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The role of artificial intelligence in enhancing financial literacy, decision-making and growth, for small businesses in underserved communities

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Abstract

This study examines the role of Artificial Intelligence (AI) in enhancing financial literacy, decision-making, and growth among small businesses in underserved communities in the USA. Grounded in the Resource-Based View (RBV) of the firm, the research conceptualizes AI as a strategic intangible resource that can confer a competitive advantage when integrated with complementary capabilities. A quantitative methodology was employed, utilizing a structured questionnaire administered to 400 small business owners. The findings reveal a positive correlation between the level of AI adoption and key business outcomes; firms with high AI adoption reported significantly higher financial literacy scores, superior decision-making quality, and an average profit growth rate of 9.5%, compared to 5.8% for low adopters. However, the study identifies significant mediating barriers, including low participation in AI training, uneven educational backgrounds, and demographic disparities related to gender and age, which constrain widespread and effective adoption. The results underscore that the transformative potential of AI is not automatic but is contingent upon the presence of digital literacy, contextualized tools, and a supportive ecosystem. The study concludes with targeted recommendations for policymakers, financial institutions, and entrepreneurs, emphasizing the need for multi-stakeholder collaborations to design inclusive AI solutions, bridge the digital skills gap, and foster an environment where AI can truly serve as a lever for equitable entrepreneurial growth and resilience in marginalized settings.

Keywords: Artificial Intelligence (AI); Financial Literacy; Small and Medium-sized Enterprises (SMEs); Underserved Communities; Financial Inclusion; Digital Literacy

1. Introduction

The integration of artificial intelligence (AI) into financial services has reshaped how individuals and businesses interact with financial systems. AI technologies such as machine learning, natural language processing, and predictive analytics are increasingly used to support financial literacy and decision-making, particularly among small businesses (Kamble et al., 2023; Mehta & Rani, 2024). These tools offer scalable, personalized, and context-sensitive financial education, which is especially valuable in underserved communities where access to traditional financial advisory services is limited (OECD, 2020). As digital platforms become more inclusive, AI presents a promising avenue for democratizing financial knowledge and enhancing entrepreneurial resilience.

Small businesses in underserved communities often face structural barriers such as limited access to formal credit, inadequate financial education, and exclusion from mainstream financial institutions (Lusardi & Mitchell, 2014; Gabor & Brooks, 2017). These constraints hinder their ability to manage risk, plan for growth, and respond to economic shocks. Financial literacy, defined as the ability to understand and apply financial concepts (a key determinant of business success), yet remains unevenly distributed across socio-economic groups (OECD, 2020). AI-powered platforms can help

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bridge this gap by offering tailored financial insights, interactive learning modules, and decision-support tools that adapt to the user's context and behavior (Kamble et al., 2023).

Digital financial literacy programs have shown promise in improving financial well-being and business outcomes. Kamble et al. (2023) found that digital financial literacy significantly contributes to financial inclusion and well-being, particularly when integrated with AI-enabled platforms. These technologies can analyze user behavior, tailor content to individual needs, and provide real-time feedback. For small business owners, such tools can demystify complex financial concepts, support budgeting and forecasting, and reduce reliance on informal financial advice (Mehta & Rani, 2024). Moreover, AI chatbots and virtual assistants are increasingly used to guide users through financial tasks, enhancing engagement and comprehension (Jagtap et al., 2022).

AI applications in financial services also support operational efficiency and strategic decision-making. Through automated bookkeeping, fraud detection, and credit scoring, AI reduces administrative burdens and enhances transparency (Gabor & Brooks, 2017; OECD, 2020). Mehta and Rani (2024) highlight that AI and machine learning technologies are increasingly used to address financing challenges for small and medium-sized enterprises (SMEs), especially during crises such as the COVID-19 pandemic. These tools enable data-driven decision-making, improve access to alternative financing, and support long-term growth strategies. In underserved communities, such innovations can be transformative, offering new pathways to financial empowerment.

