



TECHNOLOGY-DRIVEN BUSINESS DYNAMICS IN GOMBE STATE, NIGERIA: CHALLENGES, OPPORTUNITIES AND POLICY IMPLICATIONS

¹Fatima Dahiru*, ²Adama Bappahyaya, ³Aishatu Mohammed Lawan, & ⁴Usman Abubakar Sadiq

*Corresponding authors' email: mmjmu04@gsu.edu.ng

¹⁻⁴ Department of Business Administration, Faculty of Arts and Social Sciences,
Gombe State University – Nigeria

ABSTRACT

Technology has become a major driver of entrepreneurial development, business competitiveness, and economic transformation in emerging economies. This study examines the role of technology adoption, institutional support, and entrepreneurial adaptability in shaping business dynamics in Gombe State, Nigeria. Guided by the Dynamic Capabilities Theory, the study adopts a conceptual research design based on a systematic review of relevant literature, policy documents, government reports, and empirical studies on digital entrepreneurship and business development. The findings indicate that technology-driven entrepreneurship presents significant opportunities for innovation, market expansion, financial inclusion, agro-industrial development, and business resilience. However, these opportunities are constrained by infrastructural deficiencies, low digital capabilities, limited access to finance, and weak institutional coordination. The study demonstrates that the interaction between technological capabilities, entrepreneurial adaptability, and institutional support is critical for sustainable business growth and regional economic competitiveness. The paper recommends strategic investments in digital infrastructure, digital skills development, entrepreneurial financing, and institutional collaboration to accelerate technology-driven economic transformation. The study contributes to the growing literature on digital entrepreneurship by providing a subnational perspective on technology-enabled business development in northeastern Nigeria.

Keywords: Business Dynamics, Digital Transformation, Entrepreneurship, Innovation Ecosystem, Gombe State

JEL Classification Code:

1.0 Introduction

Gombe State's economy has long been rooted in trade, agriculture, and regional markets facilitated by natural waterways like the Gongola River and colonial railway systems (Oxford Business Group, 2024). Historically, these infrastructures enabled the movement of raw materials, agricultural products, and manufactured goods, attracting merchants from across Nigeria and neighbouring countries. Multinational trading companies, including early enterprises like London-Kano (later United Africa Company [UAC]), established warehouses, commodity boards, and markets, laying the groundwork for a diverse and dynamic business ecosystem. In the 21st century, business operations increasingly rely on digital infrastructure, e-commerce, and innovative technologies to compete nationally and internationally (Yusuf & Ibrahim, 2023). Entrepreneurs in Gombe face opportunities to leverage mobile banking, online platforms, and data-driven business strategies. However, significant challenges persist, including limited internet connectivity, inconsistent electricity supply, low ICT adoption among SMEs, fragmented institutional support, and socio-cultural resistance to innovation (OECD, 2022).

Understanding these dynamics is crucial for developing effective policies, fostering entrepreneurship, and promoting regional economic competitiveness. This paper aims to conceptually analyze the role of technology adoption, institutional support, and entrepreneurial adaptability in shaping business dynamics in Gombe. By highlighting historical foundations, contemporary trends, and emerging opportunities, the study provides insights for policymakers, educators, and entrepreneurs seeking to establish a resilient, technology-driven, and sustainable business ecosystem. Despite a growing body of literature on digital entrepreneurship in Nigeria, existing studies have predominantly focused on urban centres, while subnational contexts in the North-East geopolitical zone, including Gombe State, remain empirically underexplored. This gap is significant given that the region faces distinct infrastructure deficits, socio-cultural dynamics, and institutional constraints that may not be adequately captured by national-level analyses. This paper addresses this gap by providing a focused conceptual analysis of technology-driven business dynamics in Gombe State.

2.0 Literature Review

2.1 Historical Foundations of Business in Gombe

The historical development of business activity in Gombe State is closely linked to its strategic position within regional trade networks. Inland waterways such as the Gongola River and colonial railway systems facilitated agricultural trade, linking rural producers with urban and export markets (Oxford Business Group, 2024). The Gongola River enabled the movement of agricultural products, while the railway connected the region to Kano, Maiduguri, and even international trade routes. Markets such as *Kasuwa* and *Kantudu* emerged as central hubs for grain, livestock, and cotton trade. Historical records indicate that these trade systems not only promoted economic activity but also attracted diverse entrepreneurial actors, including Igbos, Yorubas, and Hausas, fostering a cosmopolitan business culture.

