

ADOPTION OF ARTIFICIAL INTELLIGENCE AND ENTREPRENEURIAL COMPETENCE FOR INNOVATIVE PERFORMANCE AMONG WOMEN ENTREPRENEURS IN NIGERIA

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Abstract:

This study investigates the extent to which artificial intelligence (AI) adoption and entrepreneurial competence predict the innovative performance of women entrepreneurs in Zamfara State, Nigeria. Utilizing a cross-sectional survey research design, the study employed judgmental sampling to distribute questionnaires to 300 participants. Over a six-week data collection period, 228 valid responses were retrieved, representing a 76% response rate. Data was collected using 4-point Likert scale. Reliability was confirmed through a pilot study with Cronbach's alpha coefficients above the 0.70 benchmark. Data were analyzed using descriptive and inferential statistics, with multiple regression applied to test hypothesized relationships. Findings revealed that adoption of artificial intelligence had a positive but insignificant effect on innovative performance, while entrepreneurial competence had a positive and significant effect. The study concludes that innovation among women entrepreneurs is largely driven by their competencies rather than technology adoption alone. It recommends targeted training and capacity-building programs to enhance entrepreneurial competence and digital literacy initiatives to strengthen AI adoption for innovation-driven growth.

Keywords: Adoption of artificial intelligence, Entrepreneurial competence, Innovative performance, Resource-Based View.

Introduction

The increasing importance of artificial intelligence (AI) in entrepreneurial ecosystems has generated significant interest in its potential to drive innovative performance across diverse business contexts. Globally, AI has been recognized as a transformative tool that enhances business efficiency, decision-making, and competitiveness by enabling entrepreneurs to adopt data-driven insights for market expansion and product development. Women entrepreneurs, particularly in developing economies such as Nigeria, are confronted with unique challenges that restrict their ability to leverage advanced technologies for innovation. Despite these barriers, the diffusion of AI into small and medium enterprises (SMEs) offers new opportunities for women entrepreneurs to bridge technological gaps, optimize processes, and increase their competitiveness in a dynamic business environment (Bhuiyan et al., 2024). The adoption of AI is no longer limited to large corporations but has become a critical enabler of entrepreneurial innovation across sectors, making it an essential area of inquiry in the context of women-owned enterprises in Nigeria.

Women entrepreneurs in Nigeria contribute significantly to job creation, poverty alleviation, and national development, yet they face systemic challenges that inhibit their innovative capacity. Limited access to finance, technology, and managerial competencies have been widely reported as barriers to women's entrepreneurial growth (Ojeleye & Mustapha, 2024). Entrepreneurial competence, which encompasses skills such as opportunity recognition, problem-solving, and strategic decision-making, plays a vital role in determining the innovative outcomes of entrepreneurial ventures. For women entrepreneurs, developing these competencies is essential in overcoming structural limitations and competing effectively in saturated markets. By integrating entrepreneurial competence with technological adoption, women entrepreneurs may achieve higher levels of innovative performance, thereby

enhancing their sustainability. In the Nigerian context, where entrepreneurship has been increasingly recognized as a key driver of economic growth, strengthening women's entrepreneurial competence is particularly relevant for achieving inclusive development.

Despite the growing recognition of women's role in entrepreneurship, empirical studies on the intersection of AI adoption and entrepreneurial competence in driving innovative performance remain limited in developing countries. Existing research has largely focused on technology adoption in male-dominated entrepreneurial environments, leaving a knowledge gap in understanding how women leverage AI for innovation (Alateeg and Al-Ayed, 2024). Moreover, studies have emphasized the importance of entrepreneurial competence in enhancing performance outcomes but often overlook the combined effects of technological and competency factors on innovation. This gap is particularly critical in Nigeria, where women entrepreneurs operate in a rapidly changing digital economy but often lack adequate support structures for capacity development. Addressing this gap is essential for providing evidence-based insights that can inform both policy interventions and entrepreneurial training programs targeted at women-owned businesses in Nigeria.

