
DIGITAL INNOVATION STRATEGY AND SUSTAINABILITY OF TELECOMMUNICATION FIRMS IN RIVERS STATE

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Abstract

This study examines the association between digital innovation strategy and sustainability of Telecommunication Firms in Rivers State. For this investigation alone, three theories were formulated and put to the test. The research was a cross-sectional survey. Seven telecommunications businesses in Rivers State provided the 163 managers that made up the study population. The sample size was determined using the methodology proposed by Taro Yamane. The research used a standardised questionnaire to gather data. Research only made use of 98 out of the 116 questions originally administered. By calculating the Spearman Rank Correlation Coefficient, we were able to test our hypothesis. A significant correlation between digital ecosystems, platforms, and infrastructure and GDP growth was found in the study. The study's results showed that digital innovation strategy may be strategically applied in Rivers State to drive the economy for the good of the community and businesses. This might provide answers for possibilities for economic and social improvement. The report recommends that telecom providers should invest in dependable broadband networks, fibre optics and 5G technologies to improve service and reduce the digital divide. Improved infrastructure can assist small companies, create employment and grow the economy of Rivers State. Telecom firms may also make their platforms more ecologically friendly by reducing emissions from data centers and implementing campaigns to make consumers more conscious of using digital resources ethically.

Keywords: Digital innovation strategy; digital infrastructure, digital platform; digital ecosystem Sustainability; Economic Impact.

Introduction

In the modern world, one of the necessities is telecommunications. It is required practically everywhere, whether it is for high-level commercial communications or daily living. Owing to this enormous demand, telecommunications income has increased to about 5% of the worldwide net Gross Domestic Product (GDP). The telecom industry presently accounts for

14.40% of the GDP in the fourth quarter of 2024, says NBS. That makes it the third greatest contribution to real GDP after trade and agriculture production. The telecom industry which is made up of Internet service providers (ISPs) and mobile network operators like as MTN, Globacom, Airtel and 9mobile is crucial to the success of the Nigerian economy as a whole. Its expansion is crucial for the country's overall success, since it influences education, healthcare, e-commerce, and financial services (NCC, 2025).

Sustainability is a development paradigm. In other words, it's a method for providing for our current needs without jeopardising those of generations to come. The goal of this interdisciplinary approach is to assess societal effects, environment and economy. International collaboration is needed for people, companies and the planet to survive. Sustainability means that long term objectives are more important than short term ones. To avoid permanent damage, it is necessary to strike a balance between immediate needs and long-term goals. In addition, as this problem is global, it cannot be remedied by one nation or group alone (Pintor, Atzori & Iera, 2025). Now the sustainable practices are part of the social responsibility efforts of the business. Companies are increasingly using it consistently as part of their planned activities instead of for reporting and regulatory compliance (Albao, Baylon, Jr., & Patiu, 2025).

There is a growing chorus of voices demanding that companies update and revamp their business models with digital technologies. The development, implementation, and outcomes of innovations are being transformed by digital infrastructures such as social media, blockchain, cloud computing, virtual and augmented reality, wearable and mobile computing, the Internet of Things, 3D printing, data analytics, and machine learning. According to Nambisan, Lyytinen, Majchrzak, and Song (2017), digital innovation strategy is the process of developing and enhancing products, services, and business models via the utilisation of digital technology. The "new combination of digital and physical components" is what drives the company to create new products (Nambisan, Lyytinen & Yoo, 2025).

Digital innovation strategy is not only the preserve of software businesses. Software is an innovation facilitator and essential differentiator in most modern goods, systems and services, and as a result, an increasing amount of businesses are turning to digital innovation strategy (Svensson & Taghavianfar 2015; Yoo et al. 2012). In our increasingly digitalized world, digital innovation strategy affects every part of our life. Numerous digital services form and impact a large portion of our daily activities. As a result, businesses that seek out new digital innovation strategys must consider how their goods and services impact consumers as well as the potential both the immediate and distant societal impacts, the economy, and culture. More broadly, recent developments at Internet companies such as Facebook and Uber (Nambisan, Lyytinen & Yoo, 2025) demonstrate implications for other organisations, particularly from an international perspective, arising from digital innovation strategy.

Although digital technology is widely used in Nigeria's telecom sector, there is little empirical study on the effect of digital innovation strategy on the long-term sustainability of businesses in the sector. Adeleke et al. (2022) and Chinomona (2013) are only two of many studies that have looked at how digitisation affects things like consumer happiness and company success. Few studies have examined how digital innovation strategy has affected

the social, environmental, and economic performance of rivers in Nigeria. These three aspects are considered crucial to sustainability. Telecommunication firms in Rivers State face peculiar issues such as lack of infrastructure, cyber insecurity, regulatory pressure and lack of digital inclusion (Ndukwe, 2020; Okon & Diri 2021). Thus, research into the function of cutting-edge digital technologies in attaining sustainable development is crucial. Considerable economic and geopolitical weight rests on Rivers State. Insufficient research has examined whether digital innovation strategy can help telecom companies stay in business. Consequently, the purpose of this research is to determine whether or not telecommunications companies in Rivers state can remain in business through digital innovation strategy.