The presence of multinational trading firms, including United Africa Company (UAC), introduced structured commercial practices such as warehousing, commodity grading, and distribution systems. These developments fostered a cosmopolitan entrepreneurial environment, attracting traders from different ethnic backgrounds and promoting knowledge exchange. Although formal industrial activities declined in certain periods, these historical structures laid the foundation for contemporary entrepreneurial resilience.

2.2 Contemporary Business Dynamics

Contemporary business dynamics in Gombe reflect broader national trends toward SME-driven growth and digitalization. SMEs dominate economic activities in sectors such as retail, agro-processing, and logistics (Central Bank of Nigeria [CBN], 2022). Modern business dynamics in Gombe are increasingly shaped by digital transformation. SMEs are integrating mobile technologies, e-commerce platforms, and fintech solutions to expand market reach, optimize operations, and enhance competitiveness (Yusuf & Ibrahim, 2023). Industrial clusters, such as the Nasarawo rice and groundnut hub, Tike livestock cluster, and agro-processing centers in Kantudu, illustrate the potential for localized technology-driven growth. These clusters support economies of scale, efficient supply chains, and collaboration among entrepreneurs.

2.3 Digital Transformation and Entrepreneurship

Digital transformation has emerged as a key driver of business innovation, enabling firms to improve efficiency, access new markets, and create value-added services/ Digital transformation involves the adoption of technologies that improve efficiency, market access,

and business innovation. Mobile banking and e-commerce platforms enable entrepreneurs to reach both local and international markets. Studies indicate that SMEs leveraging technology outperform traditional businesses in terms of productivity, profitability, and resilience (OECD, 2022). In Gombe, digital solutions can enhance agro-processing, logistics, and retail operations, complementing historical trade expertise.

2.4 Institutional Support and Policy Environment

Institutional support is critical for business growth and technology adoption. In Gombe, agencies such as the Gombe Investment Promotion Agency and Ministry of Commerce provide policy guidance and incentives, while national programs like the Bank of Industry (BOI) and National Information Technology Development Agency (NITDA) support financing and ICT development. However, limited awareness, fragmented programs, and inconsistent implementation constrain the effectiveness of these initiatives (Oxford Business Group, 2024). Strengthening institutional support and coordination is essential to foster digital entrepreneurship.

2.5 Empirical Review

Several empirical studies have examined technology adoption and digital entrepreneurship in Nigeria, though with notable differences in findings and contexts. Adeniran and Johnston (2020) found that Small and Medium-scale Enterprises (SMEs) in Nigeria face critical barriers to Information and Communication Technology (ICT) adoption, particularly unreliable infrastructure and high costs. This finding aligns with Yusuf and Ibrahim (2023), who similarly identified digital exclusion as a key constraint for entrepreneurs in northern Nigeria. However, while Adeniran and Johnston (2020) emphasise supply-side infrastructure deficits as the primary bottleneck, Yusuf and Ibrahim (2023) argue that demand-side factors, such as low digital literacy and limited awareness of digital tools, are equally determinative, suggesting that interventions must be dual-pronged. At the international level, the Organisation for Economic Co-operation and Development (OECD) (2022) reports that SMEs in emerging economies that adopt digital technologies significantly outperform their non-digital counterparts in productivity and resilience, a conclusion broadly consistent with findings on mobile banking adoption in sub-Saharan Africa by Ozili (2021). These studies collectively support the transformative potential of digital adoption, yet they diverge on the pace and preconditions for successful uptake, with context-specific factors such as electricity reliability and institutional trust playing mediating roles. Notwithstanding these contributions, the existing literature remains heavily concentrated on urban and southern Nigerian contexts. There is a conspicuous absence of empirical research specifically focused on Gombe State or the broader North-East region, leaving a significant knowledge gap regarding the unique institutional, cultural, and infrastructural dynamics that shape technology-driven entrepreneurship in this area. This paper contributes to addressing this gap.