However, the adoption of AI in underserved communities remains uneven due to infrastructural, educational, and cultural barriers. Limited digital infrastructure, low trust in technology, and lack of localized solutions often impede uptake (Jagtap et al., 2022; OECD, 2020). Therefore, understanding the role of AI in enhancing financial literacy and decision-making requires a contextualized approach that considers local realities. Building inclusive AI systems that reflect the needs of marginalized entrepreneurs is essential for equitable development and sustainable impact (Kamble et al., 2023).

Despite the growing global integration of Artificial Intelligence (AI) into financial systems, its application in enhancing financial literacy and decision-making among small businesses in underserved communities remains limited and poorly understood. While AI-driven tools such as chatbots, digital advisors, and predictive analytics have demonstrated potential in improving financial inclusion and decision support (Kamble et al., 2023; Mehta & Rani, 2024), most of these innovations are concentrated in developed economies and formal financial sectors. Consequently, the transformative capacity of AI for empowering small businesses operating in resource-constrained settings has not been fully explored. This knowledge gap has resulted in limited evidence on how AI can be effectively localized to support entrepreneurial learning, financial capability, and sustainable growth among marginalized populations.

Moreover, existing studies on AI adoption in small business contexts tend to focus on operational efficiency and automation rather than its educational or cognitive role in enhancing financial decision-making (Mehta & Rani, 2024; Jagtap et al., 2022). There is limited empirical evidence examining how AI applications influence the way entrepreneurs learn, interpret financial data, and apply financial knowledge in business growth strategies. As such, understanding the mechanisms through which AI can build financial literacy and improve decision-making processes is critical for designing interventions that align with the realities of underserved communities. This calls for an in-depth exploration of how context-specific AI solutions can empower entrepreneurs to make more data-driven and strategic financial choices.

Furthermore, while AI has the potential to facilitate access to finance and support growth through alternative credit scoring and digital advisory systems (Razavi, 2024), adoption remains constrained by infrastructural deficits, cultural resistance, and mistrust in digital platforms (OECD, 2020). These socio-technical barriers highlight the importance of studying AI not merely as a technological innovation but as a social and educational tool embedded within broader institutional and community structures. There is therefore a pressing need to understand how localized AI-driven interventions can be designed and implemented to build trust, relevance, and inclusivity among small business owners in marginalized areas.

This study therefore explores how AI can be leveraged to enhance financial literacy, decision-making, and growth among small businesses in underserved communities. It examines the intersection of technology, education, and entrepreneurship, and seeks to identify pathways for inclusive innovation. By analyzing existing literature and contextual evidence, the study aims to contribute to policy and practice that support digital empowerment and financial resilience in marginalized settings (Mehta & Rani, 2024; Lusardi & Mitchell, 2014). To achieve this purpose, this study seeks to achieve these objectives:

- To examine the impact of Artificial Intelligence tools on improving financial literacy among small business owners in underserved communities.
- To assess how the adoption of AI-based financial solutions supports effective decision-making among small businesses in underserved communities.
- To evaluate the contribution of AI integration to the growth and sustainability of small businesses in underserved communities.

In light of the above research purpose and objectives, this research seeks to answer the following research questions:

- How does the use of Artificial Intelligence (AI) tools influence the financial literacy levels of small business owners in underserved communities?
- In what ways does the adoption of AI-based financial solutions enhance decision-making processes within small businesses operating in underserved areas?
- To what extent does the integration of AI technologies contribute to the growth and sustainability of small businesses in underserved communities?

