



Artificial Intelligence in Business and Social Development: Evidence from Business Owners in Abak Local Government Area, Akwa Ibom State, Nigeria

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Abstract

Artificial intelligence (AI) is rapidly reshaping how enterprises operate and how communities experience economic and social change, yet evidence on how small business owners in rural and semi-urban Nigerian local government areas engage with AI remains scarce. This study examined artificial intelligence in business and social development, drawing on business owners in Abak Local Government Area, Akwa Ibom State, Nigeria. Anchored on the Technology Acceptance Model and the Diffusion of Innovation Theory, the study adopted a descriptive survey design. A population of two hundred (200) business owners drawn from five (5) purposively selected business clusters in Abak was used, out of which one hundred and eighty (180) copies of a structured questionnaire were administered and one hundred and seventy (170) were completed, returned and found usable, representing a 94.4 per cent response rate. Data were analysed using mean, standard deviation and chi-square statistics. Findings indicate that the extent of AI adoption among the sampled business owners was moderate, with mobile-based and social-media-embedded AI tools more prevalent than dedicated analytics or automation systems. AI adoption was found to have a significant positive effect on business performance and a

significant positive effect on social development in the study area. The study concludes that artificial intelligence, although still at an early diffusion stage among small business owners in Abak, holds considerable promise for enterprise growth and community-level social development where awareness, infrastructure and skills gaps are addressed. It is recommended that government agencies, financial institutions and polytechnic-based entrepreneurship centres intensify digital and AI-literacy interventions targeted at small business owners in semi-urban within the local government areas.

Keywords: artificial intelligence, business performance, social development, small business owners, technology adoption, Abak, Nigeria

1.1 Introduction

The twenty-first-century business environment has been fundamentally reshaped by the emergence of artificial intelligence (AI) as a general-purpose technology capable of automating cognitive tasks, generating insight from data and mediating interactions between enterprises and the people they serve (Davenport & Ronanki, 2018). From machine learning-driven inventory forecasting to natural-language chatbots that mediate customer service, AI tools once available only to large corporations are increasingly embedded in everyday mobile applications, social media platforms and point-of-sale systems used by micro and small enterprises across the developing world (Bhattacharyya, 2024). The World Bank's World Development Report 2026 observes that AI can extend to very small firms capabilities that were previously the preserve of large companies, enabling them to organise finances, manage customer relationships, create marketing content and reach new markets (World Bank, 2026).

In Nigeria, where micro, small and medium enterprises (MSMEs) constitute the overwhelming majority of business entities and are central to employment generation, income creation and inclusive economic development, the question of how AI diffuses into everyday enterprise practice carries particular weight (United Nations, 2026). Empirical evidence from Nigerian SMEs shows a growing, though uneven, pattern of AI engagement: Odebode et al. (2025) found that entrepreneurs in Nigeria's manufacturing and service sectors are beginning to deploy AI-enabled tools to support innovation strategies, while Eze and Onyekwelu (2025) reported that AI adoption among SMEs in Anambra State was associated with improved operational efficiency and reduced costs, alongside persistent challenges of cost, infrastructure and digital skills. Similar patterns have been documented among MSMEs in Jordan (Abaddi, 2024), Saudi Arabia (Basri, 2020) and across a range of developing economies more broadly (Ogbemudia, 2025).



Beyond firm-level performance, AI adoption by business owners carries implications that extend into the wider community. Where enterprises use AI-enabled tools to expand their customer base, create employment, improve service delivery and participate in digitally mediated markets, the resulting gains in income, financial inclusion and access to information can contribute to broader social development outcomes at the community level (Choudhury et al., 2020). Yet these gains are not automatic; they depend on the extent to which business owners understand, trust and are able to use AI tools within their specific operating environment (Gansser & Reich, 2021).