Statement of the Problem

Awareness about global environmental issues has grown significantly in today's society. Environmental degradation, global warming and finite resources pose a threat to human survival and the ability of Earth to continue to grow sustainably. At this stage of growth, firms are expected to adopt social responsibility and sustainable development principles, and a system that helps generate money and safeguard the environment (Sang & Han, 2023).

Large telecommunication corporations are especially expected to focus on their financial benefit and not work on the SDGs, which are important for GDP and internet access. Achieving these goals would help to provide equitable opportunity for everyone to have an appropriate education and experience social inclusion and economic success in the future. Short-term interests and lack of attention to community-oriented activities have led to little involvement in establishing inclusive tools, generating employment and enhancing people's abilities (World Bank, 2020; Olayemi & Afolabi, 2021). Weak innovation strategies and a lack of digital technology are further factors that contribute to the widening gap between wealthy and poor countries.

On the other hand, digital platforms, data analytics, cloud computing, and artificial intelligence can bring about economic and social sustainability. This suggests that a lot of uncertainty exists over whether the development of technology leads to ethical and ecological responsibility in organisations or whether it is a mere by-product of efficiency.

In this research, we'll look at how digital innovation strategy has affected the long-term viability of Nigeria's telecom industry. What matters most is not how digital technologies are used, but rather the social and economic sustainability they can bring..

Aims and Objectives of the Study

Generally, the objective of the study is to ascertain the relationship between digital innovation strategy and sustainability of telecommunications firms in Rivers State. Specifically, this study intends to:

1. Establish the relationship between digital infrastructure and economic impact of telecommunication firms in Rivers State
2. Examine the relationship between digital platform and economic impact of telecommunication firms in Rivers State

3. Establish the relationship between digital ecosystem and economic impact of telecommunication firms in Rivers State

Research Hypotheses

H01: there is no significant relationship between digital infrastructure and economic impact of telecommunication firms in Rivers State

H02: there is no significant relationship between digital platform and economic impact of telecommunication firms in Rivers State

H03: there is no significant relationship between digital ecosystem and economic impact of telecommunication firms in Rivers State

Conceptual Framework

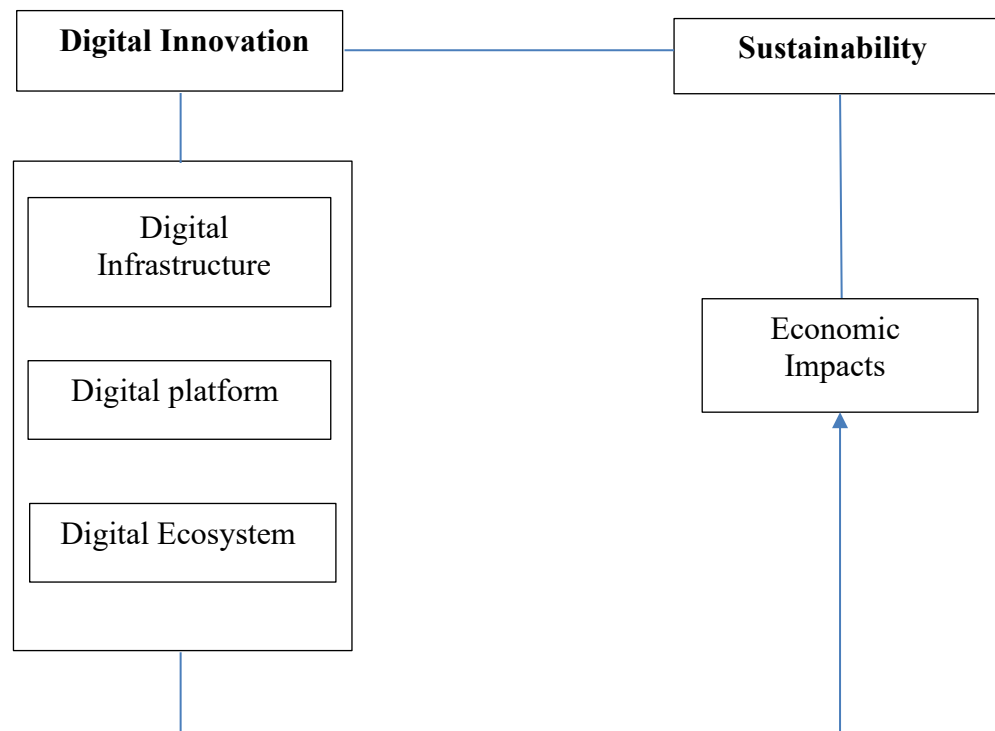


Fig 1.1: Conceptual Framework between Digital innovation strategy and Sustainability of Telecommunication Firms in Rivers State.