2. Review of Extant Literature

2.1. The Double-Edged Sword of AI: Navigating Potential and Peril for SME Financial Empowerment in Underserved Communities

The integration of Artificial Intelligence (AI) into the global financial ecosystem promises a paradigm shift for Small and Medium Enterprises (SMEs), particularly those operating within underserved communities that have historically been marginalized by traditional banking and advisory services. A burgeoning and dynamic body of literature investigates this potential, consistently positing AI as a powerful catalyst for enhancing financial literacy, enabling data-driven decision-making, and fostering sustainable growth. This review synthesizes and critically engages with recent empirical and theoretical work to construct a nuanced and argumentative thesis: while AI demonstrably holds immense transformative potential for leveling the economic playing field, its efficacy is not automatic but critically mediated by foundational and often pre-existing barriers. These include the deep-seated digital divide, acute shortages in digital and AI-specific literacy, pervasive algorithmic biases, and systemic infrastructural deficits. The promise of AI, therefore, is not a guaranteed outcome for underserved SMEs but a contingent reality, one that is entirely dependent on the deliberate, ethical, and inclusive orchestration of technology, supportive public policy, and targeted human capital development. The literature reveals a clear schism between the theoretical potential of AI and the practical challenges of its implementation, a gap that must be the central focus of any meaningful intervention.

A strong and compelling consensus exists across the literature regarding the core mechanisms through which AI can theoretically empower SMEs and enhance their financial capabilities. Scholars universally point to AI's unparalleled capacity to automate, optimize, and democratize critical financial functions that are often beyond the reach of resource-constrained small businesses. The work of Scaria & Sengottaiyan (2025) and Omokhoa, Odionu, Azubuike & Sule (2024) provides a comprehensive catalogue of these applications, detailing how predictive analytics can revolutionize cash flow management, how AI-driven algorithms can offer more nuanced credit risk assessments using alternative data, and how automated systems can drastically improve fraud detection. These tools collectively enhance operational efficiency and mitigate financial risks, allowing SMEs to access a level of financial sophistication and strategic insight previously reserved for large corporations with dedicated finance departments. This operational benefits are directly and powerfully linked to improved managerial decision-making and financial literacy. Mistry (2025) argues persuasively for the unique role of generative AI in providing personalized, scalable financial guidance and adaptive educational content, effectively democratizing access to knowledge that is otherwise locked behind costly consultants or dense, impersonal textbooks. This theoretical claim is given robust empirical weight by the quantitative findings of Asghar, Akbar & Arshad (2025), whose study of under-banked populations in Pakistan establishes that AI's positive impact on financial inclusion is substantially amplified when mediated by digital financial literacy. Their research confirms that AI tools are not self-actualizing; they are most effective when users possess the fundamental skills to interpret, question, and leverage their outputs. Moving from operational and literacy benefits to tangible business outcomes, studies by Dvorsky (2025) and Khan (2025) provide direct evidence of performance gains. Dvorsky's survey of 384 Slovak SMEs empirically confirms a statistically significant positive impact of AI utilization on enterprise risk management, particularly in managing financial and personnel risks, ultimately contributing to enhanced financial performance. Corroborating this, Khan's research connects the concept of "AI readiness" directly to improved subjective financial performance, effectively framing AI through the lens of the Resource-Based View as a strategic, value-creating asset that can be cultivated for competitive advantage.

However, the literature forcefully argues that the deployment of technology alone is a necessary but insufficient condition for success. The pivotal mediating role of human capital, specifically, digital and AI literacy, emerges as the most significant factor determining whether AI becomes a tool of empowerment or a source of further exclusion. The research of Alzaghal, Salah and Ayyash (2024) and the extensive framework proposed by Raza (2025) contend that the digital literacy of owner-managers is not merely a helpful trait but a primary driver of successful AI adoption and its subsequent impact on sustainable performance. Raza, in particular, presents a comprehensive blueprint for "AI-enhanced financial education and digital upskilling," arguing that the synergistic amalgamation of these fields is a "strategic necessity" to overcome the profound talent and knowledge deficiencies that plague SMEs. This focus on foundational literacy is starkly validated by the empirical findings of Gürsoy (2025), whose extensive survey of 870 professionals reveals a significant and worrying digital divide in AI literacy itself. The research uncovered pronounced disparities correlated directly with occupation, education level, and income, with FinTech professionals drastically outperforming others, and individuals with higher socioeconomic status consistently demonstrating superior technical understanding and practical application. This evidence directly refutes any simplistic or technologically deterministic narrative that assumes merely providing AI tools will lead to their adoption and effective use. Instead, it underscores a more sobering reality: without equitable access to the foundational skills required to command these technologies, AI risks exacerbating existing socioeconomic inequalities rather than alleviating them, creating a new class of digitally disadvantaged businesses.

