or in quick succession, the body dies. So keeping an organization sustainable requires a constant effort and unity of purpose focused on one overarching mission. Every staff member and manager must see both the forest and the trees or the organization becomes entangled in the underbrush. Organizational sustainability has been gaining its rightful recognition and importance as it offers competitive advantage and creates value for organizations, their stakeholders, and society.

Operationally, organizational sustainability is the capacity of a retail outlet to thrive over the long term by implementing a zero waste initiative to minimize environmental impact, and maintaining profitability to ensure economic viability. Tkach and Lyubomirsky (2016) opined that a holistic approach to organizational sustainability enhances reputation, reduces costs, and gives a leadership position to the organizations. Holistic green organizations should utilize used and recycled components for design new green products and green packaging. Sustainable organizational development needs and internal structure to constantly motivate, balance power, and opportunities to perform positive behaviors. Sustainable organizational practices are a mindset that affects all levels of the organization through effective change management that enable economic growth and customer satisfaction (Tabellini, 2018). Organizational sustainability is affected by global and local sustainability challenges, concerns, and issues which need to be assessed and analyzed for designing policies, strategies, and practices that may have broader economic, social, and environmental

impact. Sustainable organizations are created by groups of individuals working together (Scott, 2014).

Tata and Prasad (2015) averred that organizational sustainability has various benefits among which it builds brand reputation, improves confidence, attractiveness, and environmental consciousness to talent, investors, suppliers, customers, confidence, better performance, etc. it encompasses the need of motivation and cohesiveness of the teamwork towards setting guidelines and establishing the processes for the achievement of organizational goals (Schueth, 2013). So to say, it's values must have to be inculcated at all levels in the system of the organization to engage the initiatives while performing the tasks. In the view of Epstein (2018), organizational sustainability is a competitive strategy to enhance the ability to develop sustainable change. Organizations adopt different approaches and initiatives for achieving environmental sustainability and protecting the environmental growth avoiding disruptions by managing internal factors such as managing the causal human behavior and the role of human behavior and undertaking other environmental development initiatives outside the organizational boundaries. There have been several measures or aspects of studying organizational sustainability as identified by many researchers. Thus, this study focuses on environmental sustainability, financial health, zero waste initiative.

Measures of Organizational Sustainability

Environmental Sustainability

Yang *et al.* (2017) asserted that environmental sustainability of organization is the responsibility to conserve natural resources and protect global ecosystems to support health and wellbeing of the organization, now and in the future. Because so many decisions that impact the environment are not felt immediately, a key element of environmental sustainability is its forward-looking nature. Environmental sustainability is responsibly interacting with the planet to maintain natural resources and avoid jeopardizing the ability for future generations to meet their needs (Cornelius, *et al.,* 2018). They further stressed that environmental sustainability is about acting in a way that ensures that organizational future generations have the natural resources available to compete equally, if not better.

In the postulation of Osagie *et al.* (2014), environmental sustainability is the capacity of an organization to improve the quality of its self while living within the carrying capacity. This is because it deals with addressing how organizations are able to cope with the challenges in their business environment offers. Furthermore, Boons *et al.* (2013) averred that environmental sustainability is a responsible interaction between an organization and its environment to avoid depletion or degradation of natural resources and allow for long-term environmental quality. The practice of environmental sustainability helps to ensure that the needs of today's population are met without jeopardizing the ability of future generations to meet their needs. Environmental sustainability is the rates of renewable resource harvest, pollution creation, and non-renewable resource depletion that can be continued indefinitely between organization and its host community (Engert, *et al.,* 2016). If they cannot be continued indefinitely then they are not sustainable. Thus, it is concerned with whether environmental resources will be protected and maintained for an organization to keep operating.

