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ARTIFICIAL INTELLIGENCE AND THE GROWTH OF WOMEN-SPECIFIC SERVICE-ORIENTED ENTERPRISES IN LAFIA LOCAL GOVERNMENT AREA, NASARAWA STATE, NIGERIA

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ABSTRACT: The rapid diffusion of artificial intelligence (AI) technologies across global economic landscapes has fundamentally altered how enterprises deliver and offer services. Service-oriented enterprises are widely recognised as engines of economic growth, and the specific role of AI in empowering women entrepreneurs in Lafia Local Government, Nasarawa State is under-explored. This study examines the relationship between artificial intelligence and the growth of women-specific service-oriented enterprises in Lafia Local Government, Nasarawa State, Nigeria. The study was guided by the Technology Acceptance Model (TAM) framework. The study was qualitative, incorporating focus group discussions (FGD) and a key informant interview guide (KII), which were adopted for the study with stakeholders such as AI developers, local government officials, and successful women entrepreneurs. The study employs purposive sampling to select participants from the six political units (Adogi, Ashinge, Chiroma, Makama, Shabu/Kwandere, and Lafia Central) within Lafia LGA. Two FGDs and four KIIs were conducted in each political unit. The article argues that while AI presents transformative growth opportunities for service enterprises in Lafia Local Government Area, Nasarawa State, in terms of increased revenue, improved efficiency, and faster decision-making, adoption of AI is hindered by factors such as socio-cultural constraints, limited digital literacy, and poor infrastructure. The study highlights the need for policy interventions and financial support programmes targeted at digital literacy training. By demonstrating the link between AI adoption and enterprise growth, this research contributes to the growing body of literature on women's entrepreneurship in developing economies and on the role of AI in promoting growth through MSMEs.

Keywords: Artificial Intelligence, Service-Oriented Enterprises, Business Growth, Lafia, Nasarawa State, Nigeria

INTRODUCTION

The emergence of artificial intelligence as a general-purpose technology whose applications permeate virtually every sector of economic activity represents one of the most consequential

technological transitions of the early twenty-first century. From machine learning algorithms that predict consumer behaviour to natural language processing tools that automate customer communication, from computer vision systems that enhance quality control to AI-powered analytics platforms that transform business decision making, the productive possibilities opened by AI are substantial and rapidly expanding. Yet the geography of AI adoption and its economic effects is deeply uneven. The overwhelming majority of AI research, investment, and deployment is concentrated in a small number of technologically advanced economies, while the Global South and Africa, in particular, remain largely on the margins of the AI revolution, both as producers of AI technologies and as beneficiaries of their growth enhancing effects (Ndung'u & Signé, 2020; Cilliers, 2024).

This unevenness is reproduced within African countries themselves; for instance, Nigeria, which is Africa's largest economy and most populous nation, has a growing technology sector concentrated in Lagos and, to a lesser extent, Abuja and Port Harcourt. But the digital economy has not yet reached deeply into the country's nonmetropolitan states, where the majority of Nigerians live and work and where service-oriented enterprises operate under infrastructural constraints, limited access to digital skills, and poor institutional support. Meanwhile, within the service sector, artificial intelligence (AI) has emerged as a transformative technology with applications spanning virtually every aspect of business operations. Unlike traditional digital tools that primarily facilitate communication and information management, AI systems can learn from data, identify patterns, make predictions, and support decision-making with minimal human intervention. As a result, service enterprises worldwide are increasingly integrating AI technologies into their daily operations to enhance efficiency, improve customer experiences, and strengthen competitiveness.

