

# Sustainable Digital Business, Management and Entrepreneurship in Nigeria as an Integrated Dimension in the Post Pandemic Era

Amuzat Olawale<sup>1</sup> and Rohini Devi<sup>2</sup>

<sup>1</sup>DBA Researcher, Binary University of Management & Entrepreneurship, <sup>2</sup>Professor & Deputy Vice Chancellor, Binary University of Management & Entrepreneurship, Malaysia

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## Abstract

The rising digital wave during the Covid-19 pandemic ushered in a plethora of opportunities for entrepreneurs to expand their market. The adoption and usage of digital technologies was considered as one of the most promising transformations brought in by the Covid-19 pandemic and for successful adoption of these technologies, the issue of its sustainability needs to be addressed. This study, however, seeks to examine how digital business, management and entrepreneurship can be sustained in the post pandemic era. The dimensions of digital business, management and entrepreneurship commonly adopted by entrepreneurs were considered for this study. These were the internet of things and artificial intelligence. The study adopted a qualitative approach with semi-structured interviews. A total of 18 entrepreneurs responded and presented their views. A structured process of open, axial, and selective coding was adopted for thematic analysis. Results of the thematic analysis indicated an adoption of digital technologies by entrepreneurs. Addressing the issues of sustainability, it was concluded that technology be integrated into the revitalization strategy in the post-pandemic era to ensure business continuity. Also, entrepreneurs should think about how to choose automation tasks and the degree of automation of each task to ensure its sustainability. At the same time, consider how human intelligence can provide support in case of automation errors. Based on this, it was recommended that entrepreneurs who are yet to adopt the principles of digital technologies in promoting their products and services should implement it in their entrepreneurial activities to ensure productivity and growth.

**Keywords:** Digital Technologies, Covid-19 Pandemic, Digital Business, Management, Entrepreneurship, Internet of Things and Artificial Intelligence

## Introduction

The advent of digital technologies and, more generally, the Covid-19 pandemic has revolutionized the way businesses are conducted, allowing companies to revise and extend their products portfolio using digitalization and this inevitably has influenced the way they manage relationships with stakeholders (Hossain et al., 2022; Brenner, 2018). In 2020 and 2021, the Covid-19 pandemic was like a storm that led to scaling-up of technological changes and fueling digitalization in many parts of the world to address different challenges (Hossain

et al., 2023; Secundo *et al.*, 2021). The pandemic had challenged many businesses to orient themselves towards digital solutions for their survival and the use of digital technology became a solution for firms to adopt to solve inefficiencies and make their organization more competitive (Hossain et al., 2023). Even in established businesses, those that had invested in digital operations before Covid-19 fared better than those that did not opt for digital transformation (Volberda *et al.*, 2021; Hossain et al., 2020). In fact, for many companies today, the sustainability of their business depends strongly on their digital capabilities (Datta and Nwankpa, 2021; Hossain et al., 2022). Even governments are seen encouraging and moving towards digital innovation and the adoption of new technologies to help the environment and develop new ecosystems (Bai *et al.*, 2021).

Digitalization, which is the form of digital terminologies, is the integration of digital technologies into our everyday life. In the last two decades, the digitalization phenomenon fueled by the Covid-19 pandemic has driven technological assets ranging from internet tools to communication and information technologies (Bai *et al.*, 2021). Business opportunities such as transfer of assets, services, or digitalization of organization processes have emerged. The digitalization of business operations has contributed to the emergence of multiple platforms that offer value creation and innovation in business activities focusing on self-employed individuals, small businesses, and entrepreneurs (Brem *et al.*, 2021). These multiple platforms (e.g., e-commerce, ride sharing, etc.) have become an inseparable part of life for most entrepreneurs and are considered a significant sector for any developing economy (Johnston, 2021; Ong et al., 2020). These digitally oriented and technologically driven platforms also play a key role in enhancing employment levels and innovation culture.