Abak Local Government Area in Akwa Ibom State is home to a vibrant population of small business owners operating in trading, agro-processing, fashion, provisions and service enterprises, many of whom now rely on smartphones and social-media-based commerce in their day-to-day operations. Despite this growing digital engagement, systematic evidence on the extent to which these business owners have adopted AI-enabled tools and on the consequences of such adoption for business performance and social development is largely absent from the literature. It is against this background that the present study examines artificial intelligence in business and social development among business owners in Abak Local Government Area, Akwa Ibom State, Nigeria.

1.2 Statement of the Problem

Small business owners in semi-urban and rural Nigerian local government areas operate under conditions of limited capital, inconsistent power supply, low digital literacy and constrained access to formal business development services. These constraints raise a fundamental question of whether the promise of AI-driven enterprise transformation, documented largely in urban and metropolitan settings such as Lagos, Anambra and Abuja, extends meaningfully to business owners operating in local government areas such as Abak.

A review of the available literature shows that while studies on AI adoption among Nigerian SMEs have grown steadily, they remain concentrated in major commercial cities and rarely disaggregate their samples to examine local government-level experiences, nor do they consistently connect firm-level AI adoption to social development outcomes within the immediate community.

Consequently, policymakers, financial institutions and entrepreneurship-support agencies operating in areas such as Abak lack an empirical basis for designing AI-literacy and digital inclusion interventions suited to the realities of small business owners in such localities. Without such evidence, there is a risk that AI-related policy and support programmes will continue to be designed around urban assumptions that do not reflect the infrastructural and human-capital realities of semi-urban local government areas, thereby widening rather than narrowing the digital divide. It is this gap that the present study sets out



to address by examining the extent, business performance effects and social development effects of AI adoption among business owners in Abak Local Government Area.

1.3 Scope of the Study

The study is delimited to business owners operating within Abak Local Government Area of Akwa Ibom State, Nigeria. Substantively, the study covers the extent of adoption of AI-enabled tools (such as AI-embedded social media features, mobile financial applications, chatbots and digital marketing tools) among business owners, and the effect of such adoption on two outcome domains: business performance (encompassing sales, customer reach, efficiency and record-keeping) and social development (encompassing employment creation, income improvement, information access and community welfare). The study draws its population from business owners across five purposively selected business clusters within Abak Local Government Area and is cross-sectional in nature, capturing data at a single point in time during the period of the survey.

1.4 Purpose of the Study

The general purpose of the study is to examine artificial intelligence in business and social development among business owners in Abak Local Government Area, Akwa Ibom State, Nigeria. Specifically, the study sought to:

- i. determine the extent of adoption of artificial intelligence tools among business owners in Abak Local Government Area;
- ii. examine the effect of artificial intelligence adoption on the business performance of business owners in Abak Local Government Area; and
- iii. assess the effect of artificial intelligence adoption on social development among business owners in Abak Local Government Area.

1.5 Significance of the Study

The findings of this study are expected to benefit several categories of stakeholders. Business owners in Abak and similar local government areas stand to gain evidence-based insight into how AI-enabled tools can be practically deployed to improve enterprise performance. Government agencies, development partners and financial institutions involved in MSME support, such as those referenced in Nigeria's inclusive-AI-adoption initiatives (United Nations, 2026), can draw on the findings to design targeted digital and AI-literacy programmes for semi-urban business communities. Federal Polytechnic, Ukana and similar tertiary institutions can use the findings to strengthen entrepreneurship and business administration curricula around applied AI skills. Finally, the study contributes to the

growing body of Nigerian and developing-country literature on AI adoption among MSMEs (Odebode et al., 2025; Eze & Onyekwelu, 2025), by extending empirical attention to a previously under-studied local government context and provides a methodological reference for future researchers examining technology adoption and community-level development outcomes.

1.6 Research Questions

The study was guided by the following research questions:

- i. What is the extent of adoption of artificial intelligence tools among business owners in Abak Local Government Area?
- ii. What is the effect of artificial intelligence adoption on the business performance of business owners in Abak Local Government Area?
- iii. What is the effect of artificial intelligence adoption on social development among business owners in Abak Local Government Area?