The adoption of AI across customer service, operations, marketing, and human resource functions underscores its potential to reshape service enterprises and drive business growth. AI-powered chatbots and virtual assistants enable businesses to provide round-the-clock support, respond to customer enquiries in real time, and reduce the costs associated with human-operated service centres. Recommendation engines, commonly used by e-commerce and digital service platforms, analyse customer preferences and behaviour to provide personalised product and service suggestions, thereby increasing customer satisfaction and sales. Similarly, sentiment analysis tools help businesses monitor customer opinions expressed through online reviews and social media platforms, enabling organisations to respond proactively to consumer concerns and market trends. Beyond customer engagement, AI has become an important tool for improving operational efficiency. Predictive analytics applications allow businesses to forecast demand patterns, identify potential risks, and optimise resource allocation. For instance, automated bookkeeping systems reduce the time required and errors associated with manual financial recordkeeping, while AI-enhanced fraud detection and credit-scoring systems assist financial service providers in identifying suspicious transactions and assessing creditworthiness more accurately. These capabilities not only reduce operational costs but also improve the quality and speed of business decision-making.

AI has also transformed marketing activities within the service sector; through programmatic advertising, these service-oriented enterprises can automate the placement of advertisements and target specific customer segments with greater precision. Firms can also track consumer engagement, monitor brand perception, and evaluate marketing effectiveness through social media

analytics tools. AI-assisted content creation tools help in business promotion and advertisements, thereby allowing enterprises to maintain a strong digital presence while reducing marketing costs. AI technologies are useful in human resource management and are increasingly being utilised to streamline recruitment and workforce management processes, including screening large volumes of applications, identifying suitable candidates based on predefined criteria, and reducing hiring biases. Performance monitoring systems provide managers with data-driven insights into employee productivity and workplace trends, thereby supporting more effective personnel management and organisational planning. Collectively, these applications demonstrate the growing importance of AI as a strategic resource capable of enhancing productivity, innovation, and competitiveness within the service sector (Daugherty & Wilson, 2018; Chui et al., 2018).

Lafia Local Government is one of the thirteen local areas in Nasarawa State; it also serves as the state capital of Nasarawa State. Administratively, Lafia LGA is divided into 13 electoral units (Adogi, Akurba, Assakio, Ashinge, Arikya, Chiroma, Gayam, Makama, Shabu/Kwandere, Wakama, Zanwa, Lafia Central, and Lafia North). It is a cosmopolitan centre occupied by diverse ethnic groups. Lafia Local Government remains the backbone of the local economy, cultivation of crops, rearing of livestock, commerce, educational institutions, and government establishments, making it the fastest growing urban centre in North Central Nigeria, a local government with a growing service economy and a youth cohort increasingly connected to digital platforms, yet still operating in the shadow of the digital infrastructure gaps that characterise non-metropolitan Nigeria. Service-oriented enterprises are the economic backbone of Lafia's local government's non-agricultural economy. From fintech-enabled mobile money agents and microenterprise retailers using social commerce platforms, to private health clinics deploying electronic patient records and private schools adopting digital learning tools to hospitality businesses using online booking and review platforms, the service sector in Lafia Local Government of Nasarawa State is alive with tentative but real experimentation with digital technologies, including AI-adjacent and AI-powered tools. Yet this experimentation has gone largely unstudied. The academic literature on AI and enterprise growth in Nigeria is heavily Lagos-centric, and this evidence is nearly absent in Lafia Local Government, Nasarawa State. This gap matters not only academically but practically; policy interventions designed to promote AI adoption in Nigeria's service sector cannot be effectively designed without understanding how AI is experienced on the ground in non-metropolitan contexts. This study seeks to help fill that gap. It examines the relationship between artificial intelligence and the growth of women-specific service-oriented enterprises in Lafia Local Government in Nasarawa State.

Statement of the Problem

Artificial intelligence globally has been recognised as a tool capable of enhancing business efficiency. AI-powered tools like chatbots for customer service, automated financial management systems, personalised marketing solutions, and AI-driven analytics for decision making are geared towards business efficiency and growth. Despite the ability of AI to transform women's service-oriented enterprises, the adoption of AI among women-specific service enterprises in Lafia Local Government is still relatively low; many of the women's enterprises continue to face challenges that range from low productivity, inefficient business management, poor markets, low capital, limited digital literacy, etc. In the evolving technological landscape, AI presents a significant opportunity

to transform the operations and reach of service enterprises. Potentially, however, the substantial job creation potential of service enterprises represents a critical paradox; data reveals that women are more likely to work in unstable, unorganised, and low-paying industries, and national unemployment rates show that they bear a disproportionate amount of the burden (World Bank, 2023).