In this era of digital disruption and internet connectivity, organizations have taken advantage of these emerging digital technologies to strengthen their businesses through innovative solutions to meet societal needs and problems (Wang *et al.*, 2021). These digital technologies form a part of their digital business, management, and entrepreneurship (Ariful et al., 2023). The dimension of digital business, management and entrepreneurship lies in the adoption of internet of things and artificial intelligence which many businesses have employed in their organization (Hossain et al., 2022). Before Covid-19 pandemic, these platforms and opportunities were not considered by many organizations due to reasons such as lack of familiarity, free-flow movement, and no pressure of simplifying business activities. However, the aftermath of the pandemic has seen many businesses adopting the element of internet of things and artificial intelligence. The challenge now remains how these elements can be sustained in the post pandemic era. Thus, this study took a closer look at the outermost layer of the dimension of digital business, management, and entrepreneurship with regards to internet of things and artificial intelligence in the post pandemic era and how they can be sustained.

### **Problem Statement**

Digitalization, which is the adoption of digital technologies, and their usage is considered as one of the most promising transformations with game-changing potential. In 2020 and 2021, the Covid-19 pandemic came like a storm resulting in scaling-up of technological changes and fueling digitalization in many parts of the world to address different challenges. During this period, businesses were continually seeking to leverage digital tools, platforms and technologies to maintain uninterrupted operations (Volberda *et al.*, 2021). Additional pressures to improve margins and enhance efficiency drove the need for digitalization. In

Covid-19, multiple restrictions contributed to an economic slowdown in most of the world while digitalization witnessed a sharp rise.

Generally, the Covid-19 crisis brought a renewed interest in digitalization and sustainability (Hossain et al., 2022). Sustainability provides a solution rather than a cause and behind the background of sustainability, digital technologies were considered key for contributing solutions to the grand social and environmental challenges (Hossain et al., 2022; Ogiemwonyi et al., 2020). Digital technologies have made important contributions to the innovative success and performance of companies. For instance, artificial intelligence, edge computing, big data analytics, and block chain technology and smart energy harvesting are technologies that enable smart applications, block chain solutions, and quantum communication. Organizations have taken advantage of these emerging digital technologies to strengthen their businesses through innovative solutions to meet societal needs and problems (Wang et al., 2021; Hossain et al., 2020).

However, the potential for sustaining these new digital technologies has an implication for businesses either as a driver for digital transformation or as an agent affected by it. In this regard, a better understanding of how these new digital technologies developed can be sustained in the post pandemic era has become a thing of concern. Thus, this study was conducted to examine how the sustainability of digital technologies employed in business, management, and entrepreneurship in the form of internet of things and artificial intelligence can be maintained in the post pandemic era.

### **Limitations**

This study had its limitations as follows; first in the aspect of research design, an explanatory research design was adopted were only the use of constructivism research paradigm was employed. This research was primarily grounded in qualitative research. Qualitative research has limitations of their own, which are inherent within the respective research methods. This study used only 18 business owners through an interview section to reflect on the overall situation of sustainability. Also, the study was limited to addressing only the concepts of sustainable digital business, management, and entrepreneurship in the post pandemic era within the dimension of internet of things and artificial intelligence and how they can be sustained.

### **Literature Review**

Under the review of literature, the concepts of sustainable digital business, management and entrepreneurship, internet of things and artificial intelligence were discussed to guide in a better understanding of the study.

### **The Concept of Sustainable Digital Business, Management and Entrepreneurship**

Digitalization, which is the form of digital terminologies, is the integration of digital technologies into everyday life. Digitalization refers to the acceptance or greater usage of digital technology by entrepreneurs, governments, corporations, and organizations. Examples of such innovations include cognitive computing and cloud-based applications, edge technology and 3D printing (Prendes-Espinosa et al., 2021). Transforming businesses to become digital is said to be a common solution to many issues society faces today and will face in the future. The term "digital" is for many entrepreneurs a scary term and causes a lot of stress since their competitors seem to utilize it and their customers' demanding for it. In many ways, the use of digital technologies is crucial for entrepreneurs. In fact, for many

companies today, the continuity of their business depends strongly on their digital capabilities (Datta and Nwankpa, 2021).