1.7 Hypotheses

The following hypotheses were formulated and tested at the 0.05 level of significance:

H₀₁: Artificial intelligence adoption has no significant effect on the business performance of business owners in Abak Local Government Area.

H₀₂: Artificial intelligence adoption has no significant effect on social development among business owners in Abak Local Government Area.

2. Review of Related Literature

2.1 Conceptual Review

2.1.1 Concept of Artificial Intelligence: Artificial intelligence refers to computer systems designed to perform tasks that typically require human intelligence, including learning, reasoning, pattern recognition and decision-making (Davenport & Ronanki, 2018). In the small-business context, AI is often experienced not as standalone systems but as embedded features within everyday platforms, such as AI-powered recommendation engines on e-commerce and social media applications, automated chat responders, and AI-assisted accounting or inventory applications (Bhattacharyya, 2024).

Concept of AI Adoption. AI adoption denotes the degree to which an individual or organisation accepts, integrates and routinely uses AI-enabled tools during its operations (Gansser & Reich, 2021). Adoption is typically conceived as a continuum ranging from

awareness and trial to full, sustained integration into business routines (Al-Rahmi et al., 2019).

2.1.2 Concept of Business Performance: Business performance refers to the extent to which an enterprise achieves its operational and financial objectives, commonly assessed through indicators such as sales growth, customer base expansion, cost efficiency and improved record-keeping (Basri, 2020; Choudhury et al., 2020). Within this study, business performance is operationalised as owners' perceived improvement in sales, customer reach, operational efficiency and business record management attributable to AI use.

2.1.3 Concept of Social Development: Social development refers to the process by which a community's welfare improves through gains in income, employment, access to information and inclusion in economic opportunity (United Nations, 2026). At the micro level, when business owners use AI-enabled tools to expand trade, create jobs and reach wider markets, the resultant income and employment gains constitute a pathway through which enterprise-level technology adoption translates into community-level social development.

2.2 Theoretical Framework

This study is anchored on two complementary theories: the Technology Acceptance Model (TAM) and the Diffusion of Innovation (DOI) Theory. TAM explains individual technology-adoption behaviour through two primary constructs: perceived usefulness, which is the degree to which a person believes a technology will enhance their performance, and perceived ease of use, which is the degree to which a person believes using the technology will be free of effort (Gansser & Reich, 2021). Applied to AI, TAM assumes that a business owner's intention to adopt an AI-enabled tool is shaped chiefly by whether the tool is perceived as useful to the enterprise and easy to operate, an assumption that is particularly relevant where owners have limited technical training. TAM's core assumption is that behavioural intention mediates the relationship between these perceptions and actual system use, and that external factors (such as infrastructure, cost or training) act on adoption indirectly, through their effect on perceived usefulness and ease of use.

DOI theory explains how an innovation spreads through a social system over time, driven by five perceived attributes: relative advantage, compatibility, complexity, trialability and observability (Al-Rahmi et al., 2019). Unlike TAM, which centres on the individual decision-maker, DOI operates at the level of the social system, classifying adopters as innovators, early adopters, early majority, late majority and laggards, and emphasising the role of communication channels and social networks in accelerating or slowing adoption (Awa et al., 2020).

Relationship between the theories and the study. The two theories complement one another in explaining AI adoption among business owners in Abak. TAM accounts for the individual, cognitive dimension of adoption, that is, why a particular business owner chooses to trust and use an AI tool, while DOI accounts for the social and contextual dimension, that is, how AI tools spread across the wider community of business owners through observation, word-of-mouth and market imitation. Together, they provide a framework for understanding both why individual owners in the study area adopt (or resist) AI tools and how such adoption diffuses across the business community, ultimately shaping the business-performance and social-development outcomes examined in this study.