Markusson (2019) averred that environmental sustainability is limited to a subset of ecological sustainability. Broadly speaking, this concept of environmental sustainability" might be seen as adding depth to a portion of the meaning of the most common definition of

sustainable development, i.e., meeting the needs of the current generation without compromising the ability of future generations to meet their needs, by taking on the general definition "meeting the resource and services needs of current and future generations without compromising the health of the ecosystems that provide them (Markusson, 2019). More specifically, Costanza (2015) defined environmental sustainability as a condition of balance, resilience, and interconnectedness that allows human society to satisfy its needs while neither exceeding the capacity of its supporting ecosystems to continue to regenerate the services necessary to meet those needs nor by our actions diminishing biological diversity.

Conceptually, environmental sustainability represents organizational ability to cope with its business environmental factors such as social factor, cultural factors, compliant with environmental rules and regulations to enable them reduce greenhouse emissions as well as saving operations' cost. An environmentally aware firm considers more than just profits. It considers its impact on society and the environment. Such a firm is sustainable because it contributes to the health of the structure within which it operates, thereby helping construct an environment in which the business can thrive (McCann & Holt, 2010).

Economic Sustainability

Economic sustainability refers to an organization's ability to maintain viable economic operations over time while efficiently utilizing available resources, responding to market changes, managing risks and generating sufficient value to support continued existence and growth. Contemporary sustainability literature treats sustainability as a multidimensional organizational phenomenon involving economic, environmental and social outcomes (Ciasullo et al., 2024; Kulkov et al., 2024).

For retail outlets, economic sustainability is particularly important because retailers operate in environments characterized by changing consumer preferences, fluctuating purchasing power, inventory risks, supply-chain disruptions, competition and increasing operating costs. Economic sustainability can therefore be reflected in the ability of retail outlets to control operating costs, improve sales performance, reduce inventory losses, increase productivity, retain customers and remain resilient during economic disruptions (Gajere et al., 2024

Economic Sustainability as a Driver of Smart Economics

Smart economics emphasizes the use of information, digital technologies, innovation and intelligent decision-making to improve economic efficiency and create sustainable value, with retailing, smart economics involves using artificial intelligence and data analytics to regulate customers preference, forecast demand, manage inventory and allocate rescues efficiently (Heins, 2023; Vhatker et al. 2024).

Empirical Review

Dua'a (2024) examined the impact of artificial intelligence on organizational agility in industrial companies: The moderating role of dynamic capabilities. The purpose of the study was to examine the impact of artificial intelligence (expert systems, artificial neural networks, algorithms, machine learning) on organizational agility in industrial companies through the moderating role of dynamic capabilities. The descriptive analytical method was used in order to achieve the objectives of the study and answer its questions. The target population in this research consists of 20 industrial companies, as industrial companies are considered among the largest companies that have a direct impact on national income, and try to keep pace with global changes in the field of information technology. The researcher was able to administer

263 copies of the questionnaires and was able to collect 238 copies that were approved to be filled out by employees' industrial companies. The results shows that Artificial Intelligence with it dimension (expert systems, artificial neural networks, algorithms, machine learning) has an impact on organizational agility in industrial companies. The results also confirm the significant role of the moderate variable (dynamic capabilities) in improving the impact of artificial intelligence on organizational agility. The study recommends the use of artificial intelligence programs that rely on neural network techniques to monitor workflow and tasks in a stable and consistent manner. It is also recommended to establish specific procedures for discovering and developing capabilities within the company.

Younis and Azzam (2024) examined the impact of artificial intelligence on organisational behavior: A risky tale between myth and reality for sustaining workforce. This research paper's aim was to examines quantitatively the impact of Artificial Intelligence (AI) on organisational behavior components (job satisfaction, personality, and attitudes). The sample of our study includes alumni graduates of the past two years reflecting on post-covid19 era as young workforce from Cairo, Egypt. It is important to note that there is no sufficient data regarding the impact of AI on OB testing this bracket of young population workforce, and highlighting specific components in the study of OB. This research finding revealed that Artificial intelligence can explain 46.5 % of Organizational Behavior which refers to the importance of Artificial intelligence usage among organizations and how this might change the current organizational environments.