Nigeria's government has made strong policy commitments to digital transformation through initiatives such as the National Digital Economy Policy and Strategy (2020–2030), the CBN's financial inclusion framework, and NITDA programmes; significant challenges remain in translating these aspirations into practical outcomes. This gap is particularly evident among small and medium service enterprises in Lafia Local Government Area of Nasarawa State, where the adoption and utilisation of digital technologies, including artificial intelligence, is yet to match the priorities outlined in national and state development agendas. Despite growing policy attention to artificial intelligence and digital transformation in Nigeria, empirical evidence on AI adoption among service enterprises in Lafia remains scarce. Existing studies are predominantly urban-focused and employ broad measures of digitalisation that fail to capture the realities of AI adoption and how it can support the growth of women-specific service enterprises in Lafia Local Government Area. This knowledge gap has necessitated this research to examine the role of AI in enhancing the growth of women-specific service enterprises in Lafia Local Government Area. The specific ways in which women-specific service enterprises in Lafia Local Area of Nasarawa State can effectively adopt and benefit from AI is an area that requires in-depth investigation. The foregoing underscores the dire need for this study to attempt to answer the following research questions:

1. What is the current level of AI adoption within women-specific, service-oriented enterprises in Lafia Local Government Area of Nasarawa State?
2. What is the impact of AI in promoting the growth of women-specific, service-orientated enterprises in Lafia Local Government Area of Nasarawa State?
3. Suggest various ways to promote the growth of AI adoption in women-specific service - oriented enterprises in Lafia Local Government Area of Nasarawa State.

THEMATIC REVIEW

Role of Artificial Intelligence in the Growth and Development of an Enterprise

Artificial intelligence (AI) refers to a broad range of computational technologies that enable machines to perform tasks typically associated with human intelligence, such as learning, pattern recognition, prediction, language processing, and content generation (Russell & Norvig, 2020). Rather than a single technology, AI comprises related capabilities, including machine learning, natural language processing, computer vision, robotic process automation, and generative AI, each serving different business functions. Within the service sector, AI is increasingly applied in customer service through chatbots and virtual assistants, in operations through predictive analytics and automated bookkeeping, in marketing through social media analytics and content creation, and in human resource management through recruitment screening and performance monitoring. These applications have enhanced efficiency, decision-making, and service delivery across various enterprises (Daugherty & Wilson, 2018). AI has changed the way many businesses operate, and

MSMEs are increasingly recognised as potential beneficiaries of its transformative capabilities. Existing literature highlights several key areas where AI can contribute to the growth and development of smaller enterprises (Borah et al., 2022; Roux et al., 2023). Automation, which is a core strength of AI, offers the potential for MSMEs to streamline certain repetitive tasks across various business functions, whether customer service through AI-powered chatbots, basic accounting like the role of Dext and Docyt in accounting automation (Poli, 2023; Khan, 2023), inventory management, or marketing automation with tools like Jasper AI and Copy.ai. This automation on various fronts can result in significant gains in efficiency and productivity, freeing up valuable time and resources for entrepreneurs to focus on strategic activities, innovation, and core service delivery.

Service enterprises can understand their operations, customer behaviour, and market trends like never before through AI-powered data analytics (Aldoseri et al., 2024). Through the analysis of online activity, sales data, and customer reviews, AI algorithms can assist MSMEs in making more informed decisions regarding product/service offerings, pricing strategies, and targeted marketing campaigns. This data-driven approach can lead to improved customer engagement and satisfaction, as women-specific service enterprises can personalise their interactions and tailor their services to meet individual needs more effectively.

Currently, AI is facilitating access to new markets and opportunities for service-oriented businesses. E-commerce platforms integrated with AI-powered recommendation systems and personalised marketing tools enable smaller businesses to reach a wider customer base beyond their immediate geographical limitations. Bigger companies like Amazon, SHEIN, and Netflix have shown how effective these systems can be (Jonic, 2025). AI-driven translation tools can also help overcome language barriers in international trade. According to a comprehensive review by Mohamed et al. (2024), increased comprehension of context, idioms, and subtleties has led to unprecedented levels of translation accuracy. For MSMEs, this presents enormous opportunities, particularly in terms of boosting international trade.