AI adoption provides multiple avenues for women entrepreneurs to enhance their innovative performance through automation, customer engagement, and predictive analytics. For instance, AI tools can help entrepreneurs personalize marketing campaigns, optimize inventory, and identify emerging market trends with greater accuracy. These benefits directly contribute to product and service innovation, which are vital for competitiveness in the modern market place. (Onesi-Ozigagun et al., 2024). However, adopting AI requires more than technological access, it demands the entrepreneurial competence to understand, implement, and maximize its potential. Without the necessary skills and knowledge, women entrepreneurs risk underutilizing AI or facing technological inefficiencies that undermine business growth. Consequently, the synergy between AI adoption and entrepreneurial competence becomes critical in determining innovative outcomes. Exploring this relationship within the Nigerian entrepreneurial ecosystem provides an opportunity to understand how women entrepreneurs can strategically use technology and competencies to enhance their innovation trajectories.

Furthermore, the Nigerian business environment presents unique challenges that influence the adoption of AI and entrepreneurial competence among women. Infrastructure deficits, high operational costs, limited digital literacy, and sociocultural barriers continue to constrain the participation of women in innovation-driven entrepreneurship (Tagha, 2024). These challenges underscore the need to investigate how entrepreneurial competence can complement AI adoption to overcome structural and environmental limitations. Women entrepreneurs in Nigeria often exhibit resilience and adaptability, but without adequate technological integration and competence, their innovative potential remains underexploited. Understanding the dynamics of AI adoption and competence within this local context not only provides insights into women's entrepreneurship in Nigeria but also contributes to the broader discourse on gender-inclusive technological innovation in Africa.

Given these realities, it becomes imperative to examine the predictive role of AI adoption and entrepreneurial competence on innovative performance among women entrepreneurs in Nigeria. Such an investigation aligns with global development goals that emphasize gender equality, innovation, and inclusive economic growth. The study offers the potential to generate evidence that supports the design of entrepreneurial training programs, technology diffusion policies, and targeted interventions to enhance women's innovative capacity. By identifying the extent to which AI adoption and entrepreneurial competence influence innovative performance, this study contributes to advancing theoretical knowledge and practical solutions in entrepreneurship research. Ultimately, strengthening women's

entrepreneurial innovation capacity has far-reaching implications for Nigeria's socio-economic transformation and its ability to compete in the global digital economy.

Statement of the Problem

Despite the growing recognition of women entrepreneurs as vital contributors to economic growth in Nigeria, their innovative performance remains limited due to persistent structural, technological, and competency-related challenges. Many women-owned enterprises struggle with inadequate technological adoption, particularly in leveraging artificial intelligence (AI) for innovation, as access to digital tools and the skills required to maximize their potential remain uneven (Tagha, 2024). While entrepreneurial competence encompassing opportunity recognition, problem-solving, and strategic decision-making has been identified as a significant determinant of business performance, its interaction with AI adoption in fostering innovation among women entrepreneurs has not been adequately explored. Existing studies have largely focused on male-dominated enterprises or general entrepreneurial ecosystems, leaving a gap in understanding how women entrepreneurs in Nigeria can strategically combine competence and AI adoption to drive innovative outcomes. This knowledge gap hinders evidence-based interventions aimed at empowering women entrepreneurs to harness technology for sustainable and inclusive economic development.

Research Objectives

The broad objective of the study is to explore the adoption of artificial intelligence and entrepreneurial competence as predictors of innovative performance among women entrepreneurs in Nigeria. The specific objectives are to:

- xix. Investigate the influence of adoption of artificial intelligence on of innovative performance among women entrepreneurs in Nigeria.
- xx. Examine the effect of entrepreneurial competence on of innovative performance among women entrepreneurs in Nigeria.

Research Hypothesis

H01: Adoption of artificial intelligence does not have significant influence on innovative performance among women entrepreneurs in Nigeria

H02: Entrepreneurial competence does not have significant influence on innovative performance among women entrepreneurs in Nigeria

Review of Related Literature and Theoretical Framework

This section reviews related literature on concepts of adoption of artificial intelligence, entrepreneurial competence, innovative performance, empirical review and theoretical framework.