Source: Hund, Wagner, Beimborn, and Weitzel, (2021); Alamu, Lewis, Joseph, Frank, (2025)

Literature Review

Digital Innovation Strategy

There are three main aspects of digital technology that cause innovations to take different forms: Information may be stored, altered, sent, and monitored by any digital device once it is digitised (Yoo et al. 2010). Furthermore, digital solutions may be modified to suit new situations following deployment due to the re-programmability of digital information

(Kallinikos, et al., 2013). Thirdly, as stated by de Reuver et al. (2016) and Yoo et al. (2010), digital technology is intrinsically self-referential and necessitates the invention of more digital technology. In turn, digital inventions show how democratised innovation has become due to the low barriers to entry and tremendous scalability of digital technologies. Yoo et al. (2010) and Ciriello et al. (2018), among others, shown that digital technology is formed by and contributes to digital innovation strategys.

Employees that exhibit intrapreneurship are those that think outside of the box and apply digital innovation strategy tactics while still employed by their company (Desouza, 2011). Kristiansen and Bloch-Poulsen (2010) and Hargadon and Bechky (2006) state that firms strive to foster and cultivate the creative potential of every employee. More and more companies are allowing different departments inside the firm to gather ideas through self-organising staff networks, which considerably aids in the invention of digital innovation strategys (Chesbrough, 2003; Desouza, 2011; Neyer et al., 2009).

Despite its ties to design, digital innovation strategy is more comprehensive than design science while yet addressing a broader spectrum of concepts. Third, "IS Innovation" (Fichman et al., 2014; Swanson, 1994) describes how businesses innovate by transforming their information technology capabilities. As new services are made possible by IT, this framework considers the organisational and technological changes that are happening as a result. Through the process of comparing and contrasting it with three conceptualisations, a number of patterns emerge. Items, services, and processes that are capable of utilizing information technology (IT) come first. On the other hand, the IT innovation approach does not fall within the purview of this research since it uses IT artifacts, including open innovation, for the purpose of producing non-IT goods. Second, there's the idea that innovation can't exist apart from design and development, which includes things like adoption, making new artefacts, and executing them across the company. Third, such IT-enabled outcomes must be seamlessly integrated with the existing organization's culture, structure, and processes, among other factors. Our theoretical framework of digital innovation strategy is based on these evergreen concepts, which include the creation of ideas, their execution, the internal organisational environment, as well as the end goods, procedures, and service rendered. According to Cooper and Zmud (1990), there are three parts to a comprehensive picture: the external competitive environment, which is both influenced by and affects digital innovation strategy, the exploitation of artefacts and data, and the commencement of the process.

Cooper and Zmud (1990) outlined the following steps as the general framework for digital innovation strategy: initiating (seeking opportunities, decision-making), developing (designing, developing, adopting), installing (training, incentives), and exploiting (maximising returns, leveraging existing systems/data for new purposes). While all digital innovation strategy projects should include these four stages, there is no hard and fast rule about the order in which they must occur (Kohli and Melville, 2018).

Digital Infrastructure

Emerging as the bedrock of modern society is the internet, also referred to as digital infrastructure. Undoubtedly, the internet is among the most fundamental and important

infrastructures on the planet. However, from a conceptual standpoint, digital infrastructure encompasses a wider range of systems, including cellular networks and satellite networks. These innovations, together with other digital technology such as personal computers and cellphones, have revolutionised our day-to-day lives and global commercial dealings. According to the World Economic Forum (2014), developing countries' GDP growth per capita can increase by 1.2% for every 10% increase in internet availability. The "digital divide" refers to the difference in the ways in which individuals, households, businesses, and areas make use of and get access to digital resources. Particularly for developing nations and particular demographics like those living in rural regions or with low incomes, it is still somewhat wide. The worldwide commercialisation of the internet in 1995 sparked an ongoing debate about how to close the digital divide. Particularly for those from low-income families, the digital divide prevents them from making full use of the opportunities presented by digital technology. This will inevitably cause economic inequality and wealth disparity to widen in the future (Ben et al., 2017).

The digital infrastructure of an industry or business includes its underlying organisational structures, IT, and related services and facilities. Infrastructures are further classified according to the entity they support: global, national, regional, industry, and corporate. According to Hanseth and Lyytinen (2010), digital infrastructures consist of various user, operational, and design communities and the existing basis of different IT capabilities. Digital infrastructures are morphologically defined as open, shared, diversified, and dynamic sociotechnical systems (Hanseth and Lyytinen 2010). This implies that these infrastructures are not constrained by any particular set of requirements or functions, unlike specialised systems. In reality, they are relational, adaptable, and enduring. Information technology has entered a new era with the advent of digital infrastructures with more social integration, coordination across various socio-technical domains and standards, and, most apparent, malfunctions (Star & Ruhleder, 1996). In simple terms, the best way to understand infrastructures is to examine how the organisational practices incorporate norms and capacities that allow for new social behaviours and/or rules (Tilson, Lyytinen and Sørensen, 2010).

Digital infrastructure is the set of computers and networks that enable multiple entities to coordinate their content and service demands. The Internet, data centers, open standards like IEEE 802.11 and USB, and consumer devices like smartphones and tablets are all examples of digital infrastructures (Hanseth and Lyytinen 2010, Monteiro, 1998; Gandhi, 2017). Bygstad (2017) contrasts the "heavyweight" Internet with consumer devices, which are "lightweight" infrastructures. But when they become big enough, mobile phones become infrastructure-level computing and networking powerhouses. Consider how technologies like GPS, the web, and cell phones make services like Uber possible (Constantinides, Henfridsson & Parker, 2018).