2.6 Dynamic Capabilities Theory

The study is anchored on the Dynamic Capabilities Theory developed by Teece (2007). The theory argues that organizations achieve sustainable competitive advantage through their ability to sense opportunities, seize them, and continuously transform resources and capabilities in response to changing environmental conditions. In the context of Gombe State, this theory is applied at the entrepreneurial and subnational level to examine how technology acts as both an enabler and a catalyst for business transformation.

3.0 Infrastructure and Industrial Clusters in Gombe

3.1 Historical Infrastructure and Trade Networks

The Gongola River and colonial railways facilitated early trade and industrial development. These infrastructures allowed the transportation of raw materials, agricultural products, and manufactured goods to regional and international markets, creating a foundation for sustained economic growth.

3.2 Modern Industrial Clusters

Modern industrial clusters, including the Nasarawo rice and groundnut cluster, Kantudu grain processing hub, and Tike livestock cluster, demonstrate the potential for technology-enabled entrepreneurship. Government initiatives, such as the Muhammadu Buhari Industrial Park in Dadinkowa, aim to consolidate industrial activities, provide infrastructure, and enhance productivity. Integrating these clusters with digital technologies can improve competitiveness, market reach, and innovation capacity.

4.0 Challenges and Opportunities

Technology-driven entrepreneurship in Gombe State continues to be shaped by a set of persistent structural, institutional, and socio-economic constraints that limit the depth and scale of digital business transformation. Internet penetration in the North-East geopolitical zone remains below 30% (National Bureau of Statistics [NBS], 2023), while less than 20% of Small and Medium-scale Enterprises (SMEs) have adopted formal digital tools (Central Bank of Nigeria [CBN], 2022). One of the most critical challenges is the unreliability of electricity supply, which substantially raises operating costs for enterprises and undermines the consistent use of digital technologies. For many SMEs, maintaining generators or alternative power sources diverts scarce financial resources away from innovation and business expansion. Empirical studies on Nigerian SMEs consistently identify unstable electricity as a major deterrent to technology adoption, productivity growth, and firm competitiveness, particularly in northern and semi-urban regions such as Gombe (Adeniran & Johnston, 2020; World Bank, 2023).

Closely linked to energy constraints is the issue of limited broadband coverage and poor-quality internet services. Insufficient digital infrastructure restricts entrepreneurs' ability to engage effectively in e-commerce, digital marketing, cloud-based business systems, and online financial services. According to NITDA (2021), uneven broadband penetration across Nigerian states continues to reinforce geographic inequalities in digital participation, disproportionately affecting businesses in emerging regional economies like Gombe. Beyond infrastructure, low levels of digital literacy among entrepreneurs further constrain effective technology integration. Many SMEs lack the skills needed to adopt digital record-keeping systems, use data for business decisions, or fully exploit online platforms for marketing and customer engagement, thereby reducing the potential productivity gains of digitalisation (Yusuf & Ibrahim, 2023).

Financial constraints also pose a significant barrier to technology-driven entrepreneurship. High interest rates, stringent collateral requirements, and limited access to formal credit reduce SMEs' capacity to invest in digital tools, equipment, and innovation processes (CBN, 2022). These challenges are compounded by socio-cultural factors, where strong attachment to traditional trading practices and face-to-face market transactions may generate scepticism toward digital business models, particularly among older or informal-sector entrepreneurs (Adewale & Oyekan, 2020). Together, these constraints create a slow and uneven adoption of technology-driven entrepreneurship in the state.