Over recent years, the digital technology capability proposed by scholars has transcended over the level of technological application and provides a new perspective for studying the driving mechanism of digital sustainable business. The existence of digital innovation orientation provides a valuable perspective for digital initiatives within the organization (Patzelt and Shepherd, 2011). Digital innovation causes effective transformation and integration amid the acquired digital technology in business and management and identified opportunities. Moreover, it can be used to guide the digital innovation practice per se and solve the sustainability conundrum, thereby unleashing the potential of digital technology to the maximum extent (Guandalini, 2022).

Sustainability in digital business, management and entrepreneurship can be interpreted as something focused on the preservation of nature, life support, and community in the pursuit of perceived opportunities to bring into existence future products, processes, and services, where the pursuit of opportunities brings about the gain which is broadly construed to include economic and noneconomic gains to individuals, the economy, and society (Fernanes, Pires and Gaspar, 2022; Polas et al., 2020; Ogiemwonyi et al., 2022). Today, companies embrace the adoption and employment of digital tools in their businesses to create and modify existing business processes. Apart from benefiting businesses directly, emerging technologies help organizations to develop their workplace culture and enhance the consumer experience (Kamble *et al.*, 2021). Digital technologies enable companies to reassess their business operations, align resources, and develop capabilities to create a framework to drive innovation in business activities (Schiavone *et al.*, 2021). In addition to business use, emerging technologies have great potential for the public, and many companies have started to develop services in this direction.

With the rise of digital transformation in all walks of life over recent years, the digitalization of enterprises brings unique changes to business operations, business processes, and cooperation methods (George *et al.*; 2021). Digital transformation is defined as an organizational shift towards big data, business analytics, cloud computing, mobility, and social media platforms (Tim, Cui and Sheng, 2021). It is not only a dual structure process composed of behavioral subjects and digital technology (Srivastava and Shainesh, 2015), but also a process of recognition and re-adaptation of strategy and structure of enterprises based on digital technology. Whether from a strategic or organizational perspective, the beginning of digitalization means the beginning of a new model. Digital transformation can subvert traditional industries under the development of digital opportunities. However, some scholars have pointed out that the problems confronting digital transformation arise typically from the information asymmetry, which is manifested in the accuracy and timeliness of information transmission (Von Briel, *et al.*; 2018).

Sustainable digital business, management and entrepreneurship represents the process of embedding social, environmental, and financial objectives into digital products, platforms, or ecosystems to realize sustainable value creation. George *et al.*, (2021) defined sustainable digital business, management and entrepreneurship as the organizational activities that seek the sustainable objective of boosting social and environmental value creation by creatively deploying and utilizing digital technology. Sustainable digital business, management and entrepreneurship are becoming more popular among academics who are examining how digital technologies affect digital business, management and entrepreneurship and they have

realized that digital technologies are not only a framework for studying but also function as an active element (Bican and Brem, 2020).

Digitization of business, management and entrepreneurship unfolds around the concept of internet of things and artificial intelligence. Using these concepts, this study proposes that a digital business, management, and entrepreneurship comprised of these notions, and as such, enabling current innovations in businesses. A critical aspect of the study was on how these newly developed concepts operate and how they can be sustained in the post pandemic era.

### **Internet of Things (IoT)**

Internet of Things (IoT) can be defined as a network of interconnected devices (Vermesan and Friess, 2014). The range of devices is very broad as the word “device” may refer to computers, smartphones, vehicles, house equipment, manufacturing devices, medical implants, even entire buildings and the list can be much longer. The objects collect and exchange data thereby allowing their owners to gain a wide variety of benefits. While using IoT in business the manner and methods of communication with consumers become personal like never before. Targeting a desired audience and preciseness of segmentation also reaches new levels.

