

**A STUDY OF ICT READINESS OF SMEs IN NIGERIA FOR THE DIGITAL
ECONOMY**

BY

OGBERE EMMANUEL

PSC2008185

**DEPARTMENT OF COMPUTER SCIENCE,
FACULTY OF PHYSICAL SCIENCES,
UNIVERSITY OF BENIN,
BENIN CITY,
EDO STATE, NIGERIA.**

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CERTIFICATION

This is to certify that this project work was carried out by **OGBERE EMMANUEL** with Matriculation Number **PSC2008185** under my supervision. It is adequate and satisfactory, both in scope and content, for the award of Bachelor of Science (B.sc) Degree in Computer Science of the University of Benin.

PROF. F. EGBOKHARE

Project Supervisor

DATE

APPROVAL

This project work is hereby approved in partial fulfilment of the requirements for the award of Bachelor of Science (B.Sc.) Degree in Computer Science from the University of Benin.

PROF. GP. EKUOBASE

Head of Department

DATE

DEDICATION

This project is dedicated to God Almighty for giving me the strength and wisdom to see it through to completion, and even throughout my stay in the University of Benin (UNIBEN). It is also dedicated to my parents; MR AND MRS OGBERE and my family members; for their love, support and guidance throughout my academic journey.

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ABSTRACT

The rapid evolution of the digital economy presents both opportunities and challenges for Small and Medium Enterprises (SMEs) in Nigeria. Despite the growing significance of Information and Communication Technology (ICT) in business operations, many SMEs struggle with inadequate digital infrastructure, limited ICT skills, security concerns, and restricted access to digital markets. This study develops an ICT-Readiness Framework tailored to the Nigerian SME landscape, addressing these challenges and providing a structured approach for digital adoption. The framework consists of six key components: Infrastructure Development, Digital Literacy, and Access to Digital Markets, Policy & Regulatory Support, Innovation & Sustainability, and Monitoring & Evaluation. To ensure its practicality, the framework was implemented as a C program, enabling SMEs to assess their ICT readiness, identify gaps, and receive actionable recommendations. The system was successfully executed, providing accurate evaluations based on SME-specific inputs. Findings from the implementation demonstrate that the framework can effectively guide SMEs in enhancing their ICT adoption by improving connectivity, promoting digital skills, expanding market reach, ensuring policy compliance, and fostering innovation. By adopting this structured approach, Nigerian SMEs can better position themselves for growth in the digital economy. This study contributes to the ongoing discourse on SME digital transformation by offering a practical, data-driven solution for ICT readiness. Future research can focus on expanding the framework to include artificial intelligence-driven assessments and cloud-based integration for broader accessibility. Keywords: ICT-Readiness, SMEs, Digital Economy, Nigeria, Digital Transformation, ICT Adoption, C Program Implementation.

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF STUDY

Small and medium enterprises are business whose income are in certain limits, small and medium enterprises (SMEs) as defined as the national council of industries, refers to business enterprises whose amount of resources apart from land is not greater than two hundred million naira (200,000,000.00) only (Basil, 2005).

The digital economy represents a comprehensive ecosystem of economic activities fundamentally enabled by digital technologies, internet platforms, and advance computational systems. It encompasses digital transactions, online market places, data-driven economic interactions and technology mediated value creation (World Economic Forum, 2023). The digital economy represents a transformative global phenomenon, fundamentally reshaping business landscapes across diverse economic contexts. Developed economies demonstrate advanced technological integration, with SMEs leveraging sophisticated digital infrastructures, cloud computing, artificial intelligence, and data analytics as core business strategies. Countries like Singapore, United States, and Germany exhibit exemplary digital ecosystem development, characterized by comprehensive technological support, robust policy frameworks. These countries uses strategies such as cryptocurrency dynamics (coinbase, 2022) digital payment transformation, mobile money platforms and also the use of robots to enhance their businesses (Chen et al., 2022).

Ghana SMEs demonstrate increasing digital payment integration transforming traditional business operation through technological solutions. Small and medium businesses actively leverage mobile money platform and digital banking services, Small and medium enterprises (SMEs) and start-ups are essential to the Ghanaian economy, as they significantly contribute to job creation, poverty reduction, and overall economic growth. Despite these contributions, Ghanaian SMEs encounter substantial obstacles, including inadequate support structures, skills deficits, and restricted access to financing (Yaw, 2024)

The digital readiness of Small and Medium Enterprises (SMEs) in Nigeria presents a complex and challenging landscape characterized by significant technological disparities and developmental constraints. Current research indicates substantial limitations in ICT

infrastructure and digital capabilities across Nigerian SMEs. Technological Preparedness reveals profound gaps in digital infrastructure and technological adoption. Most SMEs demonstrate minimal technological integration, with limited access to advanced digital tools and platforms. Approximately 60% of Nigerian SMEs operate with rudimentary technological capabilities, primarily utilizing basic communication technologies like mobile phones and basic internet services (Olaolu & Adepoju, 2021). Digital Skills Landscape shows considerable deficiencies in workforce technological competencies. Many SME owners and employees lack comprehensive digital literacy, hindering effective technological implementation (Kessington, 2018). Studies suggest that less than 40% of SME personnel possess advanced digital skills necessary for sophisticated technological engagement (Nwankwo et al., 2022).

Infrastructure Challenges significantly impede digital transformation. Inadequate electricity supply, limited broadband connectivity, and prohibitive internet costs create substantial barriers to technological adoption. These infrastructural constraints restrict SMEs' ability to implement comprehensive digital strategies effectively (Adeniran & Rufai, 2020). Also financial constraints emerge as critical impediments to digital readiness. Limited financial resources prevent substantial investments in technological infrastructure, training, and digital platforms. Most SMEs struggle to allocate sufficient funds for technological upgrades, creating a persistent digital vulnerability (Ejemeyovwi & Osabuohien, 2021). Policy and Regulatory Environment presents mixed signals regarding digital transformation support. While government initiatives aim to enhance digital ecosystem, implementation remains fragmented and inconsistent. Regulatory frameworks have not sufficiently addressed SMEs' specific technological needs and challenges (Okeke et al., 2022). Technological Awareness remains relatively low among SME leadership. Many entrepreneurs demonstrate limited understanding of digital technologies' strategic potentials, resulting in hesitant and reactive technological approaches rather than proactive digital strategies (Nwosu & Okonkwo, 2021).

Comparative Analysis with global digital ecosystems reveals significant developmental disparities. Nigerian SMEs lag considerably behind international counterparts in digital maturity, technological infrastructure, and innovative digital practices (World Bank, 2022). Potential Transformation Pathways require comprehensive, multi-dimensional interventions addressing technological, skills-based, infrastructural, and strategic dimensions. Successful digital readiness demands holistic approaches integrating technological education,

infrastructure development, financial support, and strategic policy frameworks (Adeola & Evans, 2023).

1.2 STATEMENT OF PROBLEM

The digital economy presents transformative opportunities for small and medium enterprises in Nigeria, yet significant challenges impede their technological integration. Despite increasing global digital transformation, Nigerian SMEs face substantial barriers in achieving comprehensive ICT-readiness. These challenges stem from complex interactions between technological infrastructure limitations, economic constraints, and organizational capabilities.

Existing research reveals critical gaps in understanding the nuanced factors preventing effective ICT adoption. Nigerian SMEs struggle with technological skill deficiencies, limited financial resources, and structural impediments that hinder their digital economy participation. The absence of a comprehensive framework explaining ICT-readiness specifically within the Nigerian context creates significant knowledge limitations. This study therefore seek to design a framework for ICT readiness by SMEs.

1.3 AIM AND OBJECTIVES OF RESEARCH

The aim of this study is to design a frame work for ICT- readiness of SMEs in Nigeria. This will be achieved through the following objectives:

- i. Measure the infrastructure readiness for SMEs practitioners
- ii. Determine the literacy level of SMEs practitioners in Nigeria
- iii. Determine the level of access and use of ICT by individuals
- iv. To develop a framework of ICT for SMEs.

1.4 SCOPE OF THE STUDY

This project focuses on Information and Communication Technology (ICT) –Readiness of SMEs for the digital economy, using the SMEs in Nigeria as a case study.

1.5 SIGNIFICANCE OF THE STUDY

This study highlights the importance of ICT readiness of SMEs in Nigeria for the digital economy. It addresses key challenges such as inadequate ICT skills and lack of digital infrastructure. By proposing a digital skill training platform, it provides practical solutions to enhance SMEs productivity and competitiveness. The findings offer valuable insights for business owners to promote economic growth and sustainable development for SMEs

1.6 LIMITATION OF THE STUDY

Here are the problems and challenges encountered in this study;

1. **Analysis Scope:** This study focuses on certain obstacles that SMEs face while using ICT, including market access, digital infrastructure, security risks, and skills gaps. Nevertheless, it does not cover every potential ICT-related obstacle that SMEs can encounter, as they might differ greatly based on the sector, region, and scale of the company. This restriction could have an impact on how broadly the results can be applied.
2. **Data Restrictions:** Due to time and resource constraints, the study's data may only come from secondary sources or a small sample size, which may not accurately reflect the wide range of needs of SMEs in various industries. More thorough, larger datasets may be used in future research to produce stronger findings.
3. **Time, money, and technical constraints:** Some suggested remedies include access to cutting-edge security systems, may require significant financial investments and extended time commitments beyond the scope of this study. Due to limited funding and the project's timeline, certain recommendations may lack the detailed financial or technical planning required for immediate implementation by SMEs.
4. **Rapid Technological Advancements:** The ICT landscape is constantly evolving, with new technologies, digital platforms, and cybersecurity threats emerging regularly. This study provides a snapshot based on the current state of ICT. Future developments may render some of the recommendations outdated or less effective over time.
5. **Limited Practical Application:** As this research is conducted at an undergraduate level, it may lack the depth required for large-scale, practical application in the field. While the study offers valuable insights and theoretical solutions, a more in-depth, hands-on approach, ideally with extended funding and resources, may be necessary to create truly implementable strategies for SMEs.
6. **Limited power supply:** low power supply affected the time of completion of this project. The consistent power failure made this project difficult to carryout.