Despite these obstacles, Gombe State exhibits substantial opportunities for technology-enabled business growth. Digital technologies hold strong transformative potential for agro-processing, logistics, and value-chain coordination, sectors in which the state has a comparative advantage due to its agrarian economy (Aker & Ksoll, 2019; FMARD, 2022). Mobile payments, online marketplaces, and fintech solutions are expanding access to markets and improving financial inclusion for micro and small enterprises, enabling businesses to transact beyond local boundaries and manage cash flows more efficiently (Ozili, 2021). Additionally, renewable energy solutions particularly solar power offer viable alternatives for addressing energy deficits within industrial clusters and SME operations, reducing reliance on costly fossil fuel generators (World Bank, 2023). Importantly, Gombe's youthful population provides a strong demographic foundation for digital entrepreneurship, innovation, and technology-driven enterprise development, as young entrepreneurs are more likely to adopt new technologies and experiment with digital business models (NBS, 2023). Harnessing these opportunities through targeted policy support and capacity building can significantly accelerate the state's transition toward a resilient, technology-driven entrepreneurial ecosystem.

5.0 Implications for Policy, Education, and Practice

The findings of this study carry important implications for multiple stakeholders. For government agencies, priority should be given to expanding broadband connectivity across rural and peri-urban areas of Gombe State, providing reliable electricity through investment in renewable energy grids, and creating a streamlined regulatory environment for digital businesses. Government should also enhance the coordination and visibility of existing programmes such as the Bank of Industry (BOI) and National Information Technology Development Agency (NITDA) initiatives, ensuring that SMEs in the North-East region are adequately reached. For universities and educational institutions, there is an urgent need to revise business and entrepreneurship curricula to incorporate digital literacy, fintech awareness, data analytics, and innovation management as core competencies. Partnerships with industry and government can facilitate experiential learning and applied digital entrepreneurship training. Financial institutions should develop tailored digital lending products that reduce collateral requirements, lower interest rates for technology-related investments, and facilitate mobile credit access for informal-sector entrepreneurs in Gombe. Microfinance banks and development finance institutions should target female entrepreneurs and youth in particular, as these groups are disproportionately excluded from formal credit markets. For SMEs, the immediate priority should be the adoption of mobile payment platforms, digital record-keeping systems, and e-commerce tools to improve operational efficiency and expand market reach. Participation in industrial clusters can reduce transaction costs and facilitate technology sharing. Development partners and international organisations should support capacity-building programmes in digital literacy, entrepreneurship training, and renewable energy adoption, particularly targeting SMEs operating in the state's emerging industrial clusters. By addressing these structural and institutional gaps, Gombe State can leverage its historical entrepreneurial foundations and contemporary digital opportunities to build a more resilient, inclusive, and technology-driven economic ecosystem.

REFERENCE

- Adeniran, A. O., & Johnston, K. A. (2020). ICT and SMEs in Nigeria: Barriers and adoption. *Journal of Small Business and Enterprise Development*, 27(6), 1013–1030.
- Adewale, A., & Oyekan, O. (2020). Socio-cultural barriers to technology adoption in Nigerian informal markets. *African Journal of Business and Economic Research*, 15(2), 45–67.

- Aker, J. C., & Ksoll, C. (2019). Can mobile phones improve agricultural outcomes? *World Development*, 120, 52–64.
- Central Bank of Nigeria. (2022). SME finance and development report. CBN.
- Cooke, P. (2001). Regional innovation systems, clusters, and the knowledge economy. *Industrial and Corporate Change*, 10(4), 945–974.
- Federal Ministry of Agriculture and Rural Development. (2022). Agricultural transformation strategy report. FMARD.
- National Bureau of Statistics. (2023). Nigeria labour force statistics. NBS.
- National Information Technology Development Agency. (2021). National digital economy policy and strategy. NITDA.
- OECD. (2022). Digital transformation and SME productivity in emerging economies. OECD Publishing.
- Oxford Business Group. (2024). The Report: Nigeria 2024 - Gombe State chapter. <https://oxfordbusinessgroup.com/reports/nigeria/2024-report/gombe-state-chapter>
- Ozili, P. K. (2021). Financial inclusion research in Nigeria: A review. *Journal of African Business*, 22(1), 45–66.
- Teece, D. J. (2007). Explicating dynamic capabilities. *Strategic Management Journal*, 28(13), 1319–1350.
- World Bank. (2023). Nigeria digital economy diagnostic report. World Bank.
- Yusuf, A., & Ibrahim, M. (2023). Digital inclusion and SME competitiveness in Northern Nigeria. *African Journal of Entrepreneurship*, 9(2), 88–104.