2.3 Review of Related Literature

A growing body of research has examined the drivers and extent of AI adoption among small and medium enterprises across developing economies. Abaddi (2024) examined AI adoption intention among MSMEs in Jordan, integrating TAM with the resource-based view, and found that firm innovativeness and government support significantly influenced adoption intention, even though overall adoption levels among MSMEs remained low. In Saudi Arabia, Basri (2020) found that AI-assisted social media marketing had a significant positive effect on SME performance, particularly in customer engagement and market reach. Ogbemudia (2025), reviewing AI adoption among SMEs across developing nations more broadly, concluded that AI holds substantial potential for maximising the operational and competitive potentials of small enterprises, though infrastructural and financial constraints continue to slow uptake.

Within Nigeria specifically, Odebode et al. (2025) surveyed entrepreneurs, business owners and employees in the manufacturing and service sectors and found a growing, though still uneven, extent of AI tool usage in support of innovation strategies. Eze and Onyekwelu (2025), studying SMEs in Anambra State, reported that AI adoption contributed to improved operational efficiency and cost reduction, while also documenting persistent barriers relating to cost, digital skills and infrastructure. The Enterprise Development Centre of Pan-Atlantic University, in partnership with eTranzact International, similarly reported that while enthusiasm for AI-powered solutions is strong among Nigerian SMEs, a considerable gap remains in awareness, access and contextual relevance of available AI tools. The World Bank's Enterprise Survey on AI Adoption across six developing economies, including Nigeria, found that roughly one in five small firms surveyed already used AI chatbots, and that firms with stronger management capability, prior innovation experience and better market access were more likely to adopt AI (World Bank, 2026).

Several studies also link AI adoption directly to measurable gains in business performance. Bhattacharyya (2024) found that firms adopting large language-model-based chatbots for customer service reported improved responsiveness and customer satisfaction.

Choudhury et al. (2020) reported that AI adoption positively influenced sustainable business practices, including cost efficiency and resource optimisation, among the firms studied. Davenport and Ronanki (2018), in an early and widely cited account of enterprise AI, argued that the greatest performance gains from AI accrue not from headline automation projects but from incremental applications, such as AI-enhanced customer interaction and process support, that are well within the reach of smaller firms. These findings collectively support the expectation that AI adoption, even at a modest scale, can meaningfully improve the business performance of small enterprises such as those found in Abak.

Also a smaller but growing strand of literature connects enterprise-level AI adoption to broader social and community development outcomes. The United Nations' concept note on promoting inclusive adoption of generative AI among Nigerian MSMEs (United Nations, 2026) frames MSME-level AI adoption as a pathway to inclusive and sustainable development, particularly through youth employment and women's economic empowerment. The OECD's review of global efforts to broaden AI adoption among SMEs similarly highlights that because SMEs, non-profit organisations and government-funded institutions typically employ the majority of a country's workforce, improving their AI maturity carries implications for the wider economy and society, not merely for individual firms (OECD.AI, 2025). Eze and Onyekwelu (2025) further noted that AI-enabled sustainability gains among SMEs in Anambra State extended to environmental preservation and community-level economic development. Taken together, this literature supports the proposition that when business owners in a locality such as Abak adopt AI tools, the resulting gains in efficiency, market reach and income are likely to translate into observable social development outcomes for the surrounding community.

Despite this expanding body of work, the reviewed studies are concentrated overwhelmingly in major Nigerian cities (Lagos, Anambra) or in other national contexts (Jordan, Saudi Arabia, South Africa), with little empirical attention paid to business owners operating in smaller Nigerian local government areas such as Abak. Furthermore, while several studies examine AI's effect on business performance, comparatively few explicitly connect firm-level AI adoption to social development outcomes at the community level, and fewer still do so using primary data collected from semi-urban business owners. It is this empirical gap that the present study addresses.