Digital Platform

A glimmer of hope for addressing these reporting issues is the very development of digital technologies. Digital platforms have begun transforming the way organisations collect data and evaluate their sustainability and communicate about the same in terms of their

environmental sustainability (Popescu & Popescu, 2024). They provide for enhanced data analysis, standards for the collecting and reporting of data, and are therefore key to the production of reliable reports. They also increase the accuracy of the information given, because it is tracked and confirmed in real-time. The emergence of online sustainability reporting systems is a natural progression in corporate practices and a boon to economic expansion (Beucher et al., 2024; Calabrese et al., 2021). Organisations can benefit from digital platforms in terms of sustainable operations, accountability, and decision-making (Khuan et al., 2023; Wang et al., 2024).

The way individuals communicate and connect with one another has changed because of Facebook and other social media. New operating platform systems like Android and iOS have emerged as superheroes in the mobile telecom field. PayPal, Square, and Apple Pay are revolutionizing the banking industry. Rideshare and peer-to-peer commerce platforms including Airbnb and TaskRabbit have led to a 'sharing economy'. Since attracting platform-related generating activity has become more important than controlling the value chain, the emphasis of competition has changed. According to de Reuver, Sørensen, and Basole (2017), digital platform logic is the main factor behind the controversial integration of digital technology into several industries, such as healthcare, transportation, and crowdfunding (e.g., like PatientsLikeMe).

A digital platform is defined by Spagnoletti et al. (2015) as an essential component of any technological infrastructure that serves as a foundation for the development of supplementary goods, technologies, and services. From this vantage point, studies look at the platform owner's technological base, as well as the characteristics and advancements in technology that enable the production of supplemental goods and services (Ghazawneh & Henfridsson, 2013).

Digital Ecosystem

Digital ecosystems are attracting more and more attention from the academic and corporate communities. These ecosystems have a focus on partnerships and interdependencies other than organisational linkages (Jacobides et al., 2018). Despite the fact that nonhierarchical nature of ecosystems has been acknowledged by researchers, questions remain about the regulations governing membership and linkages (Sahut, Peris-Ortiz, and Teulon, 2019).

Ecosystem ecology was born out of Eugene Odum's *Fundamentals of Ecology* (1953), which brought the concept of ecosystems to a wider audience and brought attention to the United States as a site for ecological research (Golley 1993). On the other hand, his younger brother Howard T. Odum proposed the book's primary conceptual innovation: that ecosystems are limitless, self-regulating energy feedback systems. At the major Macy conferences in the late 1940s, when his mentor, the ecologist G. Evelyn Hutchinson, was speaking, the younger Odum heard the concept that ecological systems may be seen as cybernetic processes with traits of circular causality. In 1948, he built on this theory. Krivþ (2023) notes that Odum often utilised illustrations to illustrate the functioning of these ecological processes as self-regulating mechanical cogwheels, metabolic fluxes, and electrical circuits.

The most recent forms of ecosystems, called "digital ecosystems," have been a direct result of the rising dependency of people on online services and the rapid development of associated

technology. Digital ecosystems are different from other ecosystems since they are more sophisticated, they behave in a distinctive way and they are able to adapt to their surroundings. In Boley and Chang (2007) the fundamental aspects of a digital ecosystem were highlighted, which they described as an open system where the capacity to organise is not concentrated in one area and controlled by one entity, but rather is not disseminated in the conventional fashion among its parts. This is the quality that sets apart digital ecosystems. They argue the distribution of electricity is done in a unique method and is always impacted by changes in market demand. Bozintan and Crişan (2024) claim that digital ecosystems are different from traditional ecosystems by a set of particular restrictions regarding power policy. For instance, in digital ecosystems, entities that are also part of the ecosystem do not have set functions. Without mentioning it, there will be no centralised control structure when this sort of approach is followed.

Sustainability

In a globalised economy, where social, environmental and economic challenges are gaining centre stage, business companies have been challenged to align their operations and services with a sustainability strategy. But the notion of sustainability is contentious, diverse and difficult. Sustainable organisations may generate new technologies to increase productivity, question the use of technology, and implement deeper reforms to the organization's deeply ingrained culture. Also, all companies may contribute to sustainability but the extent to which they can contribute varies greatly depending on the industry and size of the organization (Grecu & Nate, 2014). Organisations are vital to sustain sustainable development. Organisations may already work to enhance overall efficiency and secure the lifespan of their organization while also positively benefiting the communities in which they work all in an effort to sustain and grow their capacity to continue functioning efficiently. According to Neacşu and Georgescu (2023), these measures should be undertaken so that the requirements of the present and future generations may be met without sacrificing the demands of the generations to follow.

Choi and Ng (2011) and Sheth, Sethia and Srinivas (2011) have suggested that the three aspects of sustainability that companies need to address are economic, social and environmental. One such definition offered by "achieving current needs while preserving the capacity of future generations to meet their own needs" is the definition of WCED (1987). More and more organisations are using sustainability as a business strategy. However, the results of a number of research conducted across the globe are gaining popularity for this viewpoint. In 2010, a McKinsey Global Survey of almost 2,000 executives indicated that corporations are not actively managing sustainability, while it is widely regarded as an essential problem (de Leaniz & del Bosque, 2013).