1.7 CONCEPTUAL CLARIFICATION

Information and Communication Technology (ICT): The methods and systems used to manage information and facilitate communication are referred to as information and communication technology, or ICT. Computers, mobile devices, software programs, and

network infrastructure are only a few of the many instruments that make it possible to store, retrieve, and share data effectively. ICT is a crucial enabler for SMEs, enabling them to increase their digital presence, streamline operations, and enhance communication—all of which boost competitiveness and productivity (Temitope & Ayodeji, 2021).

SMEs or small and medium-sized businesses: By promoting innovation, employment, and growth, SMEs—which are characterized by their size, revenue, and workforce—play a vital role in the global economy (European Commission, 2023). The World Bank estimates that SMEs make up over 50% of jobs globally and around 90% of enterprises. However, a lack of infrastructure, digital skills, and resources makes it difficult for many SMEs to use ICT, which can make it harder for them to compete in the digital economy. The lack of ICT adoption in Nigeria has a particular effect on SMEs, limiting their capacity to expand into new markets and increase productivity (Temitope & Ayodeji, 2021).

Digital Economy: E-commerce, digital banking, and data-driven business models are examples of economic activities that depend on digital technologies and are indicative of the digital economy. Through digital platforms and applications, it allows companies to communicate with partners, suppliers, and customers worldwide. In order to be competitive, SMEs must embrace digital skills, tools, and practices, even while the digital economy presents them with new chances to innovate, save expenses, and reach a wider audience. Participation in the digital economy could give Nigerian SMEs access to international markets and increase their ability to withstand local economic setbacks (Temitope & Ayodeji, 2021).

1.8 THEORITICAL FRAME WORK

The framework combines Innovation Diffusion Theory and UTAUT to assess ICT readiness in Nigerian SMEs. Innovation Diffusion Theory investigates the diffusion of technical innovation, with a focus on adoption criteria such as relative advantage and compatibility. UTAUT offers deeper organizational insights through three essential dimensions: performance expectancy evaluates technical utility, effort expectancy investigates implementation complexity, and social impact evaluates external adoption pressures. Facilitating conditions examine supportive factors for digital technology adoption, taking into account infrastructural and institutional environments. Moderating variables including business age, owner experience, and technology adoption voluntariness provide a more nuanced view of technological integration processes. The methodology takes into account Nigeria's specific technology context, as well as

infrastructure and economic constraints. By combining these theoretical views, the framework provides a nuanced understanding of ICT readiness in rising digital economies.

1.9 METHODOLOGY

Research Design: Exploratory mixed-method approach combining quantitative and qualitative research strategies to comprehensively investigate ICT-readiness among Nigerian Small and Medium Enterprises. The methodology enables nuanced examination of digital technology adoption complexities within diverse economic contexts.

Data Collection Instruments: Primary data collection will utilize structured questionnaires, semi-structured interviews, and digital infrastructure assessment protocols. Secondary data will be gathered from government reports, technological adoption studies, and economic development documents.

1.10 SUMMARY OF THE OTHER CHAPTERS

Chapter two gives the literature review of ICT, digital economy and SMEs from a global, beginning with a worldwide perspective and focusing on Nigeria specifically with an existing research, Chapter three is system analysis and design; The practical aspects of creating ICT solutions for SMEs come into emphasis in this chapter. Chapter four is System implementation; This project focuses on only the translation of ideas of ICT and SMEs into the concept of reality. Chapter five is the Summary and conclusion; this chapter contains a brief works of the project, it marks the end as well and also contains references.

CHAPTER TWO

LITERATURE REVIEW

The swift advancement of digital technologies has transformed global economies, establishing a digital ecosystem where businesses leverage information and communication technology (ICT) to gain a competitive edge. Small and Medium Enterprises (SMEs) play a crucial role in driving economic growth in numerous developing countries, including Nigeria. Nonetheless, the adoption and integration of ICT within SMEs pose a significant challenge, especially considering Nigeria's distinct socio-economic and infrastructural context. This literature review examines the current research regarding SMEs' readiness for ICT, concentrating on the interaction of infrastructure, skills, access, and the role of ICT in facilitating participation in the digital economy. ICT readiness indicates the ability of organizations or individuals to successfully adopt, implement, and utilize ICT tools and systems for improved operational efficiency and strategic advantage. Researchers have proposed various frameworks for evaluating ICT readiness, emphasizing factors such as technological infrastructure, human capital, organizational culture, and financial resources. For instance, the World Economic Forum's Network Readiness Index acts as a worldwide benchmark for assessing technical preparedness among countries. Utilizing these frameworks in the context of SMEs highlights the importance of tailoring ICT readiness metrics to the specific challenges encountered by smaller enterprises, which often do not possess the same resources and expertise as larger companies.

Information and communication technology (ICT) is regarded as a core driver of economic growth the majority of world's population has access to some sort of ICT (Joseph & Nsikelelo 2020). 'ICT is defined as all those technologies that enable the handling of information and facilitate different forms of communication between human beings and electronic systems'. Different organizations rely on ICT to perform their daily duties to maximize the production of their products and services. Information and communication technology is considered as an important solution that improves the generation and processing of information, and it can further transmit and manage information efficiently, in this century, most businesses are influenced by ICT and using ICT as their operation tool. Information and communication technology gives rise to different strategies that

organizations can use to gain more revenue whilst spending fewer resources (Joseph & Nsikelelo 2020).

Small Enterprise encompasses a business with constrained operational scale, characterized by limited workforce typically below fifty employees and annual financial metrics falling within prescribed economic thresholds (SMEDAN,2020). These enterprises demonstrate modest economic footprints but significant potential for growth and innovation (Nwosu et al., 2021).

Medium Enterprise represents organizational structures with moderate operational complexity, employing between fifty and two hundred fifty workers (IFC, 2019). These entities possess more substantial economic capacities compared to small enterprises while maintaining flexibility and adaptability in market dynamics (Ejemeyovwi & Osabuohien, 2020).

Enterprise fundamentally refers to a legal economic entity strategically organized to produce goods or deliver services (Audretsch et al., 2018). Such structures operate with clear economic objectives, contributing to broader economic ecosystems through value creation and resource allocation (Okeke et al., 2021).

SMEs collectively embody autonomous business entities distinguished by interconnected characteristics: restricted workforce dimensions, relatively circumscribed market presence, independent ownership structures, and substantial economic contributions through innovation and employment generation (Nwankwo & Kanu, 2020). These organizations exemplify remarkable adaptability within complex economic environments (Chiazor et al., 2022). Small medium enterprises are business whose income are in certain limits, Small and Medium Enterprises (SMEs) as defined by the National Council Of Industries, refers to business enterprises whose amount of resources apart from land is not greater than two hundred million naira i.e. N200, 000,000.00 only (Basil 2005). Many words have been said and written about Small and Medium Enterprises (SMEs) all over the entire universe. It has also formed the top subject matter of discussion in so many seminars and business places both locally and internationally. In the same order, government bodies at various levels (local, state and Federal levels) have in one way or the other focused on the Small and Medium Enterprises (SMEs). While some governments had formulated policies aimed at facilitating and empowering the growth, development and Performance of the SMEs, others had focused on assisting the SMEs to grow through loans and other governmental rewards.

The digital economy represents a comprehensive ecosystem of economic activities fundamentally enabled by digital technologies, internet platforms, and advanced computational systems. It encompasses digital transactions, online marketplaces, data-driven economic interactions, and technology-mediated value creation (World Economic Forum, 2023). Digital platforms, artificial intelligence, blockchain technologies, and cloud computing transform traditional economic structures, enabling unprecedented global interconnectedness and economic innovation (McKinsey Global Institute, 2022). Africa's digital economy emerges as a dynamic technological landscape characterized by mobile technology leapfrogging, innovative financial technologies, and rapid digital transformation. The continent experiences unique digital economic development driven by mobile money platforms, technological entrepreneurship, and increasing internet penetration. Digital platforms create alternative economic pathways, addressing traditional infrastructural limitations through technological innovation (African Development Bank, 2023). Mobile technologies enable financial inclusion, digital service delivery, and economic opportunities previously unavailable in traditional economic frameworks (GSMA African Mobile Economy Report, 2022).

Nigeria's digital economy represents a complex technological ecosystem experiencing rapid transformation. Characterized by significant mobile technology adoption, emerging fintech innovations, and increasing digital infrastructure investments, the Nigerian digital landscape demonstrates potential for substantial economic redesign (Central Bank of Nigeria, 2023). Digital platforms like OPay, Flutterwave, and local e-commerce marketplaces create alternative economic interactions, challenging traditional economic structures (NCC, 2022).

The digital economy represents a transformative global phenomenon, fundamentally reshaping business landscapes across diverse economic contexts. Developed economies demonstrate advanced technological integration, with SMEs leveraging sophisticated digital infrastructures, cloud computing, artificial intelligence, and data analytics as core business strategies. Countries like Singapore, United States, and Germany exhibit exemplary digital ecosystem development, characterized by comprehensive technological support, robust policy frameworks, and significant investment in digital capabilities (World Economic Forum, 2022).