IoT can be referred to as a new component of business analytics and digitalization. Organizations now offer a new product or service based on consumer market segmentation (Vermesan and Friess, 2014). This characteristic can also become a foundation for customer-centric marketing (Pauget and Dammak, 2019). IoT devices tend to facilitate the advertisement process to become less inconvenient, as these technologies provide flexibility to the target audience to acquire a product or brand-related information (Moradi and Badrinarayanan, 2021) based on their choice and preference.

### **Artificial Intelligence (AI)**

Artificial Intelligence (AI) refers to the ability of machines to learn and make decisions based on data and analytics. It is one of the digital technologies employed in business with the focus on driving growth. By embracing AI and machine learning, companies find innovative ways to increase their business performance (Datta and Nwankpa, 2021). Some benefits of AI include boosting efficiency through process automation, improving the speed or consistency of service using customer insights to inform decision making and uncovering opportunities for new products and services.

Examples of AI in business during the Covid-19 pandemic were the Chatbot. Chatbots are perhaps one of the most common instances of customers directly interacting with AI. It allows companies to streamline their customer service processes and free up employee’s time for issues that require more personalized attention. Chatbots typically uses a combination of natural language processing, machine learning and AI to understand customer requests. Chatbot technology can also help route customers to a real-life representative who is best equipped to address their questions. Another example of AI is the sentiment analysis sometimes called emotion AI which became a popular tactic that companies used during the Covid-19 pandemic to gauge the reactions of their customers. Through the use of AI and machine learning, companies gather data on how customers perceive their brands. This includes using AI to scan through social media posts, reviews and ratings that mention the brand. The insights gained from this analysis allow companies to identify opportunities for improvement. Also, in the financial industry, there are tools available that identify suspicious transactions using machine learning algorithms. This machine helps to detect and respond to

fraud threats. When a fraud risk is detected, the application stops the transaction from going through and alerts the appropriate parties (Datta and Nwankpa, 2021).

### **Research Questions**

The following research questions were formulated for the study.

- i. How will the concept of internet of things employed by companies be sustained in the post pandemic era?
- ii. How will artificial intelligence be sustained in the post pandemic era?

### **Research Objectives**

The main objective of this study was to determine how digital business, management and entrepreneurship can be sustained in the post pandemic era. Specifically, the study aimed at achieving the following objectives:

- i. To examine how the concept of internet of things can be sustained in the post pandemic era.
- ii. To determine how artificial intelligence can be sustained in the post pandemic era.

### **Research Methodology**

To examine the research objectives regarding digital business, management and entrepreneurship presented in this study, a qualitative approach was adopted. Since, there is lack of established scale with reference to post pandemic era or very complex environment accelerated opportunities for digital business, management, and entrepreneurship. To address the research objectives, it was suitable to start with qualitative study. Due to the busy work schedule of entrepreneurs who were the respondents for this study, limited and well-designed semi-structured interviews were conducted. The qualitative study was best suited to understanding the views of entrepreneurs and to obtain better insights. Therefore, this study presented insights for digital entrepreneurs operating in complex and uncertain post pandemic environments.

### **Data Analysis Plan**

Entrepreneurs from different organizations and sectors servicing local and regional markets were interviewed. The semi-structured interview schedule was developed based on the guidelines of (Leech, 2002; McCracken, 1988). Hence, interviews were conducted with Founders, CEOs, President, Managing Directors and Co-Founders, screened internal documents that were submitted, and additional secondary data were identified through internet searches. The triangulation of data improved the construct validity of our research design. Conducting interviews is prone to bias, in particular researcher bias, and threatens the validity of the study. Researcher bias relates to the effect of the researcher on the participant and the effect of the participant on the researchers. Several measures were introduced to reduce researcher bias. The researchers engaged in previous relationships with focal entrepreneurs, which created trust and openness among the interviewers and the interviewees. The researcher also made his intentions clear regarding the purpose of the research and the anonymity of the information.