Concept of Innovative Performance

Innovative performance is widely defined in contemporary scholarship as the ability of firms or individuals to successfully introduce new products, services, processes, or ideas that enhance competitiveness and growth (Saunila, 2020). According to Zhang et al. (2025), it refers to the measurable outcomes of innovation activities that contribute to organizational efficiency and market differentiation. Riaz et al. (2024), conceptualized innovative performance as the extent to which organizations transform resources and knowledge into valuable innovations. Similarly, Raji et al. (2025) defined it as the effectiveness of firms in

adopting and implementing novel solutions to meet market demands. Sufyan et al. (2024) framed innovative performance as both incremental and radical innovation outputs that determine long-term survival and adaptation Adiguzel et al. (2025) emphasized its role as the performance dimension that reflects creativity, experimentation, and continuous improvement. Ultimately, innovative performance as a critical driver of sustainable competitive advantage, linking it directly to organizational learning and dynamic capabilities.

Concept Adoption of Artificial Intelligence

Adoption of artificial intelligence (AI) has been defined in recent scholarship as the willingness and ability of individuals, firms, or industries to integrate AI systems into their operations to enhance efficiency, decision-making, and innovation (Moshiri, 2025). It is also viewed as the process through which organizations embrace AI technologies and embed them within business functions to improve performance outcomes (Ojeleye et al., 2024). Akinboyo (2025), described AI adoption as the acceptance and application of machine learning and cognitive systems in achieving organizational objectives, influenced by technological readiness and user perception. Similarly, Chen et al. (2022), emphasized AI adoption as the organizational choice to utilize intelligent technologies for automating processes and supporting strategic decisions. From a socio-technical perspective, Li and Jin (2024), defined it as the alignment of AI systems with human actors and institutional structures to generate value. In entrepreneurship, AI adoption is seen as the entrepreneurial decision to deploy intelligent tools for innovation, market insights, and competitive advantage (Rughoobur-Seetah, 2022). More recently, Li et al. (2025), conceptualized AI adoption as a dynamic process involving awareness, experimentation, and integration stages through which businesses progressively embed AI into their operations.

Concept of Entrepreneurial Competence

Entrepreneurial competence has been broadly defined in recent scholarship as the set of knowledge, skills, and abilities that enable entrepreneurs to identify opportunities, mobilize resources, and sustain business ventures effectively (Edwin et al., 2021). Danibrahim et al. (2022), described it as a multidimensional construct encompassing opportunity recognition, relationship management, and strategic decision-making. Agbor et al. (2023), conceptualized entrepreneurial competence as the dynamic capability of entrepreneurs to integrate learning, adaptability, and innovation in uncertain environments. In addition, Aliyu and Babangida (2024), highlighted it as the behavioral and cognitive attributes that differentiate successful entrepreneurs from others in terms of creativity and resilience. Nasir and Sheriff (2022), defined it as the capacity to combine managerial, technical, and social skills in creating and sustaining new ventures. According to Oraya and Maina (2023), entrepreneurial competence involves not only individual abilities but also the alignment of those abilities with market and institutional demands for sustained performance. More recently, Vanevenhoven (2022), frames entrepreneurial competence as a lifelong learning orientation that equips entrepreneurs with the flexibility to respond to changing business environments and drive innovation.

Adoption of Artificial Intelligence and Performance

Empirical evidence across diverse contexts has consistently highlighted the positive effects of artificial intelligence (AI) adoption on organizational outcomes, though the mechanisms vary. Rughoobur-Seetah (2022), found that in the hospitality sector, AI adoption enhanced employees' motivation, job security satisfaction, and organizational commitment during the

COVID-19 pandemic, underscoring its role in workforce engagement. Similarly, Li et al. (2025), demonstrated that AI adoption significantly boosts firm innovation performance among Chinese manufacturing firms, while Li and Jin (2024), revealed that AI adoption intensity improves corporate sustainability performance through organizational change, yielding economic, social, and environmental benefits. In e-commerce, Chen et al. (2022), applied the resource-based view to show that AI capabilities indirectly drive firm performance through creativity, management, and AI-driven decision-making, with innovation culture and environmental dynamism acting as important moderators. Evidence from Nigeria by Akinboyo (2025), indicated that AI adoption enhances operational efficiency and customer service in commercial banks. Extending this, Moshiri (2025), provided longitudinal evidence that AI adoption significantly improves firms' financial performance, with notable increases in revenue growth and cost savings. Collectively, these studies confirm that AI adoption strengthens firm performance across sectors and regions, whether through employee motivation, innovation, sustainability, efficiency, or financial returns.