Moilanen & Laatikainen (2023), however, highlighted the difficulties that service-oriented enterprises usually face when implementing AI. These challenges often include the high cost of implementation, a lack of technical expertise and digital literacy among entrepreneurs, concerns about data privacy and security, and infrastructural limitations such as unreliable internet access and electricity supply. Schwaeke et al. (2024), citing Liu et al. (2023), also identified the gaps and challenges these enterprises face in adopting AI. These barriers are often more pronounced for smaller enterprises with limited resources and technical capacity.

Service-Based Enterprises

There are many different industries and sectors where women entrepreneurs are active. These include food and beverage, retail and wholesale, services and consulting, technology and innovation, creative and artistic endeavours, and social enterprises (Alemu et al., 2022). Both urban and rural areas are home to women-led businesses that support local development, job creation, and poverty alleviation. They connect their business activities to sustainable development objectives.

The service sector is a significant domain for women-specific enterprises. The table below provides a breakdown of service sector categories.

Category	Description
Professional Services	Consulting, coaching, accounting, legal services, marketing, event planning, or IT solutions.
Personal Services	Personal care, beauty services, wellness services, fitness training, childcare, or elderly care.
Accommodation and Travel	Bed and breakfasts, guesthouses, boutique hotels, tour operators, travel agencies, or cultural and heritage sites.
Food and Beverage	Food production includes organic farming, artisanal food products, baked goods, and processed foods.
Food Services	Restaurant management, cafes, food trucks, catering services, or food delivery businesses.
Creative and Artistic Ventures	Businesses here include visual arts, graphic design, interior design, fashion design, or jewellery/beads making.
Performing Arts	These enterprises are involved in music, dance, theatre, or other performing arts.
Literary and Publishing	These businesses focus on writing, publishing, or operating bookshops.

Source: Author compilation (2025)

Women's Entrepreneurship and the Role of Technology

Studies by Simba et al. (2022) and Ambepitya (2016) highlight the significant contributions of women-led enterprises to economic growth and social development in Nigeria. Their study was divided into three stages of Nigeria's history: pre-colonial, colonial, and post-colonial. They did, however, highlight the particular difficulties faced by female entrepreneurs, such as their limited access to networks, funding, and business development assistance, as well as the social and cultural barriers that often prevent them from engaging in economic activity.

Technology, including digital technologies and now AI, is increasingly recognised as a potential enabler for women entrepreneurs to overcome some of these barriers. Digital platforms can provide access to finance and wider markets, facilitate online sales and marketing, and improve communication with customers and suppliers. Mobile technologies have been particularly impactful in enhancing financial inclusion and access to information for women entrepreneurs in

developing countries like Nigeria. This is demonstrated by the growth of neobanks and fintechs such as Kuda Bank, OPay, and Moniepoint.

Nonetheless, there is still considerable concern about the gender digital divide. Women often have lower levels of digital literacy and access to technology compared to men, which can limit their ability to leverage the benefits of digital tools, including AI (United Nations Department of Economic and Social Affairs, 2020; Malik et al., 2024) Therefore, research on AI adoption by women-specific services enterprises needs to specifically consider these gendered dimensions and explore how AI can be implemented in a way that is accessible, affordable, and relevant to their specific needs and challenges.

However, the empirical literature on AI and enterprise growth in the service sector is growing rapidly, though it remains heavily concentrated in high-income advanced countries. Studies from the United States, the United Kingdom, and Western Europe consistently find positive associations between AI adoption and enterprise-level outcomes, including revenue growth, productivity, employment, and customer satisfaction, but with significant heterogeneity across firm size, sector, and level of AI maturity (Brynjolfsson et al., 2018; Furman & Seamans, 2019; Acemoglu & Restrepo, 2020).