Increase in the economy that meets current needs without reducing opportunities for future generations is what Brundtland (1985) means when she says that something is sustainable. Energy consumption, stakeholder happiness, habitat conservation, and financial results are just a few of the many complex and multi-faceted aspects that make up sustainability. In its original or literal sense, the word connotes everlastingness, stability, and durability (Cheney et al., 2004). Ehrenfeld (2005) argues that the term "sustainability" does not always mean

economic success. The term "environmentally friendly" is often used to describe sustainability, but it actually encompasses more than just that. Recycling, energy and waste conservation, and environmental protection are only a few of its many facets (DeSimone & Popoff, 2003). Consequently, measuring sustainability in its whole differs significantly from examining other parts of a company's performance (Schaltegger & Wagner, 2006).

Sustainability performance refers to how well a corporation does across all aspects and for all corporate sustainability drivers. Beyond the scope of a single company, it typically encompasses the value chain as a whole, including suppliers and customers at all stages (Sebhatu, 2009).

Economic Impact

The economic pillar acknowledges how people interact with the economy, its surroundings, and how natural resources are used to process and produce commodities and services. Manufactured capital is the major component of this pillar. Physical capital created by humans, "such as roads, communication lines and other kinds of infrastructure, as well as factories and machines," is referred to as manufactured capital. Financial capital, which is quantified in monetary terms and serves as a means of obtaining resources required for more processing, is another component of economic capital. However, the most contentious aspect of sustainability is its economic component, and there is disagreement in the literature over what constitutes an economically sustainable strategy. As a result, this pillar is covered in greater detail in the thesis's subsequent parts. Thus, the focus is on the disparities between the economic approach to sustainability and the original purpose of the Brundtland report and between the environmental and economic approaches to sustainability (Iten, 2020).

Economic effect is a broad indicator of the health and prosperity of an economy. It involves the examination of the performance of an economy in relation to how well it is fulfilling its core objectives which normally comprise strong development of the economy, complete job security, stable prices, balanced budgets, balanced trade, and fair distribution of income. These aims contribute to building an integrated, healthy, varied society. Full employment implies that those who choose to work may share in and profit from economic development. And strong economic growth gives possibilities and raises the standard of life. Price stability makes the economy more predictable and this in turn facilitates investment and long-term planning. An income distribution pattern conducive to social cohesion and equity, and an external balance that avoids excessive indebtedness and economic instability. To this end, economies can develop a virtuous cycle of sustained prosperity, equitable sharing of wealth and better living conditions for all residents (Wimalaratana, 2024).

The economic pillar recognises that people's interactions with the economy, its environment together with the extraction, processing, and final fabrication of goods from natural resources; and services are fundamental to sustainable development. This pillar is mostly composed of produced capital. Manufactured capital is physical capital that is made by human people, "such as roads, communication lines and other types of infrastructure, as well as factories and machines." Another element of economic capital is financial capital. It is expressed in money and is a means of obtaining resources for further processing. (Goodwin, 2003). The economic aspect is the most problematic part of sustainability and there is no

consensus in the literature as to what an economically sustainable strategy is. Therefore, this pillar is examined in greater detail in the next chapters of the thesis. Thus, the focus is on the economic view of sustainability, on the deviation from the original idea of the Brundtland report and on the contrast between the environmental and economic view of sustainability (Iten, 2020).

Digital Infrastructure and Sustainability

The digital infrastructure connects to seventy percent of the SDGs, and the digital infrastructure is part of the internet economy. The importance of digital infrastructure lies in its role in achieving the SDGs and the digital economy. Without the digital infrastructure there would be significant impediments to the provision of education and career prospects especially in the developing countries. Universal connection requires heavy expenditures in infrastructure, but fragmented expectations and lack of the needed infrastructure and execution challenges hold back these investments (ITU-UNICEF, 2023).

As mentioned by Nchofoung and Asongu (2022), the two crucial factors to consider when drafting a policy towards a greener future include the propagation as well as the use of digital technology such as 5G internet, mobile communications, cloud computation, data centers, and other technological innovations. Digital infrastructure affects many factors such as economic development, education, and the environment (Dutta, Gupta & Sengupta, 2019). The researchers believe that as digital technology can boost productivity and minimize transaction costs, it is an excellent means to foster economic development (Ding et al., 2022). ICT innovations may lead to beneficial spillovers leading to economic development as well as profits.

Digital Ecosystem and Sustainability

Someone once said that the internet is like "a sophisticated network of interconnected socio-technological systems" with self-organization and scaling characteristics. Therefore, the components in digital ecosystems depend on each other in a way that is similar to the workings of an actual ecosystem. In other words, it is the interaction between what looks like independent entities that forms the basis of an ecosystem. According to Widyastutia, Wahyunia and Wastutiningsiha (2023), the MSME ecosystem in DIY is sustainable based on the quality of the ecosystem. In this sense, the quality of the ecosystem refers to its compatibility and sensitivity to digital technology.