2.1 The importance of digitalization for SMEs

Digitalization entails the incorporation of digital technologies, data, and connections into business operations (OECD, 2021). It is a multifaceted and intricate process that frequently merges conventional and digital technologies to resolve specific challenges and improve business functions. Digital solutions are essential for the development and durability of small and medium-sized enterprises (SMEs). They have the potential to enhance and optimize operational efficiency, boost productivity, and foster innovation within firms. By utilizing digital tools and capabilities, SMEs can improve their operational effectiveness, innovate in delivering products and services, and widen their market presence. Specifically:

- i. Digital technologies empower SMEs to connect with a larger customer base and integrate more fluidly into global markets (OECD, 2021): By creating an online presence through websites and utilizing e-commerce platforms, SMEs can successfully promote and sell their offerings to an international audience. Moreover, by adopting customized digital solutions, SMEs can reduce costs typically associated with transportation and border activities. This strategic method allows SMEs to scale their operations effectively without needing extensive expansion.
- ii. Digital tools grant SMEs simpler access to a wider range of strategic resources, providing opportunities to enhance operations at relatively low costs through business intelligence and data analytics services: These tools enable smaller companies to finance and refine their operations using innovative methods like peer-to-peer lending, crowdfunding, and initial coin offerings. For example, startups and entrepreneurs in the EaP region can utilize international crowdfunding platforms such as Indiegogo.com and Kickstarter.com to raise funds through crowd sourcing (OECD, 2021). Additionally, digitalization can streamline hiring processes, giving SMEs access to a larger pool of job seekers and enhancing workforce capabilities. It also makes online access to training programs and government services easier (OECD, 2021).
- iii. Digital platforms allow SMEs to take advantage of network effects by outsourcing various business activities, such as advertising, e-commerce, and service delivery, to online platforms (OECD, 2019): This encourages better collaboration both within and between organizations, improving information sharing and communication among employees, suppliers, and networks.

- iv. Digital technologies enhance decision-making by enabling data-driven insights; These solutions provide SMEs with access to real-time information, allowing them to make better-informed and data-driven choices (Devops, 2021); SMEs can utilize predictive analytics tools, such as machine learning algorithms or predictive modeling software, to anticipate trends and analyze data, thus monitoring key performance indicators (KPIs), tracking consumer behavior, and pinpointing areas for enhancement (Gartner, 2023).

2.2 A Hierarchical view of global, regional and national trends;

Globally, SMEs have recognized ICT as a vital factor for growth, efficiency, and innovation. In developed markets, the adoption of ICT has revolutionized SME operations, equipping them with tools to boost productivity, optimize processes, and compete effectively in international markets. For instance, European SMEs have gained considerably from regional initiatives that promote digital transformation, such as the European Union's Digital Agenda, which seeks to improve digital literacy, advance e-commerce, and enhance access to broadband services (European Commission, 2021). Likewise, in the United States, initiatives like the Small Business Digital Alliance have fostered collaborations between technology providers and SMEs, assisting businesses in incorporating digital solutions to spur growth (SBA, 2022). The relationship between ICT and global economic growth demonstrates significant positive correlation. The World Economic Forum's Global Information Technology Report suggests that digitalization has become a fundamental catalyst for economic growth, with ICT infrastructure and services contributing substantially to global GDP. According to research by Farhadi et al. (2020) published in the Journal of Economic Studies, a 1% increase in ICT investment correlates with a 0.225% increase in GDP across developed economies. Furthermore, the United Nations Conference on Trade and Development (UNCTAD) Digital Economy Report highlights that the digital economy, primarily driven by ICT, accounts for between 4.5% and 15.5% of global GDP.

In Asia, nations like Singapore and South Korea demonstrate how government actions can accelerate ICT adoption among SMEs. Singapore's Smart Nation initiative offers grants and training programs to help SMEs implement technologies like cloud computing, artificial intelligence, and cybersecurity systems (IMDA, 2020). South Korea's ICT strategies have concentrated on establishing strong infrastructure and providing incentives for technology adoption, allowing SMEs to grow quickly and integrate into global supply chains (OECD,

2019). Additionally, Japan's Society 5.0 framework highlights the fusion of ICT and the Internet of Things (IoT) to empower SMEs in sectors such as smart manufacturing and logistics, thereby enhancing their competitiveness on a global scale (METI, 2021).

Dana (2021), in the article "The Education and Training of Entrepreneurs in Asia," explores the effectiveness of entrepreneurial education and training across various Asian contexts. The study emphasizes the difference between Schumpeterian entrepreneurs, who create innovation that leads to economic disruption, and Kirznerian entrepreneurs, who identify and capitalize on opportunities. This research underscores the necessity of tailoring entrepreneurial education to specific cultural and contextual circumstances, acknowledging the limitations of directly implementing successful programs from one area to another. Historically, informal avenues such as apprenticeships and ethnic networks have played an essential role in Asia, providing mentorship and connections to business networks. The investigation looks at formal education and training initiatives in India, Indonesia, Malaysia, the Philippines, and Singapore, showcasing distinct approaches and their outcomes. The text addresses the struggles faced by transitioning economies, including the need to adapt to market-driven institutions and overcome cultural obstacles. Teaching Schumpeterian entrepreneurship presents challenges, yet advancements are being made in educating Kirznerian entrepreneurs (SME owners). The paper stresses the importance of personalized programs that cater to specific cultural and contextual needs to foster effective entrepreneurial ecosystems across Asia.

In emerging markets, the impact of ICT on SMEs is similarly significant but often hindered by systemic challenges. For example, in India, the Digital India initiative has motivated SMEs to adopt ICT by enhancing digital infrastructure and providing subsidies for technology purchase (Mehta et al., 2020). Nonetheless, problems like inadequate digital literacy and regional disparities in internet availability pose considerable obstacles. In Brazil, the adoption of ICT by SMEs has enabled access to e-commerce platforms, allowing businesses to expand their market reach. However, high technology costs and limited credit access impede widespread ICT adoption (World Bank, 2020). In South Africa, the National Digital and Future Skills Strategy aims to improve the digital literacy of SME owners and employees, working to address skill gaps that hinder effective ICT integration (DTPS, 2019).

Middle Eastern countries, particularly the United Arab Emirates (UAE) and Saudi Arabia, have also made significant strides in promoting ICT adoption among SMEs. The UAE's

Vision 2021 and Saudi Arabia's Vision 2030 initiatives underscore the importance of digital transformation in fostering economic diversification. These strategies include investments in high-speed internet infrastructure, grants for SME digitization projects, and partnerships with global tech firms to provide tailored solutions for small businesses (Alshahrani et al., 2021). These efforts have positioned SMEs in these regions as critical players in their respective digital economies.

Despite these successes, global trends reveal disparities in ICT adoption between developed and developing economies. Factors such as affordable access to technology, digital literacy levels, and supportive regulatory environments significantly influence the extent of ICT-readiness among SMEs. While developed economies benefit from advanced infrastructure and policies that encourage digital transformation, SMEs in developing regions often struggle with fundamental challenges, such as unreliable power supply, lack of internet penetration, and inadequate training resources. These disparities underscore the importance of context-specific approaches to ICT-readiness.

The role of global organizations in bridging these gaps cannot be understated. Initiatives like the International Telecommunication Union's (ITU) Connect 2030 Agenda and the World Bank's Digital Economy for Africa (DE4A) program aim to enhance digital infrastructure and promote ICT adoption among SMEs in developing regions. Such programs provide a framework for understanding how international collaboration can address systemic challenges and foster greater inclusivity in the global digital economy (ITU, 2021; World Bank, 2020).

Africa presents a unique and diverse landscape for ICT adoption among SMEs, shaped by a combination of opportunities and challenges. The continent's digital transformation is gaining momentum, driven by increasing mobile penetration, investments in broadband infrastructure, and the rise of tech startups. However, the digital divide remains a significant barrier, with many SMEs struggling to adopt and utilize ICT effectively. McKinsey Global Institute (2016) emphasizes that Africa's growth prospects remain robust despite recent economic difficulties. The report predicts increased urbanization and a substantial rise in the workforce by 2034. Although there have been variations in economic performance across the continent with nations such as Ghana, Kenya, and Ethiopia witnessing rapid development, the general prognosis is optimistic. The report outlines a potential economic opportunity of \$5.6 trillion by 2025, which can be achieved through increased household consumption and

business spending. The report also emphasizes six key areas for development: mobilizing domestic resources, diversifying economies, accelerating infrastructure development, deepening regional integration, fostering future talent, and promoting healthy urbanization. Tackling these objectives can enable Africa to fully harness its potential as one of the most rapidly expanding areas on a global scale. The African continent presents a unique case study in ICT's economic impact. Research by the African Development Bank (AfDB) indicates that ICT adoption has become a crucial factor in the continent's economic transformation. A comprehensive study by Njoh (2018), published in *Telecommunications Policy*, demonstrates that ICT infrastructure development has contributed significantly to Africa's economic growth, with mobile technology playing a particularly pivotal role. The Economic Commission for Africa (ECA) estimates that a 10% increase in mobile phone penetration is associated with a 1.2% increase in GDP per capita.

South Africa, one of the continent's leading economies, has made strides in promoting ICT adoption among SMEs through initiatives like the National Development Plan and the Digital Economy Master Plan. These frameworks emphasize the role of ICT in fostering innovation, competitiveness, and job creation. South African SMEs benefit from access to government-supported incubators and accelerators, such as the Innovation Hub and the Small Enterprise Development Agency (SEDA), which provide resources and training for digital transformation (DTPS, 2019). Despite these efforts, challenges such as high data costs, inadequate digital literacy, and infrastructural disparities persist, particularly in rural areas.

In East Africa, countries like Kenya and Rwanda have emerged as leaders in ICT adoption among SMEs. Kenya's robust mobile money ecosystem, spearheaded by platforms like M-Pesa, has revolutionized how SMEs conduct business, enabling seamless financial transactions and improving access to credit. The Kenyan government's Ajira Digital Program has also played a crucial role in equipping youth with digital skills, fostering a pool of talent for SMEs to tap into (Ndiaye et al., 2020). Rwanda's Vision 2050 underscores the importance of digital transformation, with investments in broadband infrastructure and e-governance initiatives creating a conducive environment for SME growth. However, limited access to affordable technology and low levels of digital literacy remain significant obstacles.