In addition, the responses were triangulated obtained with the companies' webpages, social media presence, and internal documents regarding the digitalization. The triangulation helped validation, for instance in the usage of artificial intelligence and the usage of internet of things. Interviewing the Founders was important, since they are the principal decision-

makers that impact the design and shape of the business. The interviews lasted between 45–60 min. The use of a semi-structured interview guide left room for flexibility regarding storytelling on behalf of the interviewees but also ensured consistency among the cases. Applying a formal interview guide improved the internal validity of our study.

The researcher participated in the interviews, took extensive notes, and documented the observations in a shared document. Eight questions were developed focusing on the sustainability of Internet of Things (IoT) and Artificial Intelligence (AI) by entrepreneurs in the post pandemic era as the impetus for innovation and unique services in solving problems (Appendix 1). In total, 42 entrepreneurs in the digital field were contacted through LinkedIn in August 2023. First, the concept of the study was introduced and requested a time and date for an interview. After three consecutive follow-ups in August 2023, only 22 respondents were interviewed. Careful transcription and filtering finally resulted in 18 responses. It was also observed that after almost 18 responses, there was saturation of responses. Therefore, overall, 18 responses were finalized for further analysis. Table 1 indicates the profile of the interviewed entrepreneurs.

Table 1

*Detail of Respondents*

Respondent profile no	Respondent code	Job Title	Domain of work	Years of experience	Year of establishment	Documents used
1.	Q1	Managing Director	Clothing	9	2014	Company promotional video Internal document
2.	Q2	Founder	Real Estate	7	2016	LinkedIn profile Internal document
3.	Q3	CEO	E-Commerce	9	2014	LinkedIn profile Company YouTube channel Facebook News article Internal document
4.	Q4	Co-founder	Digital Marketing	6	2017	Company website Internal document
5.	Q5	Director	Real Estate	6	2017	LinkedIn profile Company YouTube channel Facebook News article

						Internal document
6.	Q6	Co-founder	Digital Marketing	8	2015	Company website Internal document
7.	Q7	CEO	Clothing	5	2018	LinkedIn profile Company YouTube channel Facebook News article Internal document
8.	Q8	Founder	Education	9	2014	LinkedIn profile Internal document
9.	Q9	Managing Director	Clothing	6	2017	Company promotional video Internal document
10.	Q10	Co-Director		8	2015	Company website Internal document
11.	Q11	CEO	Clothing	6	2017	Company website News article Internal document
12.	Q12	Founder	Education	6	2017	LinkedIn profile Internal document
13.	Q13	Co-Director	E-Commerce	5	2018	Company website Internal document
14.	Q14	Director	Education	5	2018	Company website Internal document
15.	Q15	Co-Director	Clothing	9	2014	Company website News article Internal document

16.	Q16	Co-founder	Digital Marketing	5	2018	LinkedIn profile Internal document
17.	Q17	CEO	Clothing	5	2018	Company website Internal document
18.	Q18	Managing Director	E-Commerce	7	2016	Company website Internal document

Source: Researcher's Computation (2023)

### Data Analysis

Using the qualitative content analysis by conducting the interviews, a verbatim transcription and thematic coding mechanism was applied to extract themes and sub-themes. The manuscript utilized transcription a number of times to ensure internal consistency. As a measure of triangulation, the study also compared the themes and sub-themes through available secondary data. The researcher engaged in a three-layered coding mechanism to analyze the raw data. The coding process was followed to reduce personal biases, which contributed further to the reliability of the study. First, this study extracts open codes from the interview responses using respondent code (Q1-Q18). Second, open codes were further mapped to the emerging axial codes. Finally, axial codes were mapped to the selective coding. After viewing and funneling down to selective codes, a triangulation approach was applied to verify and validate the themes that emerged from the data given.