METHODOLOGY

This study was conducted in Rivers State, Nigeria, the design of the study was quantitative, and employing the descriptive survey research design for the study the accessible population of the study was Sixteen (16) retail outlets currently operating in Port Harcourt. The entire population was used as the study sample. Thus, the study was census research which involves using the entire population rather than drawing a sample from it. The choice of census method here is informed by the assumption that sixteen (16) retail outlet is not too large to be covered.

The cross sectional explanatory survey research design was adopted for this study. This research design is deemed suitable and most appropriate for the study because of two reasons: (i) the study was conducted across different retail outlets at the same time which makes it a survey study; (ii) it involves the test of hypotheses which is explanatory in nature. The response obtained from the respondents on the two occasions was correlated using PPMC (Pearson's Product Moment Correlation Coefficient) which yielded a coefficient of 0.78.While the test of hypotheses was done using Spearman Rank Order Correlation with the aid of SPSS Version 24.0. Spearman Rank Order Correlation Coefficient was computed.

Decision Rule: Using a level of significance of 0.05 (confidence interval of 95%), when a calculated significant value is less than 0.05 the null hypothesis will be rejected, if otherwise, the null hypothesis will be accepted. For the coefficient values, the following interpretation scheme were applied is stated below, (a) No Relationship = 0, (b) Low/Weak Relationship = 0.1-0.2, (c) Moderate or Relatively Strong Relationship = 0.3-0.5, (d) High/Strong Relationship = 0.6-0.7, (e) Very High/Very Strong Relationship = 0.8-0.9, (f) Perfect Relationship = 1.

Analysis and Discussion of Results

Analyses

1: What is the relationship between CCTV analytics and environmental sustainability of retail outlets in Port Harcourt?

Table 1: Responses to Question 1

S/N	Items	Response				Total	Mean	Std.	Decision
		SA	A	D	SD				
1.	CCTV analytics has helped to reduce unnecessary energy usage (e.g., lighting, air conditioning).	23	16	10	7	56	2.9	1.3	Agreed
2.	CCTV analytics provide measurable data that supports environmental reporting.	19	16	12	9	56	2.8	1.2	Agreed
3.	CCTV systems encourage more sustainable staff behavior (e.g., turning off unused equipment).	28	13	11	4	56	3.1	1.4	Agreed
4.	CCTV analytics help identify areas of the store with excessive foot traffic, leading to better energy allocation.	22	16	12	6	56	2.9	1.4	Agreed

Grand Mean = 2.9
Source: Survey Data, 2025.

Table 1 shows the grand mean score of 2.9. This means that the respondents were of the view and agreed that relationship exist between CCTV analytics and environmental sustainability of retail outlets in Port Harcourt. Table also shows standard deviation scores of 1.3, 1.2, 1.4 and 1.4. The closeness among the standard deviation scores indicates that the respondents were homogeneous in their view.

2: What is the relationship between chatbots and environmental sustainability of retail outlets in Port Harcourt?

Table 2: Responses to Question 2

S/N	Items	Response				Total	Mean	Std.	Decision
		SA	A	D	SD				
1.	The use of chatbots has led to higher customer retention and repeat purchases in my firm.	20	15	11	10	56	2.8	1.2	Agreed
2.	Our overall profitability has improved since Chabot implementation.	30	10	9	7	56	3.1	1.4	Agreed
3.	In my firm, chatbots have contributed to lower returns or cart abandonment rates.	26	17	7	6	56	3.1	1.4	Agreed
4.	Chatbots have decreased response time and improved customer satisfaction.	17	16	13	10	56	2.7	1.2	Agreed

Grand Mean = 2.9
Source: Survey Data, 2025.

The table shows Grand Mean score of 2.9. This means that the respondents were of the view and agreed that chatbots relate with financial health of retail outlets in Port Harcourt. Table 4.3 also shows standard deviation scores of 1.2, 1.4, 1.4 and 1.2. The closeness among the standard deviation scores implies that the respondents were homogeneous in their view.

3: What is the relationship between automated processing and Economics sustainability of retail outlets in Port Harcourt?