In the African context, research from Kenya's fintech sector documents significant productivity and customer reach gains from AI-powered mobile financial services (Jack & Suri, 2014; Mbiti & Weil, 2016). Studies from South Africa's retail sector find positive associations between AI-enabled inventory management and downstream revenue effects (Makoni, 2020). In Nigeria, early evidence from the Lagos fintech ecosystem suggests that AI-enhanced credit scoring has expanded financial inclusion with positive effects on borrowing enterprises' investment and growth (Osakwe & Yusuf, 2021). Research specifically examining AI adoption among Nigerian SMEs outside Lagos is, however, largely absent. There is a need for research to be extended to other states and local governments (Ahl, 2006)

The literature also highlights a range of barriers to AI adoption in African service enterprises that go beyond the individual and firm level. At the infrastructural level, unreliable electricity supply, limited broadband connectivity, and high mobile data costs impose significant constraints (ITU, 2022). At the institutional level, limited awareness of available AI tools, absence of sector-specific digital adoption support programmes, weak data protection frameworks, and limited access to AI-relevant finance all constrain adoption. At the human capital level, shortages of AI-literate workers and the high cost of AI training relative to small enterprise revenues represent binding constraints that policy has yet to adequately address.

Theoretical Framework

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) will be adopted as the primary theoretical framework for this study. TAM was developed by Davis (1989) and modified by Venkatesh et al. (2003). TAM is a widely used and validated model that aims to explain and predict individuals' acceptance and

use of information technology. The core premise of TAM is that two key beliefs significantly influence an individual's intention to use a technology. The Perceived Usefulness (PU) and the Perceived Ease of Use (PEOU). The PU refers to the extent to which a person thinks that utilising a specific technology would improve their overall effectiveness or job performance. It is the degree to which a person believes that using a specific technology or system will enhance their performance and effectiveness in a given task as well as increase productivity. Perceived usefulness in the context of women-specific service-oriented enterprises would include the conviction that AI can boost their profitability, expand their customer base, improve service quality, or increase business efficiency. Perceived usefulness could be low or high depending on the degree to which the technology is believed to improve output accuracy.

The perceived ease of use (PEOU) has to do with the degree to which an individual believes that using a particular technology would be effort-free. This means that physically or mentally, a person should be able to use the technology without stress. For women entrepreneurs in Lafia Local Area of Nasarawa State, perceived ease of use would relate to their perception of how easy it is to learn, understand, and operate AI tools and applications relevant to their businesses, considering their existing digital literacy levels and access to technical support. According to TAM, both perceived usefulness and perceived ease of use directly influence an individual's attitude toward using the technology. In the service enterprise, using a mobile banking app with a clean interface and minimal steps to transfer money can ease business transactions; a more positive attitude, in turn, leads to a stronger behavioural intention to use the technology.

The study contributes to existing literature by extending TAM beyond its original focus on technology adoption to examine how artificial intelligence (AI) adoption impacts the growth of women-specific service enterprises in the Lafia Local Government Area of Nasarawa State, Nigeria. Perceived Ease of Use (PEOU), beyond facilitating AI adoption, can influence positive service enterprise growth outcomes such as customer satisfaction, operational efficiency, and market expansion. While TAM provides a strong foundation, this study will also consider the influence of external factors that are particularly relevant to the context of women's entrepreneurship in a developing economy like Nigeria and Nasarawa State in particular.

METHODOLOGY

The study employed primary and secondary data collection methods. The secondary data sources include reputable government reports, academic journals, industry analyses, and existing studies relevant to women-specific service enterprises and artificial intelligence. The study population includes owners and managers of service enterprises, digital technology consultants, local government officers, and officials of service business associations with relevant knowledge of the phenomenon under investigation. The study employs purposive sampling to select participants from the six political units (Adogi, Ashinge, Chiroma, Makama, Shabu/Kwandere, and Lafia Central) within Lafia LGA. The selection of this ward is due to a relatively high concentration of small businesses. At the same time, Lafia Central and Shabu/Kwandere represent commercial and semi-urban areas where business activities are most vibrant, helping the study gather relevant data on a wide range of experiences with artificial intelligence (AI) adoption among women entrepreneurs. The study utilises two primary qualitative methods: Focus Group Discussions (FGDs) and Key