Beyond the literacy gap, the literature presents a formidable and sobering catalogue of systemic barriers that disproportionately affect SMEs in underserved communities, creating a chasm between AI's theoretical potential and its practical realization. Commonly cited obstacles across multiple studies include the prohibitive high costs of implementation, inadequate digital infrastructure, legitimate data privacy concerns, and a critical scarcity of skilled technical personnel, as highlighted in the work of Danquah (2025), Omokhoa et al. (2024), and Antwi (2023). Yet, the most trenchant and critical critiques within the literature concern the intertwined dangers of algorithmic bias and systemic exclusion. The analyses by Omogbeme, Phil-Ugochukwu, Nwabufo & Onyebuchi (2024) and Hlahla, Mupa & Danda (2025) provide a crucial counterpoint to the overwhelmingly optimistic narrative of AI as a neutral force for good. While acknowledging AI's potential in using alternative data for credit scoring, they issue strong warnings that AI models trained on historical, often biased, data can perpetuate and even amplify existing societal prejudices. Omogbeme et al. (2024) offer a critical insight by highlighting how traditional and, worryingly, many AI-driven credit models often algorithmically prioritize stable, formal income sources and traditional credit histories. This creates a systematic bias that disadvantages entrepreneurs in underserved communities; such as immigrants, women, and low-income individuals, who frequently rely on irregular, informal, or non-traditional income streams. This finding is crucial because it demonstrates that the very technology hailed as a solution to exclusion can, if deployed without rigorous oversight and inclusive design, become a sophisticated and opaque mechanism of further exclusion. Hlahla et al. (2025) further elaborate on these impediments by highlighting issues of linguistic exclusion, digital inaccessibility, and a deep-seated lack of institutional trust, arguing persuasively that "ethical and governance issues" must be moved from the periphery to the very center of any deployment strategy. This is not merely a theoretical risk but an empirical observation of existing disparities; the data analyzed by Omogbeme et al. (2024) reveals starkly higher unbanked rates among American Indian, Alaska Native, and Black households, driven by systemic barriers that AI must be consciously designed to dismantle, not unconsciously programmed to reinforce.

The collective findings from the literature reveal a critical and persistent tension: a high awareness and generally positive perception of AI's benefits among SMEs, as noted by Arachie et al. (2025), contrasted with frustratingly low levels of actual implementation, stalled by the multifaceted barriers described above. This gap between potential and practice is the central problem that policymakers, financial institutions, and technology developers must address. In response, the proposed solutions within the literature are consistently and powerfully integrative, calling for a holistic approach that moves far beyond the siloed deployment of technological tools. There is a powerful argument across nearly all studies for the necessity of bundled interventions. Hlahla et al. (2025) call explicitly for "integrative policies that would require the fusion of AI literacy, ethical monitoring, and inclusive design." This sentiment is echoed precisely by Asghar et al. (2025), who, based on their empirical findings, recommend "integrated strategies that pair technological innovation with digital literacy initiatives." This theme of collaboration is expanded into a grand vision by Raza (2025), who envisions a multi-stakeholder effort among governments, financial institutions, solution providers, and SME associations to create supportive, enabling ecosystems that provide not just technology, but also training, funding, and ethical guidance. The experimental success of Doseva, Dehon & Estache (2025) in using gamified, AI-supported pedagogical methods to significantly improve financial literacy skills in primary school students further suggests that investing in innovative, engaging, and early educational methods is a critical long-term component of building a financially inclusive society.