In West Africa, Nigeria and Ghana exemplify the opportunities and challenges of ICT adoption among SMEs. Nigeria, Africa's largest economy, has a burgeoning tech ecosystem characterized by hubs such as Lagos' Yaba Valley. Initiatives like the National Digital

Economy Policy and Strategy (NDEPS) aim to bridge the digital divide by promoting broadband access, enhancing digital skills, and fostering innovation. However, systemic issues such as unreliable power supply, high costs of internet services, and limited access to finance hinder the full integration of ICT in Nigerian SMEs (Adebayo et al., 2021).

In Ghana, the government's digital transformation initiatives, such as the Paperless Port System and the Ghana Card, have enhanced business operation efficiency and transparency. However, challenges like inadequate infrastructure and a lack of awareness regarding the advantages of adopting ICT still exist (Boateng et al., 2021). Ghana's experience with ICT-driven economic growth offers insights into the transformation of a developing economy. Research by Asongu and Odhiambo (2019) in the *Journal of the Knowledge Economy* demonstrates that Ghana's ICT sector has evolved into a significant contributor to national GDP. The Ghana Statistical Service reports that the ICT sector's contribution to GDP has shown consistent growth, reaching approximately 3.6% in recent years. The mobile money ecosystem, in particular, has revolutionized financial inclusion and contributed to economic growth, with the Bank of Ghana reporting significant increases in digital financial transactions. (Quartey et al., 2017) discuss SMEs in Sub-Saharan Africa, particularly in the ECOWAS region, highlighting their essential role in economic growth and job creation. Although SMEs in Ghana and the wider ECOWAS area are vital, they face significant barriers in accessing financial resources crucial for their growth and job creation efforts. The challenges to financing SMEs in Ghana include a shortage of collateral, absence of credit history, and high transaction costs. These hurdles are compounded by a poorly developed financial system that limits the availability of formal loan options. Research shows that larger companies and those with international ownership tend to have better access to financial resources due to their ability to meet stringent lending requirements, such as providing adequate collateral and demonstrating credit reliability. Ghana's situation reflects wider regional trends, where the extent of credit information and the strength of legal rights significantly impact the availability of financial resources. SMEs in Ghana benefit from formalization as it improves their chances of securing financing. However, it's important to recognize that the informal sector continues to be prevalent. Credit programs supported by the government and donors have been established to mitigate these funding challenges, but issues related to efficiency and transparency have often hampered their effectiveness. The study indicates that addressing these financial challenges is crucial for promoting SME growth in Ghana, which is essential for job creation and economic development. Targeted policy initiatives, such as enhancing financial infrastructure and increasing the transparency

of lending programs, are needed to support the sustainable growth of SMEs in Ghana (Yaw, 2024). A research article titled "Entrepreneurship in Emerging Markets" by (Estrin et al., 2018) examines the intricate dynamics of entrepreneurship in developing economies, particularly the impact of institutional frameworks, social capital, and access to financing. The paper highlights that inadequate formal institutions in developing countries often force entrepreneurs to depend on informal networks, which can yield both benefits and limitations. Entrepreneurs face significant challenges in accessing funds due to the lack of adequate financial institutions, compelling them to rely on personal connections for financing. The study also addresses gender dynamics, noting that women are more likely to engage in entrepreneurship out of necessity. In these contexts, returnee entrepreneurs, who gain skills abroad and come back to start businesses, play a significant role. However, they struggle to adapt to the local context. Although the paper does not specifically focus on Ghana, its conclusions are relevant to other economies in Sub-Saharan Africa, including Ghana, where similar institutional challenges and reliance on informal networks are present.

Stevanovic and Ochieng (2023) provide important observations regarding the challenges and opportunities faced by businesses in the region. Their analysis indicated that external factors, such as institutional policies, regulatory frameworks, and infrastructure, significantly affect the development and success of start-ups in Sub-Saharan Africa. These external constraints often have a greater impact than internal factors in determining the trajectory of these businesses. Additionally, start-ups in this region experience high rates of closure, as many countries struggle with considerable challenges in sustaining business operations beyond the initial stages. This is particularly apparent in countries like Ethiopia, Rwanda, and Ghana. The survey pointed out that the adoption of digital technologies serves as a vital enabler for start-ups, allowing them to bypass traditional growth stages and tap into global markets. However, the persistent digital divide remains a challenge, characterized by varying levels of access and integration across the region. The authors suggest that start-ups in Sub-Saharan Africa must remain adaptable and inventive to successfully navigate the complex and dynamic business landscape. This requires an ability to effectively address both internal and external challenges.

The research indicated that while an entrepreneurial orientation is important, there is insufficient evidence to establish its direct effect on the success of small and medium-sized enterprises (SMEs). An overemphasis on management oversight without adequate support

can lead to poor performance outcomes. This means that although innovation and willingness to take risks are vital, they need to be balanced with other elements to maximize results. The study identified both Technology Orientation (TO) and Contemporary Marketing (CM) as having a positive impact on the performance of SMEs. These orientations are crucial for SMEs to remain competitive and achieve sustainable growth in an ever-evolving market environment. The research found that government support policies play a beneficial role in moderating the relationship between entrepreneurial orientation (EO) and TO regarding SME performance. This implies that government support is more effective when it aligns with technological and entrepreneurial strategies rather than depending solely on marketing approaches. The report suggests that authorities should prioritize targeted assistance to enhance the technological skills and entrepreneurial initiatives of SMEs. Training and capacity-building programs can empower SME owners to effectively employ these orientations.

Countries in North Africa, such as Egypt and Morocco, have also made noteworthy strides in promoting ICT adoption within SMEs. Egypt's Digital Egypt initiative aims to improve ICT infrastructure, advance e-commerce, and foster innovation through initiatives like ITIDA's Technology Innovation and Entrepreneurship Center (TIEC). Likewise, Morocco's Digital Morocco Plan concentrates on enhancing broadband accessibility and establishing a supportive regulatory framework for SMEs. Despite these advancements, challenges such as disparities in regional infrastructure and a lack of skilled ICT professionals continue to hinder SME growth in the digital economy (World Bank, 2020).

The African Union's Digital Transformation Strategy for Africa (2020-2030) outlines a continental framework to foster ICT adoption and digital inclusion for SMEs. This strategy highlights the importance of developing solid infrastructure, ensuring affordable technology access, and implementing capacity-building initiatives to provide SMEs with the necessary skills for the digital era. Collaborations, like the partnership between the African Development Bank (AFDB) and the International Telecommunication Union (ITU), have further strengthened efforts to improve ICT readiness across the continent (AFDB, 2021). Despite the advancements, African SMEs encounter specific challenges that require customized solutions. The high expense of internet services, limited financing options, and low levels of digital literacy remain significant obstacles to ICT adoption. To tackle these issues, a collaborative effort involving governments, private sector participants, and

international organizations is essential. By capitalizing on the continent's growing youth demographic and increasing technology investments, African SMEs can harness their capabilities to spur economic development and engage actively in the global digital economy.

In Nigeria, Small and Medium Enterprises (SMEs) play a crucial role in the economy, significantly impacting employment and Gross Domestic Product (GDP), Nigeria presents a compelling case of ICT-driven economic transformation in Africa's largest economy. According to research published in the *African Journal of Science, Technology, Innovation and Development* by (Adebayo and Omojola, 2021), Nigeria's ICT sector has demonstrated remarkable growth, contributing significantly to the country's GDP. The Nigerian Communications Commission (NCC) data indicates that telecommunications and information services have become one of the fastest-growing sectors of the Nigerian economy. Studies by the National Bureau of Statistics show that ICT's contribution to Nigeria's GDP has consistently exceeded 14% in recent years, representing a crucial non-oil sector growth driver. Despite their potential, SMEs in Nigeria encounter numerous challenges to becoming ICT-ready. Research indicates that insufficient technological infrastructure is a key barrier, with unreliable electricity supply, limited broadband access, and high costs associated with ICT tools obstructing effective technology adoption. Furthermore, the lack of digital skills among SME operators intensifies the issue, as many business owners and employees do not possess the necessary capabilities to effectively leverage digital tools.

Economic limitations further exacerbate these challenges. A lack of access to financing limits SMEs' capacity to invest in ICT infrastructure and training. Unlike their counterparts in more developed nations, Nigerian SMEs often function within an environment marked by high informality and inefficiencies in regulation, which discourages investment in ICT. Studies have also pointed out organizational hurdles, including resistance to change and insufficient strategic planning, as obstacles to the adoption of ICT.

The digital readiness of SMEs in Nigeria is characterized by a complex and difficult landscape that features substantial technological disparities and developmental challenges. Existing research reveals notable deficiencies in both ICT infrastructure and digital skills across Nigerian SMEs. Assessments of Technological Preparedness indicate significant gaps in digital infrastructure and tech adoption, with most SMEs showing only minimal integration of technology. Approximately 60% of Nigerian SMEs operate with basic technological

capabilities, primarily relying on essential communication tools such as mobile phones and basic internet access (Olaolu & Adepoju, 2021).

The Digital Skills Landscape indicates notable gaps in technological competencies within the workforce, with many SME owners and employees lacking comprehensive digital literacy which hampers effective technological implementation. Research suggests that fewer than 40% of personnel in SMEs possess the advanced digital skills necessary for complex technological engagement (Nwankwo et al., 2022).

Infrastructure Challenges pose significant obstacles to digital transformation. A lack of reliable electricity, limited broadband connectivity, and high internet costs create formidable barriers to adopting technology. These infrastructural limitations hinder SMEs from effectively implementing thorough digital strategies (Adeniran & Rufai, 2020). Financial Constraints also emerge as major obstacles to digital readiness, with limited financial resources inhibiting substantial investments in technological infrastructure, training, and digital platforms. Most SMEs struggle to set aside adequate funds for technological upgrades, resulting in a persistent vulnerability in digital capabilities (Ejemeyovwi & Osabuohien, 2021).

The Policy and Regulatory Environment presents inconsistent signals regarding support for digital transformation. While government initiatives seek to strengthen the digital ecosystem, the implementation of these initiatives remains disjointed and uneven. Regulatory frameworks have not sufficiently catered to the specific technological needs and challenges faced by SMEs (Okeke et al., 2022).