Entrepreneurial Competence and Performance

Empirical studies consistently highlight the importance of entrepreneurial competence as a determinant of business performance, though with varying dimensions across contexts. Edwin et al. (2021), found that entrepreneurial competence positively and significantly improved the performance of woven fabric MSMEs in Palembang, emphasizing its role in traditional industries. Similarly, Agbor et al. (2023), reported that strategic, conceptual, and relationship competencies significantly enhanced SME performance in Calabar, while Aliyu and Babangida (2024), confirmed that entrepreneurial skills, characteristics, and motives positively influenced SMEs in Katsina State. In Kenya, Oraya and Maina (2023), demonstrated that management skills, risk-taking, creativity, and opportunity-seeking competencies were all positively associated with MSE performance. Nasir and Sheriff (2022), further established that entrepreneurial competencies are essential for the survival and sustenance of enterprises, underscoring their centrality to entrepreneurial success. However, not all findings were uniformly positive; Danibrahim et al. (2022), observed that only knowledge competence significantly affected SME performance in Northwest Nigeria, while skills and attitudes did not. Collectively, these studies suggest that entrepreneurial competence remains a critical driver of SME performance, though its effects may vary depending on specific dimensions of competence, business environments, and contextual factors.

Theoretical Framework

This study is underpinned by the Resource-Based View (RBV). RBV is a strategic management theory that emphasizes the role of firm-specific resources and capabilities as the primary drivers of sustainable competitive advantage. It was first popularized by scholars such as Penrose (1959), Wernerfelt (1984), and Barney (1991), who argued that not all resources create value, but only those that are valuable, rare, inimitable, and non-substitutable (VRIN). The RBV posits that organizations achieve superior performance by effectively deploying unique internal assets such as knowledge, skills, technology, and organizational processes, which competitors cannot easily replicate (Barney, 1991). This perspective moves away from focusing solely on external market conditions to highlighting how internal resources and competencies serve as the foundation for long-term competitiveness and innovation.

In the context of this study on women entrepreneurs in Nigeria, the RBV provides a useful lens for examining how adoption of artificial intelligence and entrepreneurial competence function as strategic resources that can predict innovative performance. AI adoption can be seen as a technological capability that, when effectively leveraged, enhances operational efficiency, product development, and market responsiveness, while entrepreneurial competence represents a human capital resource that enables opportunity recognition, creativity, and problem-solving. Together, these resources embody VRIN characteristics by offering women entrepreneurs distinctive tools for achieving sustainable innovative performance. Applying the RBV framework helps explain how women entrepreneurs, despite external challenges, can utilize their technological and competency-based resources to create innovations that differentiate their businesses in Nigeria's competitive entrepreneurial landscape.

Methodology

The study adopted cross-sectional and survey research designs. A judgmental sampling technique was employed to administer structured questionnaires to 300 women entrepreneurs in Zamfara State, Nigeria. After a six-week period, 228 (76%) completed questionnaires were retrieved. Adoption of artificial intelligence was measured with 5 items, entrepreneurial competence with 6 items, and innovative performance with 5 items, all structured on a 4-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). To ensure instrument reliability, a pilot study was conducted among women entrepreneurs in Gusau Local Government Area, where 40 questionnaires were distributed. The reliability test using Cronbach's alpha revealed coefficients of 0.732 for innovative performance, 0.711 for adoption of artificial intelligence, and 0.832 for entrepreneurial competence. According to Sekaran and Bougie (2016), alpha coefficients above 0.70 indicate acceptable internal consistency and reliability of research instruments. Since all variables in this study exceeded this threshold, the measurement scales were considered both adequate and appropriate for the study.