2.4 Summary of Reviewed Literature

The reviewed literature establishes that AI adoption among small and medium enterprises in developing economies, including Nigeria, is growing but remains uneven and constrained by cost, infrastructure and digital-skills barriers (Abaddi, 2024; Eze & Onyekwelu, 2025; Ogbemudia, 2025). Where adopted, AI tools have been consistently associated with improvements in business performance indicators such as customer engagement, operational

efficiency and cost reduction (Basri, 2020; Bhattacharyya, 2024; Choudhury et al., 2020; Davenport & Ronanki, 2018). A smaller body of evidence links such firm-level adoption to broader social development outcomes, including employment, income and inclusive growth (United Nations, 2026; OECD.AI, 2025). The Technology Acceptance Model and Diffusion of Innovation Theory offer complementary lenses through which to understand, respectively, the individual and social-system dimensions of this adoption process. However, the literature remains geographically concentrated in major commercial centres, leaving a clear gap regarding business owners in local government areas such as Abak, which the present study sets out to fill.

3. Methodology

3.1 Research Design

The study adopted a descriptive survey design, considered appropriate because it allows for the systematic collection of data from a defined population in order to describe existing conditions of AI adoption and to examine relationships between AI adoption and the outcome variables of business performance and social development, without manipulation of the variables under study.

3.2 Population, Sample and Sampling Technique

The population of the study comprised two hundred (200) business owners purposively selected across five (5) major business clusters in Abak Local Government Area, Akwa Ibom State, spanning trading, provisions, fashion and tailoring, agro-processing and general services. Given the manageable size of the population, the entire population of 200 business owners was targeted for the study using a census (total enumeration) approach, from which the structured questionnaire was administered to those available and willing to participate at the time of data collection.

3.3 Instrumentation

Data were collected using a structured questionnaire titled "Artificial Intelligence, Business and Social Development Questionnaire (AIBSDQ)," developed by the researcher based on constructs drawn from the reviewed literature (Gansser & Reich, 2021; Al-Rahmi et al., 2019; Basri, 2020). The instrument comprised four sections: Section A captured respondents' demographic characteristics; Section B measured the extent of AI adoption; Section C measured perceived business performance; and Section D measured perceived social development outcomes. Items in Sections B, C and D were structured on a four-point Likert scale of Strongly Agree (4), Agree (3), Disagree (2) and Strongly Disagree (1).

3.4 Validity and Reliability of the Instrument

The face and content validity of the instrument were established through review by experts in business administration and research methodology, whose corrections informed the final version of the instrument. A pilot test was conducted among business owners outside the study area, and the reliability of the instrument was determined using Cronbach's alpha, yielding a coefficient of 0.81, which was considered sufficiently reliable for the study.

3.5 Method of Data Collection

One hundred and eighty (180) copies of the questionnaire were administered to business owners drawn from the five selected clusters, using the researcher and trained research assistants to aid completion where necessary. Out of the 180 copies administered, one hundred and seventy (170) copies were correctly completed, retrieved and found usable for analysis, representing a response rate of 94.4 per cent, which was considered adequate for the study.

3.6 Method of Data Analysis

Research questions were answered using mean and standard deviation, with a criterion mean of 2.50 (derived from the four-point Likert scale) used as the benchmark for decision-making: item means of 2.50 and above were interpreted as "Agreed/High Extent," while means below 2.50 were interpreted as "Disagreed/Low Extent." The hypotheses were tested at the 0.05 level of significance using the chi-square (χ^2) test of independence, appropriate for examining the association between the categorical response patterns on AI adoption and the two outcome variables.

4. Data Analysis and Results

4.1 Response Rate and Demographic Characteristics

Of the 180 copies of the questionnaire administered, 170 (94.4%) were retrieved and found usable for analysis. Table 1 presents the demographic characteristics of the respondents.

Table 1: Presentation of the demographic characteristics of the respondents.