Informant Interviews (KIIs). Two FGDs were conducted with women entrepreneurs across the selected units in Lafia LGA. Each FGD consisted of 6–8 participants, selected based on their experience with AI tools such as chatbots and automated financial management systems, to gain insights into the role of AI in women-specific service-oriented enterprises. Four KIIs were conducted in each of the six political units in Lafia LGA with AI developers, policymakers, and successful women entrepreneurs using AI. Each interview was semi-structured, allowing for flexibility while ensuring key topics were covered. The methodology is designed to capture the lived experiences of women entrepreneurs, their AI adoption patterns, and their impact on the growth of their enterprises in Nasarawa State. The FGD and KII were audio-recorded with verbal consent from the participant before recording was done and were transcribed verbatim using a thematic analysis procedure that combined deductive and inductive coding, following the six-phase approach of Braun and Clarke (2006). Deductive codes were derived from the framework of the study, the Technology Acceptance Model, while inductive codes emerged directly from the data and other issues raised by participants that fell outside the TAM categories. A codebook was developed to document each code, its definition, and a representative excerpt from the transcripts, ensuring consistency in how codes were applied across the dataset.

Codebook for Thematic Analysis

Code	Type	Definition	Excerpt (Source)
Perceived usefulness	Deductive (TAM)	Extent to which a participant believes AI tools have improved or would improve business outcomes (sales, visibility, efficiency, etc.).	Fashion designer describing how AI-assisted content creation helped her secure buyers before finishing her dresses (FGD, Kwandere).
Perceived ease of use	Deductive (TAM)	Extent to which a participant describes AI tools as accessible, simple, or manageable to operate within their business routine.	Guest house manager noting how technology makes it easy to understand and respond to customer requests (KII, Kwandere).
Adoption behaviour	Deductive (TAM)	Concrete description of an AI tool actually being used in day-to-day business operations, as opposed to awareness or intention alone.	Salon owner describing active use of AI-assisted social media tools to receive bookings from new customers (KII, Lafia Central).
AI-enabled visibility and market reach	Inductive	Reports of AI tools expanding a business's customer base or public profile beyond its immediate locality.	The hairdresser noted bookings from customers she had never met, following adoption of AI-assisted social media tools (KII, AShinge, and Lafia).

Operational efficiency gains	Inductive	Improvements in how a business manages orders, bookings, production planning, or customer service as a result of AI tools.	Baker describes how online tools convey customer preferences directly, improving production planning and reducing losses (FGD, Choroma).
Digital skills gap	Inductive	Lack of knowledge or technical ability to operate AI-powered applications, cited as a barrier to adoption.	A local government official noted that digital literacy remains a serious barrier to AI adoption and business growth (KII, Lafia Central).
Device and infrastructure access	Inductive	Absence of a suitable device (e.g., smartphone) or reliable internet connectivity needed to use AI tools.	A retail food seller explaining she does not own an Android phone and questioning how she could begin using AI tools (FGD, Adogi).
Financial constraints	Inductive	References to cost as a barrier to acquiring devices, data, or training needed for AI adoption.	Retail food seller's account of needing help to afford a phone and access training, linked to broader financial limitations (FGD, shabu LGA).
Awareness of training/support programmes	Inductive	Participant knowledge (or lack thereof) of existing digital skills or AI training programs available to them.	A local government official noted that most female entrepreneurs are unaware that free training programmes exist (KII Lfia Central LGA).
Peer/social influence on adoption	Inductive	References to observing or learning from other entrepreneurs' use of AI tools as a trigger for one's own adoption.	Salon owner's account of expanded bookings prompting continued and deepened use of AI-assisted tools among peers in her network (KII, Ashinge Lafia LGA).
Sector-specific tool use	Inductive	Descriptions of AI tools tailored to the specific needs of a sub-sector (fashion, hospitality, food, retail).	Baker's description of using AI-generated design suggestions specific to cake orders is distinct from booking-system use described by guesthouse operators (FGD, Chroma, Lafia LGA).