Table 3: Responses to Question 3

S/N	Items	Response				Total	Mean	Std.	Decision
		SA	A	D	SD				
1.	In my firm, automated systems help prevent overstocking and product waste.	33	17	5	1	56	3.4	1.5	Agreed
2.	Automation reduces human error in waste management processes in my firm.	26	14	10	6	56	3.0	1.3	Agreed
3.	Smart inventory systems help minimize expired or unsold product disposal.	20	15	12	9	56	2.8	1.2	Agreed
4.	Automation contributes to more efficient recycling and waste sorting.	30	18	6	2	56	3.3	1.5	Agreed

Grand Mean = 3.1
Source: Survey Data, 2025.

The Table shows Grand Mean score of 3.1. This means that the respondents were of the view and agreed that automated processing relates with economic sustainability of retail outlets in Port Harcourt. This table also shows standard deviation scores of 1.5, 1.3, 1.2 and 1.5. The closeness among the standard deviation scores implies that the respondents were homogeneous in their view.

Test of Hypotheses

Ho_1: There is no significant relationship between CCTV analytics and environmental sustainability of retail outlets in Port Harcourt.

Table 4: Correlations between CCTV Analytics and Environmental Sustainability

			CCTV Analytics	Environmental Sustainability
Spearman's rho	CCTV Analytics	Correlation Coefficient	1.000	.658**
		Sig. (2-tailed)	.	.000
		N	56	56
	Environmental Sustainability	Correlation Coefficient	.658**	1.000
		Sig. (2-tailed)	.000	.
		N	56	56

**. Correlation is significant at the 0.05 level (2-tailed).

Source: Survey Data, 2025.

Table 4 above showed r value of 0.658 at a significance level of 0.00 which is less than the chosen alpha level of 0.05 for the hypothesis relating CCTV analytics and environmental sustainability. Since the significance value is less than the alpha level of 0.05, the null hypothesis (Ho_1) which states that there is no significant relationship between CCTV analytics and environmental sustainability of retail outlets in Port Harcourt was rejected and the alternate hypothesis (Ha_1) was accepted. This implies that there is a strong positive relationship between CCTV analytics and environmental sustainability of retail outlets in Port Harcourt.

Table 5: Correlations between Chatbots and Environmental Sustainability

			Chatbots	**Environmental Sustainability**
Spearman's rho	Chatbots	Correlation Coefficient	1.000	.801**
		Sig. (2-tailed)	.	.000
		N	56	56
	Environmental Sustainability	Correlation Coefficient	.801**	1.000
		Sig. (2-tailed)	.000	.
		N	56	56

**. Correlation is significant at the 0.05 level (2-tailed).

Source: Survey Data, 2025.

The table above shows r value of 0.801 at a significance level of 0.00 which is less than the chosen alpha level of 0.05 for the hypothesis relating chatbots and Environmental Sustainability. Since the significance value is less than the alpha level of 0.05, the null hypothesis (Ho_2) which states that there is no significant relationship between chatbots and Environmental Sustainability of retail outlets in Port Harcourt was rejected and the alternate

hypothesis (Ha_2) was accepted. This implies that there is a very strong positive relationship between chatbots and financial health of retail outlets in Port Harcourt.

Ho_3: There is no significant relationship between automated processing and zero waste initiative of retail outlets in Port Harcourt.

Table 6: Correlations between Automated Processingand Economics Sustainability

			Automated Processing	Economics sustainability
Spearman's rho	Automated Processing	Correlation Coefficient	1.000	.750**
		Sig. (2-tailed)	.	.000
		N	56	56
	Economics sustainability	Correlation Coefficient	.750**	1.000
		Sig. (2-tailed)	.000	.
		N	56	56

**. Correlation is significant at the 0.05 level (2-tailed).

Source: Survey Data, 2025.