The other important considerations that have been raised in relation to this issue include arifin's 2024 article titled "Creating a Sustainable Digital Business Ecosystem: Challenges and Opportunities for Global Economic Development." emphasises the importance of digital business ecosystems and sustainability in building a long-lasting corporate environment. "As said before, digital inclusion, sustainable innovation, and participation from several stakeholders cooperation were considered as some of the most important factors for the realization of this objective. The report identifies the necessity of incorporating sustainability in digital business ecosystems for promoting a sustainable corporate environment. This involves assessing the socio-environmental implications of economic development and

identifying ways in which various stakeholders may work together in order to facilitate the formation of such ecosystems.

Digital Platforms and Sustainability

There is no doubt that sustainability is gaining prominence owing to the complex challenges being faced by nature and society, such as global warming and widening inequalities. This has led to firms giving importance to environmental matters, sometimes even necessitating innovative solutions. However, for any real progress to be made, there must be coherence in policy matters. According to Holzmann and Gregori (2023) and Guaita-Martínez et al. (2022), this would involve a detailed incorporation of ESG factors at both national and international levels.

Better reporting and performance have both been greatly enhanced by online sustainability reporting systems (Khuan et al., 2023; Salamzadeh et al., 2024). These technologies have greatly reduced the impact of human mistake via automating and verifying data operations. As noted by Paridhi and Ritika (2024), businesses that have relied on these systems have reported significant improvements in terms of collecting and verifying information. For example, there have been cases where the improvement amounted to 60% in relation to efficiency of reporting activities. Better reports have been prepared with the use of online sustainability reporting systems and target organizations have been able to devote more effort to the analysis of data because of the improved performance, according to Grover et al. (2018) and Adelakun et al. (2024).

The development of innovative business models coupled with digitisation has the potential to bring about significant positive impacts on society, the economy, and the environment, as stated by Parida et al. (2019). Sustainable digital platforms, as described by Kovacic et al. (2020) and Meath et al. (2022), are online resources that aim to be environmentally friendly. This is one way in which sustainable business models may be shown. The European Commission (2015) defines a digital platform as an online business that brings together several user communities and uses the Internet to facilitate communication between them. The goal is to generate value for one of these groups. By design, digital platforms may be considered circularity and sustainability driven if they work to benefit everyone who uses their service. Vo-Thanh et al. (2021) and Blackburn et al. (2022) cite platforms that mediate between various actors with the goals of reducing emissions, reusing resources and materials, and recycling them.

Theoretical Framework

Disruptive Innovation Theory

Disruptive innovation, as a notion, was first put out by Christensen in 1997. He contended that, in an uncertain and fast-paced world, innovation is the only way to stay ahead of the competition. Nevertheless, innovation also heightens market pressure and uncertainty (Lettice, 2006). As the radicality of an idea increase, so does the difficulty of predicting its potential and commercial acceptance. The ever-increasing complexity of markets has led to a widening chasm in our understanding of how theory and practice relate. Many organisations

are not prepared to experiment, understand when a trend is about to expire, respond quickly to changes or even start a trend in the market (Markides, 2009).

In particular, 5G technologies, fibre optics and cloud computing platforms challenge conventional telecom paradigms enabling more scalable, efficient and low latency services (Markides, 2006). These improvements not only improve service delivery, but also minimise the need for maintenance, energy consumption and infrastructure redundancy, all in the name of environmental sustainability. In addition, digital platforms such as virtual interactions, mobile payments and e-services minimise the need for physical customer support centers which saves operating expenses and carbon emissions (Govindarajan & Kopal, 2006).

Disruptive innovation also encourages organisations to regularly reassess their social and environmental ramifications by fostering a culture of responsiveness and agility. For example, new technology such as AI-driven network management systems replaces old and resource-intensive operations. This is consistent with the notion that disruptive innovations are strategic instruments to include sustainability in core operations, rather than mere technology advancements (Yu & Hang, 2010).

Thus, the research contends that Disruptive Innovation Theory explains how digital innovation strategy may be a mechanism and a catalyst for sustainability in telecom firms. The research is premised on the notion that telecom enterprises that have embraced digital transformation are not only achieving socio-economic and environmental goals in Rivers State but also gaining competitive advantage.

Empirical Review

From 2000 to 2020, Kouladoum (2025) analyses 44 nations in Sub-Saharan Africa to determine how investments in digital infrastructure affected equitable growth. In order to achieve inclusive growth, the study included many metrics, including the number of internet, fixed broadband, fixed phone, and mobile cellular subscriptions per 100 individuals in Sub-Saharan Africa. The results show that regardless of the socioeconomic classes of the nations in Sub-Saharan Africa, digital infrastructure increases the likelihood of inclusive growth.

Giourgali (2023) aims at a conceptual examination of the confluence between sustainable digital technologies and tourism and their potential. The writers argue tourism is always adopting sustainable methods. This is a notion, not particular acts. Although there have been significant advances in the application of sustainability concepts by firms and individuals, the tourist sector currently does not have the necessary tools to allow the full efficiency and effective development of sustainable digital technologies.