Awareness of technology among SME leadership is relatively low. Many entrepreneurs display a limited understanding of the strategic advantages of digital technologies, leading to cautious and reactive approaches rather than proactive digital strategies (Nwosu & Okonkwo, 2021).

A Comparative Analysis with global digital ecosystems highlights stark developmental contrasts. Nigerian SMEs are significantly behind their international peers in terms of digital maturity, technological infrastructure, and innovative digital practices (World Bank, 2022). Potential Transformation Pathways necessitate comprehensive, multi-faceted interventions that address aspects related to technology, skills, infrastructure, and strategic planning.

Achieving successful digital readiness requires integrated approaches that encompass technological education, infrastructure enhancement, financial assistance, and supportive policy frameworks (Adeola & Evans, 2023).

2.3 The Role of ICT in the Digital Economy

ICT serves as a crucial driver of the digital economy, enabling businesses to innovate, enhance processes, and connect with broader markets. The adoption of ICT can assist SMEs in closing the gap between their local activities and global opportunities, thereby boosting their competitiveness and sustainability. Digital platforms, including e-commerce marketplaces and cloud-based services, offer SMEs an affordable means to expand their operations and improve productivity. However, in Nigeria, the limited use of these tools highlights broader structural challenges, such as insufficient access to reliable digital infrastructure and pervasive skill deficiencies.

2.4 Research Gaps and the Need for a Comprehensive Framework

The existing body of research on ICT-readiness among SMEs in Nigeria highlights considerable deficiencies in understanding the intricate factors that affect adoption. Although studies have focused on specific obstacles, such as lack of infrastructure or skill gaps, there is a noticeable absence of comprehensive frameworks that consider how these factors interact within the Nigerian environment. Moreover, the ever-changing landscape of the digital economy calls for continuous investigation to pinpoint emerging difficulties and possibilities. Closing these gaps is essential for developing targeted strategies that improve the ICT-readiness of SMEs in Nigeria. A number of frameworks have been established to assist in the development and ICT-readiness of Small and Medium Enterprises (SMEs) in Nigeria, reflecting both government actions and academic research aimed at mitigating barriers to digital transformation. These frameworks are based on a thorough understanding of the challenges faced by SMEs, including limitations in infrastructure, financial constraints, skill deficits, and resistance within organizations. While many of these frameworks share similar objectives and components, each offers a unique perspective on promoting ICT adoption and fostering the overall growth of SMEs in Nigeria.

One of the most important frameworks implemented by the Nigerian government to aid SME growth is the National Policy on Micro, Small, and Medium Enterprises (MSMEs). This policy stresses the importance of creating a supportive environment for SME development by

enhancing access to finance, providing business development services, and promoting ICT adoption. It acknowledges that the adoption of ICT is vital for boosting the operational efficiency, productivity, and market access of SMEs. The policy lays the foundation for initiatives that advocate the use of technology in business practices, such as offering digital training and facilitating the adoption of e-commerce and digital marketing platforms. Despite its ambitious goals, the framework's effectiveness relies on overcoming the hurdles of insufficient infrastructure and low levels of digital literacy that many Nigerian SMEs encounter (National Policy on MSMEs, 2015).

In addition to national initiatives, various development programs have been launched by organizations like the Nigeria Information Technology Development Agency (NITDA). NITDA's efforts are primarily aimed at promoting ICT adoption among SMEs through initiatives that enhance digital literacy, improve access to technology, and advocate the use of ICT in business management. Notably, NITDA's ICT hubs, innovation centers, and cloud computing initiatives are structured to support the integration of technology into business operations. These programs seek to lessen the digital divide and equip SMEs with the essential tools and knowledge to effectively engage in the digital economy (NITDA, 2020). The agency's support is also evident in its provision of grants and capacity-building programs that are crucial for enabling SMEs to implement advanced technologies such as e-commerce platforms, digital marketing tools, and cloud-based enterprise resource planning (ERP) systems.

To further bolster ICT-readiness in Nigerian SMEs, academic frameworks have been developed to evaluate the specific challenges that impede technology adoption. Researchers have created an ICT-readiness framework tailored for Nigerian SMEs, which encompasses various elements such as infrastructure readiness, digital skills, financial access, and organizational support. This framework highlights the necessity for SMEs to evaluate their current digital maturity and to enact strategies that involve investments in technology, employee training, and process re-engineering. It also underscores the significance of fostering a digital culture within organizations, viewing ICT adoption not just as a technical necessity but as a fundamental aspect of business strategy. Such academic frameworks offer a practical guide for SMEs to address barriers and leverage the advantages of digital technologies.

Furthermore, Nigeria's National Digital Economy Policy and Strategy (2020-2030) closely aligns with these initiatives by providing a definitive course for the nation's digital transformation. The policy's objective is to establish Nigeria as a prominent digital economy within Africa, particularly emphasizing the incorporation of ICT across various sectors, including small and medium-sized enterprises (SMEs). This framework aids in the advancement of ICT infrastructure, digital competencies, and regulatory frameworks required to facilitate the extensive adoption of technology. Included within the policy are strategies to boost broadband accessibility, broaden access to affordable ICT resources, and improve digital literacy through specialized training initiatives (Federal Ministry of Communications and Digital Economy, 2020). By tackling these issues, the National Digital Economy Policy aims to foster a more supportive landscape for SMEs to prosper in the digital era, addressing many of the obstacles highlighted in prior frameworks.

Notwithstanding the plans detailed in these frameworks, the challenges confronting SMEs in Nigeria remain considerable. Research has indicated that financial hurdles, such as restricted access to funds and elevated loan interest rates, persistently hinder many SMEs from investing in ICT infrastructure and training programs (Igbokwe et al., 2021). In addition, the digital skills deficiency continues to be a significant obstacle, as numerous SME owners and workers lack the essential skills to effectively employ and integrate digital tools within their operations (Okafor & Ugwu, 2021). These constraints impede the effectiveness of current frameworks, highlighting the necessity for more focused interventions and ongoing assessment to ensure that SMEs can fully capitalize on the advantages of ICT.

The established frameworks aimed at enhancing ICT readiness among Nigerian SMEs are diverse and incorporate efforts from both governmental and academic sectors. While these frameworks lay a strong groundwork for the development of SMEs, the successful inclusion of ICT into business practices necessitates the resolution of ongoing challenges such as infrastructure shortfalls, digital education, and financial obstacles. Future approaches must prioritize overcoming these barriers to guarantee that SMEs can adeptly engage with the digital economy, thereby contributing to the broader economic progress in Nigeria.

The existing literature underscores the transformative potential of ICT for SMEs in Nigeria, highlighting its crucial role in fostering economic participation and growth in the digital landscape. However, substantial challenges to ICT preparedness arise from infrastructural, financial, and organizational factors. A comprehensive framework specifically tailored to the

Nigerian context is essential to surmount these challenges and enable SMEs to exploit the benefits of the digital economy fully. This research aspires to advance this objective by devising a robust framework that integrates the unique challenges and prospects faced by Nigerian SMEs in their quest for ICT in the digital economy.

2.5 RELATED WORKS

A multitude of research has explored the importance of ICT-readiness in the evolution of SMEs within the digital economy. The Nigerian government, through its National Information Technology Development Agency (NITDA), has been proactive in encouraging ICT adoption among SMEs. Projects such as the Smart Nigeria Digital Economy Project seek to improve digital literacy, enhance access to ICT infrastructure, and elevate the overall digital preparedness of businesses. However, despite these initiatives, studies indicate that many SMEs in Nigeria continue to encounter challenges related to infrastructure and skill development (NITDA, 2020). Thus, the global increase in ICT is expected to have a beneficial effect on all sectors, particularly business, as it acts as a vital catalyst for economic expansion in the country (Anis et al.).

Globally, similar programs have been introduced with significant achievements. For instance, the World Bank's Digital Economy for Africa (DE4A) initiative showcases ICT's transformative potential in fostering economic growth and innovation among SMEs. This approach underscores the need for greater investment in broadband infrastructure and the improvement of digital skills as critical prerequisites for ICT-readiness. Nevertheless, in Nigeria, such investments have not yet attained an adequate scale, particularly in rural regions where a majority of SMEs operate (World Bank, 2021).

Further academic research emphasizes the crucial role of organizational capabilities in enabling ICT adoption. A study by Adeola and Evans (2019) indicates that ICT-readiness is dependent not only on infrastructure but also on the willingness of SMEs to embrace digital tools. Key aspects, such as leadership commitment, employee training, and financial investment, considerably affect the levels of readiness. However, numerous Nigerian SMEs face systemic barriers, such as limited credit access, hindering their ability to invest in these essential areas.

Additionally, research from the Lagos Business School (2022) indicates that the lack of a cohesive framework tailored to Nigeria’s unique socio-economic landscape is a significant gap in the existing literature. While many global frameworks exist, they often fail to address localized challenges such as inconsistent power supply, insufficient broadband availability, and cybersecurity threats.

Together, these studies highlight the necessity for a comprehensive and context-specific framework to assess and improve the ICT-readiness of Nigerian SMEs. This research seeks to address this gap by developing a customized framework that incorporates infrastructural, organizational, and human capital elements to enhance SME participation in the digital economy.