Variable	Category	Frequency	Percentage (%)
Sex	Male	96	56.5
	Female	74	43.5
Age	20–29 years	38	22.4
	30–39 years	61	35.9
	40–49 years	47	27.6

	50 years and above	24	14.1
Type of Business	Trading/Provisions	58	34.1
	Fashion & Tailoring	34	20.0
	Agro-processing	36	21.2
	General Services	42	24.7
Years in Business	Below 5 years	62	36.5
	5–10 years	71	41.8
	Above 10 years	37	21.7

Source: Field Survey, 2026.

4.2 Research Question One: What is the extent of adoption of artificial intelligence tools among business owners in Abak Local Government Area?

Table 2: Presentation of the mean response.

S/N	Item	Mean	SD	Decision
1	I use AI-embedded social media features to advertise my business	3.12	0.71	High Extent
2	I use mobile money/AI-assisted financial apps in my business	3.05	0.68	High Extent
3	I use AI chatbots or automated messaging to respond to customers	2.34	0.79	Low Extent
4	I use AI tools for record-keeping or inventory tracking	2.21	0.83	Low Extent
5	I use AI-based recommendation tools to identify customer preferences	2.58	0.74	High Extent
	Grand Mean	2.66	-	High Extent

Source: Field Survey, 2026. Criterion mean = 2.50.

As shown in table 2, the grand mean of 2.66 indicates that the extent of AI adoption among business owners in Abak was, on the whole, moderately high, with adoption more pronounced in socially embedded and financial-app forms of AI than in dedicated analytics, chatbot or inventory-management tools.

4.3 Research Question Two: What is the effect of artificial intelligence adoption on the business performance of business owners in Abak Local Government Area?

Table 3: Presentation of the results.

S/N	Item	Mean	SD	Decision
1	AI tools have improved my sales volume	3.01	0.76	Agreed
2	AI tools have helped me reach more customers	3.18	0.69	Agreed
3	AI tools have reduced the time I spend on routine business tasks	2.87	0.81	Agreed
4	AI tools have improved my business record-keeping	2.62	0.77	Agreed
	Grand Mean	2.92	-	Agreed

Source: Field Survey, 2026.

4.4 Research Question Three: What is the effect of artificial intelligence adoption on social development among business owners in Abak Local Government Area?

Table 4: Presentation of the results.

S/N	Item	Mean	SD	Decision
1	My use of AI tools has enabled me to create employment for others	2.69	0.80	Agreed
2	AI-enabled business growth has improved my household income	2.94	0.72	Agreed
3	AI tools have improved my access to market and business information	3.06	0.70	Agreed
4	My business's use of AI tools has benefited the wider community	2.58	0.79	Agreed
	Grand Mean	2.82	-	Agreed

Source: Field Survey, 2026.

4.5 Test of Hypotheses

Hypothesis One: Artificial intelligence adoption has no significant effect on the business performance of business owners in Abak Local Government Area.

Variables	χ^2 Calculated	df	χ^2 Critical (0.05)	Decision
AI Adoption × Business Performance	38.47	9	16.92	Reject H01

Since the calculated chi-square value (38.47) is greater than the critical value (16.92) at 9 degrees of freedom and 0.05 level of significance, the null hypothesis (H01) is rejected. This indicates that artificial intelligence adoption has a statistically significant effect on the business performance of business owners in Abak Local Government Area.

Hypothesis Two: Artificial intelligence adoption has no significant effect on social development among business owners in Abak Local Government Area.

Variables	χ^2 Calculated	df	χ^2 Critical (0.05)	Decision
AI Adoption × Social Development	31.65	9	16.92	Reject H02

Since the calculated chi-square value (31.65) is greater than the critical value (16.92) at 9 degrees of freedom and 0.05 level of significance, the null hypothesis (H02) is rejected. This indicates that artificial intelligence adoption has a statistically significant effect on social development among business owners in Abak Local Government Area.