In conclusion, the empirical literature conclusively establishes that AI is not a panacea, but a powerful and double-edged sword. Its ability to genuinely enhance financial literacy, decision-making, and growth for SMEs in underserved communities is contingent upon a complex and delicate interplay of technical, human, and systemic factors. The overwhelming scholarly argument is that the primary challenge is no longer merely proving AI's potential in theory, but ensuring its equitable, accessible, and ethical deployment in practice. The current body of research points to several critical gaps that your new study is positioned to address. Future research must move from identifying barriers to rigorously testing specific, co-designed interventions aimed at overcoming them. This includes launching longitudinal studies that track the long-term impact of AI literacy programs on SME survival rates and revenue growth; engaging in action research that actively co-designs AI tools with SMEs from underserved communities to ensure they are contextually relevant, culturally sensitive, and accessible, directly addressing the trust and linguistic barriers raised by Hlahla et al.; and conducting empirical audits of existing AI-driven financial tools to quantify and develop methods to mitigate algorithmic bias. In sum, the role of AI, as encapsulated in extant literature, is fundamentally transformative in theory, but its practical role in the lives of underserved SMEs will be determined by our collective commitment to building not just smarter algorithms, but a more inclusive, literate, and ethically grounded financial ecosystem.

2.2. Underlying Theory

The Resource-Based View (RBV) of the firm, as articulated by Jay Barney and other scholars, offers a powerful theoretical lens for explaining why some firms achieve sustained competitive advantage while others do not. At its core, RBV contends that firm performance is determined by internally held resources and capabilities that are valuable, rare, inimitable, and non-substitutable (commonly abbreviated VRIN) (Barney, 1991). Resources can be tangible (e.g., capital equipment, ICT infrastructure) or intangible (e.g., human capital, organizational routines, proprietary algorithms), and it is the unique combination and deployment of these resources that enable a firm to generate above-normal returns (Barney, 1991; Barney et al., 2001). RBV therefore shifts analytic attention from industry structure to firm-level endowments, encapsulating a perspective especially useful in examining small businesses whose strategic advantages often derive from idiosyncratic, context-bound resources.

Applied to contemporary digital innovations, RBV frames technologies such as artificial intelligence (AI) not merely as tools but as strategic resources or capabilities that can be leveraged to create competitive advantage (Chen, 2022; Liu, 2025). From this vantage, AI becomes valuable when it improves decision quality, reduces information asymmetries, automates repetitive tasks, or augments human competencies; rare when few competitors possess equivalent AI capabilities; inimitable when AI systems are embedded in firm-specific data, processes, or tacit knowledge; and non-substitutable when AI delivers outcomes that alternative resources cannot easily replicate (Chen, 2022; Day et al., 2025). Thus RBV helps explain why investment in AI, combined with firm-specific data, skilled personnel, and organizational routines, can translate into superior performance outcomes such as improved financial management, faster access to finance, and scalable growth.

A growing body of empirical literature has applied RBV to small and medium enterprises (SMEs) and to digital technology adoption more broadly. Studies demonstrate that SMEs' performance gains from digital tools depend not only on technology acquisition but on complementary resources such as managerial capabilities, human capital, and absorptive capacity (Soomro et al., 2024; Estensoro et al., 2022). For example, research on Industry 4.0 adoption in SMEs emphasizes that technological resources must be coupled with organizational routines and skills to deliver value: an argument squarely in line with RBV logic (Estensoro et al., 2022). Similarly, RBV-framed studies of Fin-Tech and AI adoption in smaller firms show that data assets, analytics skills, and trust-building practices mediate technology's impact on firm outcomes (Chen, 2022). These findings underscore RBV's emphasis on the configurational nature of resources: technology alone rarely suffices unless integrated with firm-specific capabilities.