Data Analysis and Presentation

The data for this study were analyzed using both descriptive and inferential statistics. Descriptive statistics, particularly percentages, were employed to determine the level of agreement with the statements across each variable. Inferential statistics, specifically multiple regression analysis, were applied to test the hypothesized relationships among adoption of artificial intelligence, entrepreneurial competence and innovative performance.

Descriptive Statistics

Descriptive statistics was conducted to ascertain the level of agreement with the statement proposed in each of the variable of the study below.

Table 1: Innovative Performance

S/ N	Statement	Strongly Agree	Agree	Disagree	Strongly Disagree
1	My business adopts new ideas quickly.	90(39.5%)	98(43%)	22(9.6%)	18(7.9%)
2	I frequently apply creative solutions to business challenges.	100(43.9%)	78(34.2%)	23(10.1%)	27(11.8%)

3	I actively seek new methods to improve business processes.	93(40.8%)	76(33.3%)	28(12.3%)	31(13.6%)
4	encourage trying new ways of doing things in my business.	112(49.1%)	82(36%)	24(10.5%)	10(4.4%)
5	My business invests in improving product or service quality.	78(34.2%)	99(43.4%)	29(12.7%)	22(9.6%)

Source: Field Survey, 2025.

Table 1 presents the responses on Innovative Performance among women entrepreneurs in Zamfara State. The findings show a generally high level of agreement across the five items. A majority of respondents (82.5%) indicated that their businesses adopt new ideas quickly, while 78.1% agreed they frequently apply creative solutions to business challenges. Similarly, 74.1% confirmed that they actively seek new methods to improve business processes, though 25.9% disagreed. Encouragingly, 85.1% of the respondents agreed that they encourage trying new ways of doing things in their business, reflecting a strong openness to innovation. Additionally, 77.6% agreed that their businesses invest in improving product or service quality. Overall, the results suggest that most women entrepreneurs in the study domain demonstrate strong innovative performance, with openness to new ideas, creativity, and continuous improvement being key drivers of their business practices.

Table 2: Adoption of Artificial Intelligence

S/N	Statement	Strongly Agree	Agree	Disagree	Strongly Disagree
1	My business uses AI tools to improve daily operations	23(10.1%)	5(2.2%)	98(43%)	102(46.1%)
2	My business applies AI to reduce operational costs.	11(4.8%)	13(5.7%)	104(45.6%)	100(43.9%)
3	I am open to learning and using new AI technologies in my business.	24(10.5%)	39(17.1%)	87(38.2%)	78(34.2%)
4	I adopt AI tools to increase productivity and efficiency.	26(11.4%)	36(15.8%)	78(34.2%)	88(38.6%)
5	AI technologies are used in my business to improve customer service	23(10.1%)	15(6.6%)	90(39.5%)	100(43.9%)

Source: Field Survey, 2025.

Table 2 presents the responses of women entrepreneurs on the adoption of Artificial Intelligence (AI) in their businesses. The results reveal a generally low level of AI adoption across the sampled respondents. For instance, only 10.1% strongly agreed and 2.2% agreed that their businesses use AI tools to improve daily operations, while a majority of 89.1% disagreed or strongly disagreed. Similarly, only 10.5% strongly agreed and 17.1% agreed to being open to learning and using new AI technologies, compared to 72.4% who expressed disagreement. The highest level of disagreement was recorded on the use of AI to reduce operational costs (89.5% disagreed or strongly disagreed) and in improving customer service (83.4% disagreed or strongly disagreed). These findings suggest that while there is a small proportion of entrepreneurs showing openness to adopting AI for productivity and learning, the overwhelming majority of women entrepreneurs in Zamfara State have not integrated AI into their business operations, highlighting a significant gap in technology adoption.