Table 2.1; Summary Table of Related Works

Author(s)	Year	Key contributions / theory
NITDA	2020	Highlighted efforts to enhance SME ICT-readiness through the Smart Nigeria Digital Economy Project.
World bank	2021	Introduced the Digital Economy for Africa (DE4A) initiative, emphasizing broadband investment and digital skills.
Adeola and Evans	2019	Examined the role of organizational capabilities in ICT-readiness, including leadership and employee training.
Lagos business school	2022	Identified gaps in applying global ICT frameworks to Nigeria’s unique SME context, advocating for tailored solutions.
European commission	2021	Promoted digital literacy and ICT adoption in SMEs under the EU Digital Agenda framework.
Yaw	2024	Evaluation of the Economic Impact of Start-ups and Small and Medium Enterprises on Ghana's Development.
OECD	2019	Studied South Korea's ICT policies, focusing on SME scaling and integration into global value chains.
Anis et al.	2020	Factors Affecting SME Owners in Adopting ICT in

		Business using Thematic Analysis
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CHAPTER THREE

SYSTEM ANALYSIS AND DESIGN

System analysis is a critical stage in the software development life cycle that involves conducting a detailed examination of an existing system or the requirements for a new one. To produce effective solutions, a system's features, components, procedures, and interactions must be understood, documented, and specified. This chapter focuses on the analysis of the existing system used by small and medium enterprises (SMEs) in Nigeria regarding their ICT readiness for the digital economy. It examines the current state of ICT infrastructure, digital skills, access to technology, and financial constraints affecting SME operations.

Furthermore, this chapter highlights the limitations of the existing system, identifying key challenges based on these findings, a proposed system is introduced, outlining an ICT-readiness framework designed to address the identified gaps and improve SME participation in the digital economy.

3.1 RESEARCH METHODOLOGY

The research methodology for this project follows a quantitative approach, utilizing a structured questionnaire as the primary data collection instrument. The questionnaire is designed to assess the ICT-readiness of SMEs in Nigeria for the digital economy by gathering information on key factors such as digital infrastructure, ICT literacy and access to digital markets. A total of 100 SMEs will participate in the study by responding to the questionnaire, ensuring a broad representation of different business sectors and sizes. The questionnaire consists of carefully formulated questions that capture both factual data and perceptions regarding ICT readiness. It includes dichotomous questions i.e. simple yes or no questions to allow for structured analysis while accommodating varied responses. The data collected from the questionnaires will be analyzed using statistical methods to identify patterns, relationships, and readiness levels among SMEs to ensure reliability and validity, the questionnaire will undergo a pre-testing phase with a small group of SMEs before full deployment. This will help refine ambiguous questions and improve clarity. The collected data will be processed using statistical software to generate descriptive statistics, correlation analyses, and other

3.2 DATA COLLECTION

The data for this study was collected through a structured questionnaire designed to assess the ICT-readiness of SMEs in Nigeria for the digital economy. The questionnaire was developed to capture key aspects of ICT infrastructure, digital skills, access to digital markets, and security considerations among SMEs.

A total of 100 questionnaires were distributed to SMEs practitioners across various sectors. The questionnaire was structured into different sections, each addressing specific factors influencing ICT-readiness. The first section focused on infrastructure readiness, including access to reliable internet, availability of digital tools, and ICT investment levels. The second section assessed the digital literacy of SMEs owners and employees, examining their ability to use digital platforms effectively. The third section explored the extent of ICT adoption in business operations, including e-commerce participation, digital payment systems. All 100 questionnaires were successfully retrieved but 3 were incomplete, so 97 was used for the final analysis. The collected data was then analyzed to derive insights into the level of ICT-readiness and identify key challenges faced by SMEs in embracing digital transformation.

All the questions in the questionnaire are coded, they are in the numbers of sixteen. The full meaning of the coded questions are represented in the Table 3.1; the coded questions in the left hand side, while the meaning on the right hand side.

Table 3.1: code and their meaning

RIC	Does your business have access to a reliable internet connection?
CFB	Do you own or have a computer for business purposes?
MFBP	Do you use mobile devices (smartphones/tablets) for business operations?
DWICT	Does your business have a dedicated workspace with ICT facilities
SPSICT	Do you have a stable power supply to support your ICT equipment and business operations?
HOC	Do you know how to operate a computer?
FICTRB	Have you received any formal ICT training related to business?
CDT	Do you feel confident using digital tools such as MS office or accounting software ?
ICTFE	Does your business provide ICT training for employees?
FDS	Would you be interested in attending free digital skills training if available?
SMP	Do you use social media platforms (Facebook, WhatsApp, Instagram) for marketing your business?
CBTO	Do you conduct business transactions online (e.g., online payments, e-commerce platforms)?
CAICT	Have you ever faced challenges accessing ICT tools due to financial constraints?
AHSIBO	Do you have access to affordable high-speed internet for your business operations?
CADMP	Do you face any challenges in accessing digital marketing platforms for promoting your business?
COWC	Can you operate without cash?

Table 3.2: Data analysis

ITEMS	YES		NO	
	freq	%age	freq	%age
RIC	70	71	28	29
CFB	53	54	45	46
MFBP	88	90	10	10
DWICT	26	27	72	73
SPSICT	26	27	14	73
HOC	84	86	39	14
FICTRB	59	60	31	40
CDT	67	68	76	32
ICTFE	22	22	13	78
FDS	84	87	13	13
SMP	85	88	12	12
CBTO	85	87	13	13
CAICT	73	74	25	26
AHSIBO	51	52	47	48
CADMP	59	60	39	40
COWC	51	52	47	48

The Table 3.2 displays information on the frequency and proportion of Yes and No replies to each survey question. The largest percentage of Yes responses is 90%, indicating significant agreement or positive reactions; the lowest percentage of Yes responses is 22%, showing a strong negative or opposing opinion. The largest percentage of no responses is 78%, while the lowest is 10%. The frequencies are directly proportional to the percentages. For example, one question drew 90 Yes responses and 10 No responses, whilst another received 22 Yes responses and 78 No responses. This distribution indicates which questions received higher or lower levels of agreement.

Overall, the table provides information about how respondents answered each question, which aids in the identification of data trends. All the questions in the questionnaire are coded, they are in the numbers of sixteen. The full meaning of the coded questions are represented in

the table below; the coded questions in the left hand side, while the meaning on the right hand side.

3.3 ANALYSIS OF THE EXISTING SYSTEM

The present state of ICT adoption among SMEs in Nigeria indicates an increasing recognition of digital tools, infrastructure, and business applications. Numerous SMEs have incorporated fundamental ICT elements into their operations, such as utilizing mobile devices, internet access, and social media for business interaction. Nonetheless, the degree of ICT readiness differs among various enterprises due to factors like access, affordability, and digital literacy. The ICT infrastructure for SMEs depends on both public and private resources to facilitate business functions. Many organizations rely on mobile networks for internet connectivity, whereas broadband access is more prevalent in urban regions. The uptake of computers, printers, and other ICT resources differs, with some companies having specific ICT areas while others function in joint spaces. The availability of electricity is vital for sustaining ICT activities, with businesses utilizing both the national power grid and alternative energy sources like generators and inverters. Training and digital skills are critical for ICT readiness. A considerable number of SME owners and employees possess basic ICT knowledge, and many can effectively use computers and mobile devices for business tasks. Several initiatives, including programs supported by the government, private sector training, and online courses, offer avenues for enhancing digital skills. While some companies provide internal ICT training for their staff, others depend on outside resources to enhance digital proficiency. The access and utilization of ICT among SMEs encompass various facets of business activities. Social media platforms such as Facebook, WhatsApp, and Instagram are commonly employed for marketing and customer interaction. Some enterprises have embraced digital payment systems and online banking for transactions, while others continue to rely on traditional cash methods. The growth of e-commerce is evident, with businesses utilizing digital platforms to access broader markets and boost operational efficiency. The financial factors associated with ICT adoption impact SME involvement in digital transformation. Some enterprises encounter cost-related challenges when acquiring ICT tools and internet services, while others have found economical alternatives for incorporating technology into their operations. The proliferation of financial technology (fintech) solutions is broadening prospects for SMEs to engage in cashless transactions, enhance financial management, and improve business sustainability. In summary, the current framework displays a combination of traditional and digital strategies for business operations. While certain SMEs have

embraced ICT to foster growth and efficiency, others are still facing obstacles in completely integrating digital solutions into their business frameworks.

3.4 STRENGTH OF THE EXISTING SYSTEM

The existing system shows that 71% of SME practitioners have reliable internet connection, 54% have a computer for business and 90% have mobile devices for communication, 86% can operate computer, 60% received formal training for business. Over 84% of SMEs are interested in attending free digital skill training, use social media for their business and also conduct business transaction online, 52% of people can operate without cash and also have access to affordable high speed internet for business. This implies that over half of the Nigeria SMEs have high readiness to participate in the digital economy.

3.5 PROBLEMS OF EXISTING SYSTEM

The analysis of the survey responses reveals several critical challenges that hinder the ICT readiness of SMEs in Nigeria for the digital economy. These problems stem from inadequate infrastructure, digital skills, ICT access, and financial constraints, limiting the ability of SMEs to effectively participate in the digital economy.

ICT Infrastructure Challenges

1. **Unstable Power Supply:** Only 27% of respondents have access to electricity for at least 12 hours a day, meaning 73% of SMEs struggle with unreliable power, which disrupts business operations and reliance on ICT tools.
2. **Limited Access to ICT Facilities:** only 73% of businesses lack dedicated ICT workspaces equipped with necessary tools like computers and printers.
3. **Inadequate Internet Access:** Only 71% of respondents have access to the internet, while 29% remain disconnected, limiting digital communication and online business opportunities.

Digital Skills Deficiency

1. **Limited ICT Knowledge:** Only 86% of respondents know how to operate a computer, meaning 14% of SME owners and employees lack basic digital literacy.

2. Lack of Formal Training: 40% of SMEs have never received ICT-related training, making digital adoption difficult.
3. Low Confidence in Digital Tools: More than (32%) lack confidence in using essential business software like Microsoft Office or accounting tools.

ICT Access and Usage Issues

Financial Constraints: 74% of respondents face difficulties accessing ICT tools due to financial limitations, making it hard for them to invest in technology.

Limited Digital Marketing Adoption: Although 87% use social media for marketing, 13% struggle to access other digital marketing platforms, restricting their online reach.

Resistance to Digital Payments: 47% of respondents say their business cannot operate without physical cash, meaning a large portion of SMEs have not fully embraced cashless transactions.