The importance of digital platforms in facilitating the transition to sustainable entrepreneurial growth in developing nations is discussed by Hadizadeh et al. (2024). The future of sustainable entrepreneurship in digital ecosystems, particularly for poor nations, is defined by six important unknowns that are highlighted in this paper. Developing and producing mobile apps, getting into international markets, being competitive, creating value, meeting ethical and environmental norms, and so on are all areas fraught with risk. To cope with this uncertainty, several imaginable futures have been imagined. These are paradigm shift to cooperative corporate structures; increasing emphasis on sustainability and CSR; changes in consumer behaviour and market conditions and; developments in digital technology.

The needs of digital platforms for better sustainability in agriculture were investigated by Chkarat, Abid, and Sauvée (2023). The authors of this paper argue that in order to fully utilise digital platforms for sustainable agriculture, a broader and more comprehensive view is necessary. Digital platforms may be great tools to aid sustainability in this important task if they have the basic characteristics described in this essay.

Isensee, Teuteberg and Griese (2025) carry out a cross-case analysis of sustainability in three German small and medium-sized enterprises (SMEs) from the construction, information and communication technology, and wholesaling sectors. These SMEs are adopting multi sided platform platform. The suggested socio-eco-technical framework shows interrelations of the SDGs (ecological system), business culture (social system) and platform stakeholders and an executed platformization strategy (technical system). This study proposes a seven-step approach to allow and support the creation and continual improvement of platformization for sustainability in SMEs.

Methodology

Research Design

This research was a cross-sectional survey. The research was designed in a cross-sectional way to fulfil the major purpose of the research.

Population of the Study

The study's available population included 153 participants from 7 different telecommunication operators in Port Harcourt.

Sampling Technique/Sample Size Determination

For this research, the respondents were selected using the simplest form of random sampling method. The number of respondents for the study was 116, which was selected using the sample size determination technique suggested by Taro-Yamene (1967).

Sources of Data Collection

The primary source of data for this study was the standardised questionnaire that was personally delivered to the respondents by the researcher.

Data Analysis Technique

The relationship between the variables was determined by the use of the Spearman Rank Order Correlation Coefficient. The relationships were proved to be significant at the 0.05 significance level via the SPSS 25 Output Viewer.

Descriptive Statistics

Variable	Category	Frequency	Percent (%)
Age	21–30 years	18	18.4
	31–40 years	39	39.8
	41–50 years	29	29.6
	51 years & above	12	12.2
Gender	Male	45	45.9
	Female	53	54.1
Marital Status	Single	68	69.4
	Married	30	30.6
Educational Qualification	M.Sc/MBA	28	28.6
	B.Sc/HND	59	60.2
	OND/Diploma	11	11.2
Age of Firm	5 years & below	28	28.6
	6–15 years	58	59.2
	16 years & above	12	12.2
Total		98	100.0

Source: Researcher, (2026)

From the above statistics on demographics of respondents, it is obvious that a large percentage of respondents are from middle age group, which is between 31 and 50 years. This indicates that roughly 70% of the entire population are young individuals with sufficient experience and engagement in the decision-making processes of organisations. In terms of gender, the sample is evenly distributed with respect to gender, however females significantly outnumber male peers. The data show that more than half of the respondents are female (54.1%) and the rest are male (45.9%). This indicates that the survey has sufficiently gathered perspectives from all the genders. Regarding marital status, a majority of respondents are single (69.4%). This indicates that the survey has gathered the perspectives of single persons who are able to be flexible and movable as opposed to married individuals. In terms of education, majority of the respondents (60.2%) have obtained the level of B.Sc/HND while some have attained higher education levels (postgraduate degree). In addition, more than half of the sample enterprises are between six and fifteen years old.

Test of Hypotheses

H01: there is no significant relationship between digital infrastructure and economic impact of telecommunication firms in Rivers State.

Table 4.1: Spearman’s correlation between digital infrastructure and economic impact

		Correlations		
			Digital Infrastructure	Economic Impact
Spearman's rho	Digital Infrastructure	Correlation Coefficient	1.000	.753**
		Sig. (2-tailed)	.	.000
		N	98	98
	Economic Impact	Correlation Coefficient	.753**	1.000
		Sig. (2-tailed)	.000	.
		N	98	98

** . Correlation is significant at the 0.05 level (2-tailed).
SPSS output, (2026)

Table 4.1: Correlation between Digital Infrastructure and Sustainability Measure (Economic effect). With the help of 98 members of management from telecommunications companies in Rivers State, we did a Spearman's rank order correlation to find out how digital infrastructure relates to sustainability metrics like economic effect. A noteworthy link was demonstrated by the statistically significant positive correlation coefficient ($\rho = .753^{**}$, $p = .000 < 0.05$ (alpha value)) between digital infrastructure and economic effect. There is a robust correlation between Rivers State digital infrastructure and the economic effects of telecommunications companies, hence we reject the null hypothesis (H_{01}).