Table 3: Entrepreneurial Competence

S/ N	Statement	Strongly Agree	Agree	Disagre e	Strongly Disagree
1	I am confident in making strategic business decisions.	98(43%)	100(43.9%)	11(4.8%)	19(8.3%)
2	I possess strong problem-solving skills in managing my business.	100(43.9%)	102(44.7%)	9(3.9%)	17(7.5%)
3	I am good at building and maintaining business relationships.	109(47.8)	87(38.2%)	21(9.2%)	11 (4.8%)
4	I have the ability to effectively manage financial resources.	110(48.2%)	100(43.9%)	9(3.9%)	9(3.9%)
5	I possess strong communication skills that support my business activities.	87(38.2%)	98(43%)	25(11%)	18(7.9%)
6	I apply creativity and innovation in running my business.	89(39.0%)	100(43.9%)	25(11%)	14(6.1%)

Source: Field Survey,
2025.

Table 3 presents the responses on entrepreneurial competence among women entrepreneurs in Zamfara State. The results reveal that the majority of respondents demonstrated high levels of competence across the measured dimensions. Specifically, 86.9% (98 strongly agree, 100 agree) affirmed confidence in making strategic business decisions, while 88.6% (100 strongly agree, 102 agree) reported possessing strong problem-solving skills. Similarly, 86% (109 strongly agree, 87 agree) acknowledged their ability to build and maintain business

relationships, and 92.1% (110 strongly agree, 100 agree) indicated competence in managing financial resources effectively. In addition, 81.2% (87 strongly agree, 98 agree) agreed to having strong communication skills, and 82.9% (89 strongly agree, 100 agree) affirmed applying creativity and innovation in their businesses. These results suggest that women entrepreneurs in the study area possess significant entrepreneurial competencies, particularly in financial management, problem-solving, and strategic decision-making, which are essential for enhancing innovative performance and sustaining business growth.

Inferential Statistics

This statistic was undertaken to analyse the hypothesized relationship between adoption of artificial intelligence, entrepreneurial competence and innovative performance of women entrepreneurs in Nigeria.

Table 4: Test of Hypothesised Relationship

Hypotheses	Relationship	Beta	Std. Error	T-Value	P-value	Decision
H01	Adoption of Artificial Intelligence->Innovative Performance	0.031	0.103	0.300	0.764	Failed to be Rejected
H02	Entrepreneurial Competence->Innovative Performance	0.211	0.034	6.206	0.000	Rejected
R ² = 0.258						

Source: Field Survey, 2025.

Table 4 presents the results of the test of hypothesised relationships between the study variables. The findings indicate that adoption of artificial intelligence does not significantly influence innovative performance ($\beta = 0.031$, $t = 0.300$, $p = 0.764$), leading to the failure to reject the null hypothesis (H01). In contrast, entrepreneurial competence has a positive and significant effect on innovative performance ($\beta = 0.211$, $t = 6.206$, $p < 0.001$), resulting in the rejection of the null hypothesis (H02). The model’s coefficient of determination ($R^2 = 0.258$) suggests that approximately 25.8% of the variance in innovative performance is explained by adoption of artificial intelligence and entrepreneurial competence, highlighting the greater importance of entrepreneurial competence in driving innovation among women entrepreneurs in Zamfara State.

Discussion

The study found that adoption of artificial intelligence (AI) had a positive but insignificant effect on the innovative performance of women entrepreneurs. This is contrary to previous studies of e.g., Akinboyo (2025); Li and Jin (2024); Rughoobur-Seetah (2022). The finding suggests that while AI adoption shows potential to enhance creativity, efficiency, and innovation, its actual impact remains limited in the current context. This outcome may be attributed to factors such as limited technological infrastructure, inadequate digital skills, and high costs of AI tools, which prevent women entrepreneurs from fully leveraging its benefits. Moreover, many women-owned businesses in developing regions like Zamfara State often operate on a small scale with resource constraints, making it difficult to integrate advanced technologies effectively. Hence, although the relationship is positive, the insignificance indicates that without proper training, access to affordable digital solutions, and supportive

policies, AI adoption alone cannot guarantee improved innovative performance among women entrepreneurs. This underscores the need for capacity building and enabling environments to translate AI adoption into meaningful innovation outcomes.