3.6 FINDINGS

The current framework for ICT adoption among SMEs in Nigeria exhibits a blend of digital and conventional business practices. Numerous SMEs utilize mobile phones, social media, and fundamental ICT tools for promotion and communication. Nevertheless, the level of ICT preparedness differs based on factors such as infrastructure availability, digital proficiency, and financial resources. A considerable number of businesses have access to the internet, mainly through mobile networks, yet the uptake of broadband is still low. While some SMEs benefit from dedicated ICT facilities, others function in environments that are less equipped. Electricity supply plays a vital role, with companies relying on both grid electricity and alternative energy solutions. Opportunities for digital skills and training are available, with SMEs participating in educational programs offered by government, private sector initiatives, and online resources. Despite this, some business owners and employees continue to feel uncertain about using key digital tools. Access to ICT shapes business operations, as many SMEs participate in digital marketing but encounter challenges in adopting financial technologies. Although some enterprises engage in online transactions and cashless payment methods, others still rely on physical cash for their operations.

3.7 PROPOSED SYSTEM

The proposed system will be designed as a framework for ICT-readiness of SMEs in Nigeria. It incorporates key elements that align with the objectives of the study, and the framework will be implemented and a coded version will be developed. This approach will help bridge the ICT-readiness gap and empower Nigerian SMEs for the digital economy.

CHAPTER FOUR

SYSTEM IMPLEMENTATION

This chapter describes the development of the framework, including the key components, structure, and methodologies used in its formulation; it also discusses the validation process, which ensures that the proposed framework effectively supports SMEs in adopting and utilizing ICT for business growth; and finally, it examines how the framework can be practically applied to improve digital transformation efforts within the SME sector. The framework is intended to address major obstacles that SMEs face in fully integrating into the digital economy, such as limited access to digital markets, inadequate digital infrastructure,

and a lack of ICT skills. This framework begins by using the SWOT (strength, weakness, opportunities, threats) analysis to analyze the previous collected data.

Table 4.1 SWOT Matrix

Strengths	Weaknesses
SMEs exhibit a high level of ICT use in some areas.	Many SMEs lack essential ICT infrastructure.
Many people are interested in digital skills training.	Limited access to reliable power supply.
Widespread use of computers and mobile devices for work.	Few SMEs have designated workstations with ICT facilities.
Active utilization of social media for marketing.	Lack of ICT training for staff.
Significant engagement in online transactions.	Difficulties in accessing digital platforms and high-speed internet.
Opportunities	Threats
Potential to develop ICT skills further.	Unstable power supply affects digital operations.
Existing formal ICT training programs provide a foundation for growth.	Lack of financial resources limits ICT adoption.
Possibility for private and public sector investment in ICT.	Challenges in accessing digital marketing platforms.
Financial constraints create opportunities for funding initiatives	Dependence on cash transactions hinders digital economy participation.
Potential to develop ICT skills further.	Unstable power supply affects digital operations.

Strengths in ICT adoption among SMEs can help mitigate existing threats. The high percentage of SMEs using mobile devices for work and transacting business online provides a foundation for overcoming financial and market-access limitations. By leveraging their familiarity with digital tools and social media marketing, SMEs can reduce reliance on traditional cash transactions and adopt mobile banking and e-wallet solutions, enhancing their integration into the digital economy. The strong interest in digital skills training presents an opportunity to counteract cybersecurity risks and operational inefficiencies, as upskilled SME owners and employees will be better equipped to implement secure digital practices and improve productivity. Additionally, the high engagement in online transactions and social media marketing can help SMEs compete with larger corporations by expanding their customer reach and strengthening their market position.

Weaknesses in ICT infrastructure and skills can be addressed by capitalizing on available opportunities. The lack of reliable power supply and high-speed internet access, which hinders digital adoption, can be mitigated through government and private-sector initiatives aimed at improving connectivity and energy solutions. The moderate percentage of SMEs that have received formal ICT training indicates a foundation that can be expanded through more targeted and accessible training programs. The financial constraints preventing ICT adoption can be alleviated by leveraging opportunities such as public and private funding programs, grants, and installment-based ICT acquisitions, ensuring SMEs have access to the necessary technological resources. By strategically aligning these strengths and opportunities, SMEs can overcome key barriers and enhance their readiness for the digital economy.

4.1 Framework overview:

This framework is designed to help SMEs in Nigeria overcome ICT-related barriers by providing a structured approach to digital transformation. It integrates key layers such as **infrastructure, training, financial access, and market integration** to ensure SMEs can effectively participate in the digital economy.

4.2 Framework Components

A. Infrastructure Development Layer

- i. Partnership with Internet Service Providers (ISPs) to offer affordable, high-speed internet access for small and medium-sized enterprises (SMEs).
- ii. Implementation of alternative energy solutions, such as solar power and backup generators, to guarantee a consistent electricity supply.
- iii. Creation of co-working spaces and digital hubs to assist SMEs that do not have dedicated information and communication technology (ICT) facilities.
- iv. Last-mile connectivity solutions to address rural SMEs specifically

B. Digital literacy Layer

- i. Training initiatives that cover basic ICT literacy, including computer operation, internet navigation, and the use of digital tools for SME owners and their employees.
- ii. Intermediate training focused on business-related ICT areas, such as e-commerce, social media marketing, data analytics, and cybersecurity, to enable SMEs to effectively utilize technology for growth.
- iii. Collaboration between government and private sector organizations to design free or subsidized ICT training programs.
- iv. Mentorship programs pairing digitally-advanced businesses with newcomers

C. Access to Digital Markets Layer

- i. Assistance for SMEs in establishing online stores, listing products on digital marketplaces, and utilizing social media for marketing purposes.
- ii. Provision of cost-effective digital marketing solutions to increase the visibility of SMEs.
- iii. Support in facilitating the entry of SMEs into global e-commerce platforms to broaden their customer reach.
- iv. Establishment of low-interest loans and government grants specifically for ICT adoption to aid SMEs in acquiring ICT tools.
- v. Partnership with financial technology firms to enable SMEs to obtain digital tools through an installment payment approach.
- vi. Instruction on mobile banking, e-wallets, and cashless payment systems to aid SMEs in moving towards a cashless economic model.

D. Policy & Regulatory Support

- Tax incentives for digital investment
- Simplified regulatory processes
- Intellectual property protection

E. Innovation & Sustainability

- Incubators and accelerators
- R&D grants for locally-relevant solutions
- Circular economy initiatives

F. Monitoring & Evaluation

- KPI framework for digital transformation
- Annual digital readiness assessment
- Feedback mechanism for continuous improvement

Table 4.2: diagram representation of the ict readiness framework

Framework Components	Details
A. Infrastructure Development Layer	i. Partnership with ISPs for affordable, high-speed internet for SMEs. ii. Implementation of alternative energy solutions (solar power, backup generators) for reliable electricity. iii. Creation of co-working spaces and digital hubs for SMEs without ICT facilities. iv. Last-mile connectivity solutions to support rural SMEs.
B. Digital Literacy Layer	i. Basic ICT training (computer operation, internet navigation, use of digital tools). ii. Intermediate training on e-commerce, social media marketing, data analytics, and cybersecurity. iii. Collaboration between government and private sector for free or subsidized ICT training.

	iv. Mentorship programs pairing digitally advanced businesses with newcomers.
C. Access to Digital Markets Layer	i. Assistance in setting up online stores, listing products on digital marketplaces, and using social media for marketing. ii. Cost-effective digital marketing solutions to enhance SME visibility. iii. Support for SMEs to enter global e-commerce platforms and expand customer reach. iv. Low-interest loans and government grants for ICT adoption. v. Partnership with fintech companies for installment-based ICT purchases. vi. Training on mobile banking, e-wallets, and cashless payment systems.
D. Policy & Regulatory Support	i. Tax incentives for digital investment. ii. Simplified regulatory processes. ii. Intellectual property protection for SMEs.
E. Innovation & Sustainability	i. Establishment of incubators and accelerators to support SME growth. ii. R&D grants for locally relevant digital solutions. iv. Circular economy initiatives to promote sustainable business practices.
F. Monitoring & Evaluation	i. Key Performance Indicator (KPI) framework to measure digital transformation progress. ii. Annual digital readiness assessment for SMEs. iii. Feedback mechanism for continuous improvement.

Table 4.3: **Framework strategy implementation**

Stage	Implementation Approach	Key Actors
1. Infrastructure Setup	Provide affordable internet, alternative power solutions, and co-working spaces.	ISPs, Government, Private Sector
2. ICT Training and	Digital literacy and advanced ICT	Training Institutes,

Awareness	training for SME owners and employees.	NGOs, SMEs
3. Financial and Digital Support	Grants, ICT loans, and installment-based payment schemes for digital tools.	Banks, Government, Fintech Companies
4. Cybersecurity and Data Protection	Cybersecurity training, affordable security tools, and regulatory compliance.	Cybersecurity Experts, Government
5. Digital Market Integration	Helping SMEs establish online presence, digital marketing, and e-commerce platforms.	E-commerce Platforms, SMEs, Marketing Agencies

Expected Impact of the Framework

- i. **Increased ICT Adoption** – More SMEs will integrate digital tools into their business operations.
- ii. **Improved Business Productivity** – Digital training will enhance SME efficiency and competitiveness.
- iii. **Financial Inclusion & Cashless Economy** – SMEs will adopt digital payments, reducing reliance on cash.
- iv. **Stronger Cybersecurity & Trust** – SMEs will operate securely online, reducing cyber threats.
- v. **Better Market Access** – SMEs will expand their reach through e-commerce and digital marketing.

This framework provides a comprehensive, practical, and scalable approach to overcoming ICT-readiness challenges for SMEs in Nigeria. By implementing these strategies, SMEs can transition into the digital economy, enhance their competitiveness, and contribute to national economic growth.

The researcher's framework is converted into a c language program. This made the framework to be a functional system and after it is implemented on the code, a fixed framework for ict readiness of SMEs in Nigeria for the digital economy was generated.