H₀₂: there is no significant relationship between digital platform and economic impact of telecommunication firms in Rivers State

Table 4.2: Spearman's correlation between digital platform and economic impact

Correlations				
		Digital Platform		Economic Impact
Spearman's rho	Digital Platform	Correlation Coefficient	1.000	.730**
		Sig. (2-tailed)	.	.000
		N	98	98
	Economic Impact	Correlation Coefficient	.730**	1.000
		Sig. (2-tailed)	.000	.
		N	98	98

** . Correlation is significant at the 0.05 level (2-tailed).
SPSS output, (2026)

The link between digital platforms and the sustainability indicator known as Economic Impact was determined by a Spearman's rank order correlation run among 98 management staff members of telecoms firms in Rivers State. The results are displayed in Table 4.2. Digital platforms are significantly related to economic impacts, as indicated by a statistically significant positive correlation coefficient value between the two ($\rho = .730^{**}$, $p = .000 < 0.05$ (alpha value)). Hence, we conclude that telecommunications companies in Rivers State have a substantial link between digital platforms and economic impact, rejecting the null hypothesis (H_{03}).

H₀₃: there is no significant relationship between digital ecosystem and economic impact of telecommunication firms in Rivers State

Table 4.3: Spearman's correlation between digital ecosystem and economic impact

Correlations				
		Digital Ecosystem		Economic Impact
Spearman's rho	Digital Ecosystem	Correlation Coefficient	1.000	.828**
		Sig. (2-tailed)	.	.000
		N	98	98
	Economic Impact	Correlation Coefficient	.828**	1.000
		Sig. (2-tailed)	.000	.
		N	98	98

** . Correlation is significant at the 0.05 level (2-tailed).
SPSS output, (2026)

Table 4.3 shows the outcomes of a Spearman's rank order correlation run that was performed to examine the link between digital ecosystem and the sustainability indicator (economic effect). The run was conducted among 98 management staff members of telecommunications businesses in Rivers State. Statistical examination revealed a favourable correlation coefficient value between digital ecosystem and economic effect ($\rho = .828^{**}$, $p = .000 < 0.05$ (alpha value)), suggesting a meaningful association between the two. Thus, we conclude that the digital ecosystem has a substantial influence on the economic impact of telecommunications enterprises in Rivers State and reject the null hypothesis (H_0).

Discussion of Findings

A strong correlation between digital infrastructure and economic effect was found in the first set of hypotheses. There is a robust and statistically significant association, according to the results of the investigation. ($\rho = .753^{**}$, $p = .000 < 0.05$ (alpha value)) between digital infrastructure and the socio-economic impact of telecommunications firms in Rivers State. A strong association between digital platforms and economic repercussions was suggested by the findings of the second hypothesis analysis, which showed a statistically significant positive relationship ($\rho = .730^{**}$, $p = .000 < 0.05$ (alpha value)). with the telecommunications providers in the state of Rivers. Finally, the third hypothesis showed a positive association that was statistically significant ($\rho = .828^{**}$, $p = .000 < 0.05$ (alpha value)) between the digital ecosystem and economic effect. Digital technologies including artificial intelligence (AI), big data analytics, mobile technologies, the IoT, and social media platforms leads to beneficial changes for both society and business, according to Vial (2019). As stated by Dutta, Gupta and Sengupta (2019), digital infrastructure has a direct impact on several economic parameters, such as environmental sustainability, educational achievement, and economic development, among many others. Similarly, the study by Parida et al. (2019) also revealed that digitization may offer numerous positive aspects in addition to the formation of novel business models. In particular, such digital platforms can be defined as sustainable and circular, meaning that their purpose lies in achieving long-term results for all actors involved in the process of platform usage. According to Vo-Thanh et al. (2021) and Blackburn et al. (2022), the intermediary platforms aim to recycle resources, reduce emissions, and reuse materials. In addition, according to Ahmad et al. (2022), small and medium-sized enterprises (SMEs) with sufficient digital skills to gain a competitive edge through digital ecosystem development perform better when digital ecosystem features are included. Another case study conducted by Nosratabadi, Atobishi, and Hegedhus (2023) revealed that developing a digital ecosystem and sustainable digital transformation can facilitate economic solidarity and equalize opportunities among individuals.

Conclusion and Recommendations

In this research, digital technology was considered as a moderating variable and the relationship between digital innovation strategy as defined here as digital infrastructure, digital platforms and digital ecosystems and the sustainability of telecoms firms in Rivers State was examined. The results demonstrated that broad digital innovation strategy had a significant impact on the bottom lines of these organisations, implying that digital

transformation is a key driver of the long-term performance of the sector. In light of the study's findings, we consequently propose:

1. Telecom companies may improve service delivery by providing better internet infrastructure, fibre optics, and even 5G networks to overcome the gap in the digital divide that exists today. Rivers State would benefit from improved infrastructure which include job development and economic growth”
2. The digital platforms to be established should aim at empowering individuals economically with the use of remote employment and e-commerce prospects. The cooperation with the local firms might bring about socio-economic advantages.
3. Firms might engage with governments, enterprises, and NGOs organisations to build a well-integrated digital ecosystem that would stimulate innovation, develop local apps, and boost entrepreneurship.

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