FINDINGS

AI Adoption and Growth of Women-Specific Service-Oriented Enterprises in Lafia LGA, Nasarawa State

The findings from the qualitative fieldwork reveal a growing awareness of AI tools among women entrepreneurs in Lafia LGA, Nasarawa State, particularly in personal service, accommodation,

financial management, and marketing. Interviews with women operating personal service enterprises (tailoring and beauty salons) revealed that AI-enabled digital tools have increased their business visibility.

During the focus group discussion, a participant maintained that

> I have greatly improved in my dressmaking; I make a lot of money now. AI-assisted content creation helps me with new designs. I have maintained a regular online presence recently, but before, I did not know how to market the dresses I make. Nowadays, before I finish making them, there are buyers already waiting. (fashion designer from Kwandere, Lafia, LGA)

A salon owner during the KII in Lafia maintained the following:

> Before now, only people in my neighbourhood knew my business. Since I started using AI-assisted social media tools, I have received bookings from customers I have never met before. Sometimes we even provide home services for our customers. (hairdresser from Ashinge, Lafia LGA)

Women managing guest houses and small hospitality establishments reported that AI-powered booking and customer management systems improved operational efficiency. They can easily respond to customer inquiries, make provisions for reservations, and manage them effectively.

A participant operating a guest house observed the following:

> In our hotel, we can attend to customer requests with ease. With technology, we can understand what they want and make it available in no time. Even their complaints are addressed almost immediately; our services are improved with the use of AI (guest house manager, Kwandere, Lafia LGA)

Also, women engaged in food processing, catering, and beverage production agreed that AI-supported digital marketing tools have helped them to maintain wider coverage in marketing their products. Participants maintained that using AI-generated advertisements and online ordering systems has increased their sales and reduced wastage.

A participant during the focus group discussion observed the following:

> Online tools tell us what our customers want through their orders. I don't have to meet with them as a baker; they tell me the type of cake, the colours, the kind of icing they want, etc. I post most of the designs I get from AI. Hmmm…. It makes this work a lot easier, I must say. We plan our production earlier and better, and losses have been reduced. (a female baker, Chiroma, Lafia LGA)

Although participants acknowledged the potential benefits of AI technologies, many women operating women-led service enterprises observed limited adoption of AI tools in their businesses.

This was attributed to a lack of digital skills and financial constraints, especially for those who are operating micro, women-led service enterprises. Lack of knowledge and skills to utilise the AI-powered application, as well as poor internet, has been a serious setback for their businesses.

A participant during the focus group discussions remarked that

> For me, I have heard of this AI stuff, but to start with, I don't have an Android phone. Even if I get the phone now, how do I start? Women in small businesses should be helped. The government and good people should help us; we need urgent training so we can use these AI tools. (A retail food seller, Makama, Lafia LGA)

A local government official during the KII corroborated that:

> There are several programmes to improve digital skills, but most female entrepreneurs are not aware that programmes exist, and most of the time the training is free. How can their businesses grow in this era of technological advancement for them? Digital literacy remains a serious barrier to AI adoption and business growth.

DISCUSSION OF FINDINGS

The results support the TAM, indicating that perceived usefulness and ease of use significantly influence AI adoption. Women entrepreneurs who found AI tools accessible and user-friendly were more likely to integrate them into their businesses, while those facing technical or financial barriers remained hesitant

The study also firmly concludes that the realisation of AI's full empowering potential for women entrepreneurs in Nasarawa State is contingent upon a deliberate and multifaceted effort to address the existing digital divide. This divide manifests in limited access to reliable internet connectivity, inadequate digital literacy skills, and a lack of awareness regarding the specific applications and benefits of AI technologies within their service-oriented businesses. In order to close this gap, a comprehensive strategy that includes infrastructure development, focused educational programmes, and the establishment of a supportive ecosystem that promotes AI knowledge and grants access to pertinent tools and resources is required. Many female entrepreneurs may not be able to access the potential advantages of AI unless there is a concerted effort to democratise access to AI knowledge and tools, which would further entrench socioeconomic gaps.