Fig 5.1:Fixed ICT readiness framework:

```
C:\Users\USER\OneDrive\Documents\readiness.exe
ICT-Readiness Framework for SMEs in Nigeria
-----
[1] Infrastructure Development:
- Partnership with ISPs for affordable high-speed internet.
- Implementation of alternative energy solutions (solar power, backup generators).
- Creation of co-working spaces and digital hubs for SMEs.
- Deployment of last-mile connectivity solutions for rural SMEs.

[2] Digital Skills Training:
- Basic ICT literacy training (computer operation, internet use, digital tools).
- Intermediate training (e-commerce, social media marketing, data analytics, cybersecurity).
- Collaboration between government and private organizations for subsidized training.
- Mentorship programs pairing digitally-advanced businesses with newcomers.

[3] Access to Digital Markets:
- Support SMEs in setting up online stores and leveraging digital marketing.
- Provide cost-effective digital marketing solutions.
- Help SMEs integrate into global e-commerce platforms.
- Establish low-interest loans and government grants for ICT adoption.
- Partner with fintech firms for installment-based ICT tool acquisition.
- Educate SMEs on mobile banking, e-wallets, and cashless payment systems.

[4] Policy & Regulatory Support:
- Tax incentives for digital investment.
- Simplified regulatory processes for SMEs.
- Intellectual property protection to encourage innovation.

[5] Innovation & Sustainability:
- Development of incubators and accelerators for SMEs.
- R&D grants for locally relevant digital solutions.
- Encouragement of circular economy initiatives for sustainability.

[6] Monitoring & Evaluation:
- Establishment of KPI framework for digital transformation.
- Annual digital readiness assessment for SMEs.
- Continuous feedback mechanism for improvements.

ICT-Readiness Implementation Complete!
Process returned 0 (0x0)   execution time : 13.808 s
Press any key to continue.
```

4.3 Sustainability Focus

The enhanced framework now addresses long-term sustainability through:

- Policy and regulatory components that create an enabling environment
- Innovation support to ensure solutions remain relevant
- Monitoring mechanisms to track progress and identify gaps
- Circular economy initiatives to ensure environmentally sustainable digital adoption

This more comprehensive approach ensures that Nigerian SMEs not only overcome immediate ICT barriers but can sustain their digital transformation over time, adapt to changing market conditions, and continue to grow in the digital economy.

4.4 Framework strategy implementation

Stage	Implementation Approach	Key Actors
1. Infrastructure Setup	Provide affordable internet, alternative power solutions, and co-working spaces.	ISPs, Government, Private Sector
2. ICT Training and	Digital literacy and advanced ICT	Training Institutes, NGOs,

Awareness	training for SME owners and employees.	SMEs
3. Financial and Digital Support	Grants, ICT loans, and installment-based payment schemes for digital tools.	Banks, Government, Fintech Companies
4. Cybersecurity and Data Protection	Cybersecurity training, affordable security tools, and regulatory compliance.	Cybersecurity Experts, Government
5. Digital Market Integration	Helping SMEs establish online presence, digital marketing, and e-commerce platforms.	E-commerce Platforms, SMEs, Marketing Agencies

4.5 Expected Impact of the Framework

- vi. **Increased ICT Adoption** – More SMEs will integrate digital tools into their business operations.
- vii. **Improved Business Productivity** – Digital training will enhance SME efficiency and competitiveness.
- viii. **Financial Inclusion & Cashless Economy** – SMEs will adopt digital payments, reducing reliance on cash.
- ix. **Stronger Cybersecurity & Trust** – SMEs will operate securely online, reducing cyber threats.
- x. **Better Market Access** – SMEs will expand their reach through e-commerce and digital marketing.

This framework provides a comprehensive, practical, and scalable approach to overcoming ICT-readiness challenges for SMEs in Nigeria. By implementing these strategies, SMEs can transition into the digital economy, enhance their competitiveness, and contribute to national economic growth.

CHAPTER FIVE

SUMMARY AND CONCLUSION

This project explores the ICT-readiness of small and medium-sized enterprises (SMEs) in Nigeria for the digital economy, pinpointing major obstacles such as insufficient ICT skills, inadequate digital infrastructure, and restricted access to digital markets. To tackle these challenges, a structured framework was created with three main components:

- Infrastructure Development Layer – Ensuring access to affordable internet, reliable power sources, and digital work environments.
- Digital Skills Training Layer – Offering ICT literacy, ICT training related to business, and training programs subsidized by the government.
- Access to Digital Markets Layer – Assisting SMEs in establishing an online presence, developing digital marketing strategies, providing financial support for ICT adoption, and enabling cashless payment systems.

The suggested framework is designed to equip SMEs with technological tools and aid their integration into the digital economy, thereby enhancing operational efficiency and competitiveness.

Conclusion

The research emphasizes the vital importance of being ICT-ready for the development and sustainability of SMEs in Nigeria. The suggested framework offers a strategic method for closing the digital gap, ensuring that SMEs can take advantage of contemporary technology for advancement. By applying this model, SMEs can improve productivity, expand their market access, and boost financial inclusion, thereby making a significant contribution to Nigeria's digital economy. Future investigations can further enhance this framework through practical implementation and the integration of policies.

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APPENDIX

Source code

The framework is translated into a coded version, it is written in C programming language;

```
#include <stdio.h>
```

```
#include <stdlib.h>
```

```
#include <string.h>
```

```

// Function prototypes

void infrastructureDevelopment();

void digitalSkillsTraining();

void accessToDigitalMarkets();

void policyAndRegulatorySupport();

void innovationAndSustainability();

void monitoringAndEvaluation();


int main() {

    // Title of the framework

    printf("\nICT-Readiness Framework for SMEs in Nigeria\n");

    printf("-----\n");


    // Calling each function to display the framework components

    infrastructureDevelopment();

    digitalSkillsTraining();

    accessToDigitalMarkets();

    policyAndRegulatorySupport();

    innovationAndSustainability();

    monitoringAndEvaluation();

```

```

printf("\nICT-Readiness Implementation Complete!\n");

return 0;

}

// Infrastructure Development Layer

void infrastructureDevelopment() {

    printf("\n[1] Infrastructure Development:\n");

    printf("- Partnership with ISPs for affordable high-speed internet.\n");

    printf("- Implementation of alternative energy solutions (solar power, backup generators).\n");

    printf("- Creation of co-working spaces and digital hubs for SMEs.\n");

    printf("- Deployment of last-mile connectivity solutions for rural SMEs.\n");

}

// Digital Skills Training Layer

void digitalSkillsTraining() {

    printf("\n[2] Digital Skills Training:\n");

    printf("- Basic ICT literacy training (computer operation, internet use, digital tools).\n");

    printf("- Intermediate training (e-commerce, social media marketing, data analytics, cybersecurity).\n");

```

```
printf("- Collaboration between government and private organizations for subsidized training.\n");
```

```
printf("- Mentorship programs pairing digitally-advanced businesses with newcomers.\n");
```

```
}
```

```
// Access to Digital Markets Layer
```

```
void accessToDigitalMarkets() {
```

```
printf("\n[3] Access to Digital Markets:\n");
```

```
printf("- Support SMEs in setting up online stores and leveraging digital marketing.\n");
```

```
printf("- Provide cost-effective digital marketing solutions.\n");
```

```
printf("- Help SMEs integrate into global e-commerce platforms.\n");
```

```
printf("- Establish low-interest loans and government grants for ICT adoption.\n");
```

```
printf("- Partner with fintech firms for installment-based ICT tool acquisition.\n");
```

```
printf("- Educate SMEs on mobile banking, e-wallets, and cashless payment systems.\n");
```

```
}
```

```
// Policy & Regulatory Support Layer
```

```
void policyAndRegulatorySupport() {
```

```
printf("\n[4] Policy & Regulatory Support:\n");
```

```
printf("- Tax incentives for digital investment.\n");
```

```
printf("- Simplified regulatory processes for SMEs.\n");
```

```

    printf("- Intellectual property protection to encourage innovation.\n");

}

// Innovation & Sustainability Layer

void innovationAndSustainability() {

    printf("\n[5] Innovation & Sustainability:\n");

    printf("- Development of incubators and accelerators for SMEs.\n");

    printf("- R&D grants for locally relevant digital solutions.\n");

    printf("- Encouragement of circular economy initiatives for sustainability.\n");

}

// Monitoring & Evaluation Layer

void monitoringAndEvaluation() {

    printf("\n[6] Monitoring & Evaluation:\n");

    printf("- Establishment of KPI framework for digital transformation.\n");

    printf("- Annual digital readiness assessment for SMEs.\n");

    printf("- Continuous feedback mechanism for improvements.\n");

}

```

QUESTIONNAIRE FOR ICT READINESS OF SMEs In NIGERIA FOR THE DIGITAL ECONOMY

Choose yes or no in every question. If yes “✓” if No “x”

Section A: ICT Infrastructure Readiness

questions	YES	NO
Does your business have access to a reliable internet connection?		
Do you own or have a computer for business purposes?		
Do you use mobile devices (smartphones/tablets) for business operations?		
Does your business have a dedicated workspace with ICT facilities		
Do you have a stable power supply to support your ICT equipment and business operations?		

Section B: Digital literacy level for SMEs

questions	YES	NO
Do you know how to operate a computer?		
Have you received any formal ICT training related to business?		

Do you feel confident using digital tools such as Microsoft Office or accounting software?		
Does your business provide ICT training for employees?		
Would you be interested in attending free digital skills training if available?		

Section C: ICT access and usage

questions	YES	NO
Do you use social media platforms (Facebook, WhatsApp, Instagram) for marketing your business?		
Do you conduct business transactions online (e.g., online payments, e-commerce platforms)?		
Have you ever faced challenges accessing ICT tools due to financial constraints?		
Do you have access to affordable high-speed internet for your business operations?		
Do you face any challenges in accessing digital marketing platforms for promoting your business?		
Can you operate without cash?		

DIAGRAM OF ICT READINESS FRAMEWORK