### Findings and Conclusion

Here, a description of the findings related to each of the two research questions formulated was accomplished by the entrepreneurs interviewed.

### How will the concept of Internet of Things (IoT) employed by companies be sustained in the post pandemic era?

In the Covid-19 pandemic organizations utilize IoT devices and other new technologies such as machine learning and social media to promote various products and services. Specifically, IoT devices were adopted for communicating with customers, collecting marketing data, and evaluating marketing trends and performance indicators. Numerous entrepreneurs contended that the role of IoT in business analytics and marketing was less substantial prior to the pandemic period though it has become a considerable concept in the post pandemic era. The practical development of IoT and digitalization has a quite progressive in comparison with its theoretical development. The technical capabilities of IoT can empower business owners to plan and carry out marketing research in a comprehensive manner. In utilizing the IoT platforms for marketing research, the approach and communication methods allow entrepreneurs to establish a good rapport with consumers. IoT features such as Machine-to-Machine (M2M) communication, automation, and big data have swiftly assisted entrepreneurs in identifying marketing opportunities and precisely segmenting the marketplace. In the context of communication, IoT platforms create a substantial number of new opportunities for organizations.

The findings revealed that IoT and social media play a crucial role in expanding business channels and tools. Social media are used by companies to receive feedback on products and services. The integration of IoT technologies and social media can build a digital space where a company and a target audience can have closer rapport. In addition to sharing personal data, the possibility of increasing the customer base is higher. Overall, IoT technologies have become an integral component of integrated marketing communications (IMC) and transform the overall architecture of business communication.

On sustainability, the findings revealed that digital technologies like IoT need to be reviewed continually to meet up with societal trends. Also, the technical capability of IoT such as Machine-to-Machine (M2M) communication, automation, and big data will need to be tracked and monitored.

### **How will artificial intelligence be sustained in the post pandemic era?**

The findings revealed that the Covid-19 pandemic has increased the digital transformation of all organizations. The pandemic affected organizations in all industries. The negative impact of Covid-19 pandemic has seen entrepreneurs struggling around the world with quickly adopting digital technologies, such as AI, in their manufacturing or services operations to achieve sustainable development. Based on the findings, the researcher concluded by highlighting some of the measure's entrepreneurs can adopt to ensure sustainability in the post pandemic era. First, entrepreneurs obtaining quality talents are the primary objective. This could be done by training, recruiting, and retaining employees with AI technology knowledge. Secondly, understanding the principles required to use AI in the heart of the business model, such as what special resources and knowledge are needed by entrepreneurs to formulate the transformation strategy of AI. Also, consider how to integrate AI technology into its revitalization strategy in the post-pandemic era to ensure business continuity. Thirdly, entrepreneurs should think about how to choose AI automation tasks and the degree of automation of each task (such as information acquisition, information analysis, decision making, action selection and action implementation) to ensure its sustainability. At the same time, consider how human intelligence can provide support in case of AI automation errors.

### **Recommendation**

Based on the findings, the following recommendations were made.

- i. Entrepreneurs who are yet to adopt the principles of IoT technologies such as machine learning and social media in promoting various products and services should implement it in their entrepreneurial activities.
- ii. Entrepreneurs should focus on training, recruiting, and retaining employees with AI technology. Consideration should be given to the appropriate systems that ensure the infrastructure related to AI technology.

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## **Appendix 1**

### **Interview Questions on Sustainability of Internet of Things (IoT)**

1. It was not easy adopting IoT in my business?
2. My employees are comfortable with the IoT used?
3. Sustainability of technology is the responsibility of all?
4. I will consistently use IoT in my operations?

### **Interview Questions on Artificial Intelligence (AI)**

1. AI is quite easy to adopt and use?
2. Using AI makes work easier and more competitive?
3. Training, recruiting, and retaining employees with AI technology knowledge helps in its sustainability?
4. AI automation tasks and the degree of automation of each task in information acquisition, information analysis, decision making, action selection and action implementation can help ensure its sustainability?