The table above showed r value of 0.750 at significance value of 0.00 which is less than the chosen alpha level of 0.05 for the hypothesis relating automated processing and zero Economics sustainability. Since the significant value is less than the alpha level of 0.05, the null hypothesis (Ho_3) which states that there is no significant relationship between automated processing and Economics sustainability of retail outlets in Port Harcourt was rejected and the alternative hypothesis (Ha_3) was accepted. This implies that there is a strong positive relationship between automated processing and economics sustainability of retail outlets in Port Harcourt.

Summary of Findings

Based on the analyses of data, the following findings were made:

1. There is a strong positive relationship between CCTV analytics and environmental sustainability of retail outlets in Port Harcourt.
2. There is a very strong positive relationship between chatbots and environmental sustainability of retail outlets in Port Harcourt.
3. There is a strong positive relationship between automated processing and Economics sustainability of retail outlets in Port Harcourt.

Discussion of Findings

The findings of this study are discussed under the following headings:

Relationship between CCTV Analytics and Environmental Sustainability

The test of hypothesis one revealed that there is a strong positive relationship between CCTV analytics and environmental sustainability of retail outlets in Port Harcourt. This implies that improvement in CCTV analytics brings about an enhancement of environmental sustainability of retail outlets in Port Harcourt. CCTV analytics, traditionally used for security, have evolved into powerful tools that support environmental sustainability in retail settings. By integrating artificial intelligence and data analysis, modern surveillance systems can monitor energy use, foot traffic patterns, and in-store behavior.

Zhang *et al*. (2019) in line with the above found that CCTV analytics can help retailers identify inefficiencies related to waste management. Surveillance can track improper disposal of materials, detect overstocking that leads to spoilage, and verify adherence to recycling protocols. When integrated with inventory and supply chain systems, this data can support more accurate demand forecasting, minimizing overproduction and unnecessary packaging. As a result, retailers can align their operations with zero-waste goals while reducing environmental strain.

Additionally, Wamba *et al.* (2021), found that the insights provided by CCTV analytics can inform strategic sustainability planning. Historical footage and trend analysis can support compliance reporting for environmental regulations and corporate responsibility programs. Additionally, visibility into daily operations enables retailers to train staff and adjust policies to foster environmentally responsible behavior. Overall, CCTV analytics offer a data-driven foundation for building greener retail operations, making them a valuable asset in sustainability efforts.

Relationship between Automated Processing and Economics sustainability

The test of hypothesis three revealed that there is a strong positive relationship between automated processing and Economics sustainability of retail outlets in Port Harcourt. This implies that the adoption of automated processing brings about zero waste initiative of retail outlets in Port Harcourt.

As revealed by Choi *et al*. (2018), automating repetitive and time-consuming tasks such as inventory tracking, billing, and order management, retailers can reduce human error and streamline store operations. This automation enables employees to focus on higher-value tasks like customer service and sales engagement. Pantano *et al.* (2024) revealed that automation in service delivery contributes to higher perceived service quality, increasing customer loyalty and brand competitiveness. Moreover, these systems are scalable, allowing retailers to handle peak hours without significantly increasing labor costs. Automated processing facilitates seamless integration between physical and digital retail environments, supporting omnichannel strategies. Systems such as automated online order fulfillment, curbside pickup coordination, and real-time customer notifications help unify in-store and online shopping experiences.

Conclusion

Based on the analyses of data and discussion of findings, the study concluded that there is a significant positive relationship between artificial intelligence capabilities and organizational sustainability of retail outlets in Port Harcourt. Thus, leveraging artificial intelligence powered tools such as CCTV analytics, chatbots and automated processing, retailers can enhance operational efficiency, improve customer experiences and gain valuable insights into market trends.

Recommendations

Based on the findings, the following recommendations were made:

1. Management of retail outlets should leverage on CCTV analytics to monitor and optimize energy consumption, waste management and resource utilization.
2. Management of retail outlets should develop chatbots that is capable of providing customer support and improve customer satisfaction at all time.

3. Employees of retail outlets should utilize automated system to track inventory level, reduce waste and optimize stock replenishment.

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