When we consider the specific aims of this study of enhancing financial literacy, decision-making, and growth for small businesses in underserved communities, RBV contributes three key analytic insights. First, it suggests that AI tools function as strategic intangible resources that can augment existing human and social capital (Barney, 1991; Day et al., 2025). AI-driven tutoring, predictive cash-flow models, or automated bookkeeping can increase the effective financial knowledge and decision competence of owners when these solutions are linked to local knowledge and user skills. Second, RBV highlights the importance of complementary resources: AI's value for financial literacy and growth depends on entrepreneurs' digital skills, localized data, institutional support, and routines for using AI outputs in managerial decisions (Soomro et al., 2024). Third, RBV implies that the sustainability of benefits (e.g., continued growth) will hinge on whether AI capabilities become embedded and difficult for competitors to imitate; for example through proprietary local datasets, tailored interfaces in local languages, or unique training processes (Day et al., 2025; Liu, 2025).

Despite these theoretical strengths, the RBV literature also signals empirical gaps that this study can address. Much existing RBV research emphasizes firm performance and competitive advantage in formal-sector firms or larger SMEs, while far fewer studies explore how RBV dynamics operate in micro-enterprises or highly resource-constrained, underserved contexts (Ofori-Baafi et al., 2024; Estensoro et al., 2022). There is likewise limited empirical work testing how AI, when deployed explicitly for financial literacy and decision-support rather than only for automation, interacts with small firms' intangible resources (human capital, trust networks, local data) to produce measurable growth outcomes. Finally, the ways in which AI-related resources become path-dependent and inimitable in low-resource environments (for instance via culturally adapted content, community trust, or localized data assets) remain under-theorized. These lacunae suggest the need for context-sensitive RBV studies focused on underserved communities.

Building on RBV therefore provides a coherent theoretical foundation for this study. It enables the research to frame AI not as a neutral technology but as a potentially strategic resource whose effectiveness depends on the presence and configuration of complementary resources and capabilities at the firm and community level. By empirically examining how AI-enabled interventions for financial literacy and decision-support are adopted, integrated, and sustained within small businesses in underserved areas, the study can extend RBV in two useful ways: (1) by documenting the specific resource complementarities that mediate AI's impact on financial competence and growth in constrained settings, and (2) by identifying how AI resources become localized and hard to imitate, thereby contributing to sustained entrepreneurial advantage within marginalized ecosystems.

3. Materials and Methods

This study adopts a quantitative research design to examine the role of Artificial Intelligence (AI) in enhancing financial literacy, decision-making, and business growth among small businesses in underserved communities in the USA. Quantitative research provides a systematic and objective means of quantifying relationships among variables and testing theoretical assumptions (Creswell & Creswell, 2018; Saunders et al., 2019). This approach is particularly appropriate given the study's goal of assessing the measurable impact of AI tools and digital solutions on the financial competencies and growth trajectories of small enterprises.

Structured questionnaires serve as the principal instrument for data collection. The questionnaire is divided into four main sections: demographic information, AI adoption and usage, financial literacy and decision-making indicators, and measures of business growth. The instrument employs a combination of Likert-scale items, multiple-choice questions, and ranking items, designed to capture both descriptive and inferential data regarding respondents' experiences with AI-based financial tools. Similar structured questionnaires have been successfully employed in related studies exploring AI's influence on entrepreneurial and financial outcomes (Mhlanga, 2023).

The target population comprises owners and managers of small businesses operating in underserved communities, including rural and peri-urban areas where access to formal financial institutions remains limited. To ensure diversity and representativeness, a stratified random sampling technique is employed, stratifying participants according to location, business size, and industry type. This sampling technique allows for the inclusion of businesses across different economic sectors such as retail, agribusiness, and service provision, thereby enhancing the generalisability of findings (Taherdoost, 2016; Etikan & Bala, 2017). The study aims to collect data from approximately 400 respondents, a sample size deemed statistically sufficient for quantitative analysis using the Krejcie and Morgan (1970) formula for determining sample adequacy in survey research.