The study revealed that entrepreneurial competence has a positive and significant effect on the innovative performance of women entrepreneurs in tandem with previous studies of e.g., Oraya and Maina (2023); Aliyu and Babangida (2024); Agbor et al. (2023); Edwin et al. (2021) indicating that the skills, knowledge, and abilities women possess directly enhance their capacity to develop new ideas, adapt to market changes, and sustain competitive advantage. Competencies such as problem-solving, creativity, financial management, and effective communication equip entrepreneurs to identify opportunities and implement innovative solutions that improve business performance (Agbor et al., 2023). This finding suggests that innovation among women entrepreneurs in Zamfara State is largely driven by their personal capabilities and business acumen rather than external technological factors. It also highlights the importance of continuous learning, skill development, and entrepreneurial training programs in fostering innovation. By strengthening their competencies, women entrepreneurs are better positioned to overcome challenges, leverage available resources, and introduce novel products, processes, or strategies that improve their business outcomes and long-term sustainability.

Implications

The practical implication of this study is that women entrepreneurs should focus on strengthening their entrepreneurial competencies, such as problem-solving, creativity, financial management, and communication, as these skills significantly enhance their innovative performance. The finding suggests that while technology adoption, particularly AI, holds promise, its effect may remain minimal without the necessary competence to integrate and maximize its potential. Policymakers, business development agencies, and support organizations should therefore prioritize capacity-building programs, mentorship, and access to entrepreneurial training tailored to women entrepreneurs. Furthermore, interventions aimed at improving digital literacy, resource accessibility, and infrastructural support are crucial to enable women entrepreneurs to effectively combine competence with technology to drive innovation and business growth.

Theoretically, the study provides further validation for the Resource-Based View (RBV), which posits that firm performance and sustained competitive advantage are driven by valuable, rare, inimitable, and non-substitutable resources. In this context, entrepreneurial competence emerges as a key intangible resource that equips women entrepreneurs with the capabilities necessary to innovate and remain competitive. While AI adoption aligns with the RBV as a technological resource, its insignificance in this study suggests that resources alone do not guarantee performance unless combined with human competencies that can deploy them effectively. Thus, the findings expand RBV's application by emphasizing the synergistic role of human and technological resources, reinforcing that the development of entrepreneurial competence remains central to innovation-driven performance among women entrepreneurs.

Conclusion

This study concludes that while adoption of artificial intelligence shows a positive but insignificant effect on the innovative performance of women entrepreneurs in Zamfara State, entrepreneurial competence plays a more critical role, exerting a positive and significant influence. The findings highlight that innovation among women entrepreneurs is largely

driven by their personal skills, knowledge, and abilities rather than reliance on technology alone. Although AI adoption has potential, its effectiveness is limited without adequate digital literacy, infrastructural support, and resources to harness its benefits. In contrast, entrepreneurial competence consistently enhances creativity, decision-making, and problem-solving, enabling women entrepreneurs to introduce innovative solutions and sustain competitiveness. Overall, the study emphasizes the need for targeted training, capacity building, and supportive policies to strengthen entrepreneurial competencies while creating an enabling environment for effective AI integration, thereby fostering innovation and sustainable growth among women-owned enterprises.

Recommendations

Based on the findings, the study recommended that:

5. Since entrepreneurial competence significantly enhances innovative performance, government agencies, NGOs, and business development organizations should design and implement regular training programs, mentorship schemes, and workshops that focus on problem-solving, creativity, financial management, and communication skills. This can be achieved by partnering with universities, business schools, and successful entrepreneurs to deliver tailored programs that address the unique challenges faced by women entrepreneurs in Zamfara State.
6. Given the positive but insignificant effect of AI adoption, efforts should be made to improve women entrepreneurs' digital skills and provide affordable access to AI tools. This can be achieved by establishing technology hubs, offering subsidized digital training, and creating policies that reduce the cost of AI-enabled applications for small businesses. Collaboration between government, private sector, and technology providers will be essential in making AI solutions more accessible and practical for women entrepreneurs to drive innovation.

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