The active participation of different stakeholders is crucial, even beyond infrastructure. This encompasses collaborative efforts between government agencies like SMEDAN, non-governmental organisation development partners, and the private sector to design and implement targeted capacity-building programmes. These programmes should focus on providing practical AI training tailored to the specific needs of women entrepreneurs in service-oriented sectors, coupled with gender-sensitive mentorship initiatives that offer ongoing guidance and support as they navigate the integration of AI into their business models.

Looking ahead, this study underscores the need for further rigorous research, particularly detailed quantitative investigations, within the specific context of Nasarawa State. Such research should aim to provide a more granular understanding of the precise impacts of AI adoption on the growth of women entrepreneurs. This deeper understanding will be invaluable in informing the development of more targeted and effective AI-driven solutions and policy interventions.

Conclusion

This study examines how artificial intelligence adoption shapes the growth of women-specific service-oriented enterprises in Lafia Local Government Area of Nasarawa State. The qualitative evidence gathered through focus group discussions and key informant interviews shows that women entrepreneurs in personal services, hospitality, and food-related enterprises who have adopted AI-enabled tools, social media marketing, AI-assisted design, booking, customer management systems, and AI-generated advertisements all report tangible gains.

The study reveals that these gains remain unevenly distributed; women who are particularly operating micro-enterprises are held back by a combination of low digital literacy, lack of appropriate devices, poor awareness of existing training programmes, and unreliable digital infrastructure. The findings affirm that where the perceived usefulness and ease of use of AI tools are high, adoption follows and enterprise performance improves significantly, but where structural and human capital barriers persist, the promise of AI remains largely unrealised for women-specific service enterprises in Lafia Local Government of Nasarawa State.

The findings lend qualitative support to the Technology Acceptance Model but also suggest the need to extend it for contexts such as this one. The findings of this study also carry several practical implications for policymakers, development partners, and agencies such as SMEDAN, alongside NGOs and private-sector partners, raising awareness and considering gender sensitive intervention training and mentorship of women entrepreneurs.

The implementation of the study's qualitative methodology presented logistical and participant-level challenges. Specifically, some key informants and focus group participants initially exhibited reluctance to commit time to the data collection process for KII and FGD. Although participant engagement was ultimately achieved through strategic persuasion. This constraint extended the timeframe required for data collection.

Recommendations

1. Women entrepreneurs in Lafia Local Government, Nasarawa State, and beyond, operating service-oriented enterprises, are strongly encouraged to proactively explore and strategically integrate relevant AI applications into their business operations.
2. Significant improvement of essential infrastructure and widespread internet connectivity, especially in rural and underserved areas. These are foundational prerequisites for the successful adoption and sustained use of AI technologies by enterprises.
3. Stakeholders, including government agencies (e.g., SMEDAN), NGOs, development partners, and private sector actors, should collaboratively design and implement

comprehensive capacity-building initiatives focused on AI for women entrepreneurs in local government. These programmes should focus on practical AI training tailored to the specific needs of service-oriented enterprises.

4. The study recommends future large-scale quantitative research, ideally longitudinal, that can test the relationships of AI adoption and its effects on enterprise growth over a longer period across other local government areas and states.

Contribution to Knowledge

First, it extends the empirical literature on AI adoption and enterprise growth, which has been concentrated in high income countries and, in Nigeria, confined to Lagos's fintech ecosystem, to a sub-national, semi-urban context in Lafia local government of Nasarawa State, North-Central Nigeria, and to women-specific service enterprises rather than the technology or finance sectors that dominate existing African studies.

Second, it grounds the Technology Acceptance Model in the lived, gendered realities of micro and small service enterprises, showing empirically how perceived usefulness and ease of use interact with gender-specific constraints to produce differentiated adoption outcomes among women entrepreneurs who face the same technology landscape as their male counterparts.

Third, by documenting AI adoption simultaneously across different service sub-sectors (fashion and beauty, hospitality, food processing, catering, and retail), the study offers a comparative account of how AI's benefits and barriers manifest differently across women-specific service enterprises, rather than treating "AI adoption" as a single undifferentiated phenomenon.

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