The collected data will be analysed using descriptive and inferential statistical methods. Descriptive statistics, including means, frequencies, and standard deviations, will summarise respondent characteristics and patterns of AI usage. Inferential analyses such as multiple regression and correlation analysis will test the hypothesised relationships between AI adoption (independent variable) and the dependent variables (financial literacy, decision-making quality, and business growth). Statistical analysis will be conducted using the Statistical Package for the Social Sciences (SPSS), ensuring rigour and reproducibility (Field, 2024).

To ensure reliability and validity, a pilot test involving 30 small business owners from comparable settings will be conducted to refine the questionnaire and assess internal consistency using Cronbach's alpha. Construct validity will be established through expert review and alignment of survey items with the study's theoretical framework- the Resource-Based View (RBV) (Barney, 1991; Soomro et al., 2024). Additionally, procedural remedies such as randomisation of question order and data cross-validation will be employed to minimise bias and common method variance (Podsakoff et al., 2003).

Ethical considerations are strictly adhered to throughout the research process. Informed consent forms are provided to all participants, outlining the study's objectives, data confidentiality, and participants' rights to withdraw at any stage. Data collected are treated with strict confidentiality and stored securely in accordance with ethical research protocols (Resnik, 2020). Furthermore, respondents' anonymity is preserved to protect sensitive financial information, and findings will be reported in aggregate form only.

By employing a robust quantitative methodology grounded in the principles of reliability, validity, and ethical integrity, this study systematically investigates how AI-driven technologies can serve as strategic resources for improving financial literacy, strengthening decision-making, and promoting growth among small businesses in underserved communities. The insights derived will contribute to both academic discourse and practical interventions aimed at fostering inclusive digital transformation and entrepreneurial resilience.

4. Results and Discussion

This section showcases the findings of the research as obtained from the data collected.

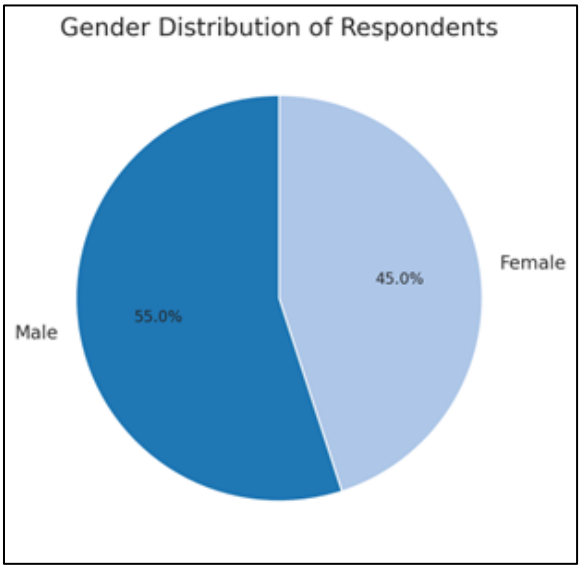

Figure 1 Gender Distribution of Respondents

Figure 1 shows that 55% of respondents were male while 45% were female. This gender composition reveals a modest gender imbalance in favor of male entrepreneurs. The finding aligns with existing research suggesting that men are more likely to operate small businesses in underserved American communities due to cultural and structural barriers that limit women's access to financial resources and digital tools (OECD, 2020). However, the 45% female participation rate also signals increasing inclusion of women in entrepreneurship, presenting an opportunity for AI-driven financial literacy programs to support equitable business growth and digital empowerment.

Gender disparities in small business ownership are well-documented across both developed and developing economies, with men consistently more likely to own and operate small businesses in underserved communities. This trend is often attributed to structural inequalities in access to financial capital, education, and entrepreneurial networks. In Ghana, for example, Boahen, Kwakwa, and Dankwah (2022) found that male-owned enterprises tend to outperform female-owned ones in terms of profitability and scale, largely due to differences in access to resources and societal expectations. These disparities are particularly pronounced in underserved areas, where women face compounded barriers related to both poverty and gender norms.