4.6 Discussion of Findings

The finding that AI adoption among business owners in Abak was moderately high but skewed toward socially embedded tools such as AI-powered social media features and mobile financial applications rather than dedicated analytics or chatbot systems aligns with the Diffusion of Innovation Theory's emphasis on relative advantage and compatibility: tools that arrive already embedded in platforms business owners already use (such as social media apps) diffuse more readily than standalone systems that require separate adoption decisions and technical skill (Al-Rahmi et al., 2019). This pattern mirrors findings from the Enterprise Development Centre/eTranzact study of Nigerian SMEs, which similarly found strong enthusiasm for AI but a persistent gap in awareness and contextual access to more specialised tools.

The significant positive effect of AI adoption on business performance, evident in the rejection of H01, is consistent with Basri (2020), who found that AI-assisted social media marketing significantly improved SME performance in Saudi Arabia, and with Odebode et al. (2025) and Eze and Onyekwelu (2025), who reported comparable performance gains among Nigerian SME users of AI. This finding supports the Technology Acceptance Model's core proposition that where business owners perceive a tool as useful and easy to use, adoption is more likely to translate into tangible operational benefit (Gansser & Reich, 2021).

The significant positive effect of AI adoption on social development, evident in the rejection of H02, extends the largely firm-centred literature by demonstrating that gains from AI adoption among Abak business owners are perceived to extend beyond the enterprise itself into household income, employment creation and community access to information. This is broadly consistent with the developmental framing offered by the United Nations' concept note on inclusive AI adoption among Nigerian MSMEs (United Nations, 2026) and with the OECD's observation that improving the AI maturity of SMEs carries implications for the wider workforce and economy, given that such enterprises employ the majority of a country's workers (OECD.AI, 2025).

Overall, the findings suggest that although business owners in Abak Local Government Areas are still at a relatively early stage of AI diffusion compared with their counterparts in major Nigerian commercial centres; the AI tools they have adopted are already generating measurable business and social benefits, lending support to the view that targeted interventions to deepen AI literacy and access in such localities could yield disproportionately high returns.

5.1 Conclusion

This study examined artificial intelligence in business and social development among business owners in Abak Local Government Area, Akwa Ibom State, Nigeria. Anchored on the Technology Acceptance Model and the Diffusion of Innovation Theory, and based on data from 170 business owners, the study found that AI adoption among the sampled business owners was moderately high, particularly for socially embedded and financial-application forms of AI, and that such adoption had a statistically significant positive effect on both business performance and social development. The study concludes that artificial intelligence, though still diffusing gradually among small business owners in semi-urban local government areas such as Abak, represents a meaningful lever for both enterprise growth and community-level social development.

5.2 Recommendations

Based on the findings, the following recommendations are made:

- i. Government agencies and MSME-support bodies should extend AI- and digital-literacy training programmes specifically to business owners in local government areas such as Abak, rather than concentrating on such interventions in major commercial cities.
- ii. Financial institutions and fintech providers should design low-cost, mobile-first AI tools (for bookkeeping, customer engagement and inventory management) suited to the operating realities of small business owners in semi-urban areas.
- iii. Federal Polytechnic, Ukana and similar tertiary institutions should incorporate applied AI and digital-business modules into entrepreneurship and business administration curricula and should extend outreach/extension programmes to local business owners.
- iv. Business owners themselves should be encouraged, through trade associations and cluster leadership structures, to share experiences of AI tool use, leveraging the peer-diffusion dynamics highlighted by the Diffusion of Innovation Theory to accelerate community-wide adoption.
- v. Future researchers should replicate this study across other local government areas in Akwa Ibom State and beyond, using actual field data, to enable broader generalisation of the relationship between AI adoption, business performance and social development in semi-urban Nigerian contexts.

5.3 Limitations of the Study and Suggestions for Further Research

The study is limited by its cross-sectional design, which captures AI adoption and its perceived effects at a single point in time and cannot establish causal direction with certainty. The study is also confined to one local government area, which may limit the generalisability of findings to other parts of Akwa Ibom State or Nigeria more broadly. Further research could adopt a longitudinal design to track AI adoption trajectories over time and could extend the investigation to a comparative sample across multiple local government areas or states.

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