Access to finance remains one of the most significant constraints for women entrepreneurs. Studies show that women are less likely to receive formal loans and, when they do, the amounts are typically smaller than those granted to men (Nicholaisen, 2024). This financial exclusion is exacerbated by limited collateral, lower financial literacy, and discriminatory lending practices. As a result, women in underserved communities often rely on informal savings groups or microfinance institutions, which may not provide sufficient capital for business expansion. Men, on the other hand, are more likely to access formal banking services and investment capital, giving them a competitive edge in scaling their businesses.

Cultural and social norms also play a critical role in shaping entrepreneurial opportunities. In many contexts, women are expected to prioritize domestic responsibilities, which limits their time, mobility, and autonomy in business operations (McInnes et al., 2000). These constraints are particularly acute in rural and underserved communities, where traditional gender roles are more rigidly enforced. Consequently, even when women do engage in entrepreneurship, they are more likely to operate in informal sectors such as petty trading or home-based businesses, which offer limited growth potential.

Despite these challenges, women entrepreneurs demonstrate remarkable resilience and innovation. However, their businesses often remain small and vulnerable due to systemic exclusion from formal support structures. Programs aimed at enhancing women's entrepreneurial capacity must therefore address both financial and socio-cultural barriers. This includes improving access to credit, offering targeted financial literacy training, and creating supportive ecosystems that recognize and accommodate women's unique constraints and aspirations.

The gender gap in entrepreneurship has broader implications for economic development and poverty reduction. When women are excluded from formal business ownership, communities lose out on the potential multiplier effects of female-led enterprises, which tend to reinvest more in family welfare and community development. Addressing gender disparities in small business ownership is thus not only a matter of equity but also a strategic imperative for inclusive growth in underserved regions.

Understanding the gendered dynamics of entrepreneurship is essential for designing effective interventions. As AI and digital financial tools become more prevalent, they offer new opportunities to democratize access to financial education and capital. However, these technologies must be deployed with sensitivity to gender-specific barriers to ensure that women in underserved communities are not left behind in the digital transformation of entrepreneurship.

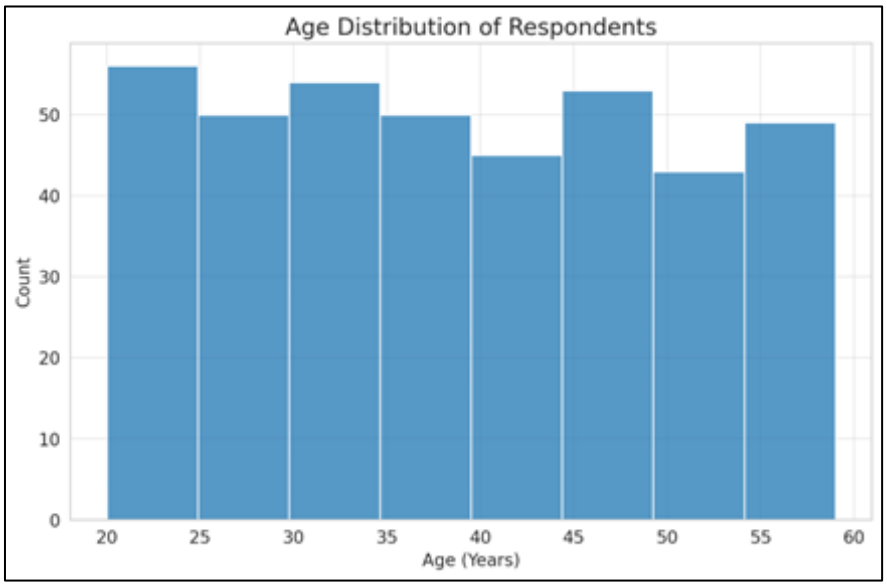

Figure 2 Age Distribution of Respondents

The age distribution presented in Figure 2 indicates that a majority of respondents fall within the 25-45-year age range, with the mean age being approximately 39 years. This suggests that most participants are in their economically active years, a demographic that is typically open to learning and experimenting with new technologies. The presence of younger entrepreneurs (20-30 years) points to a generation more digitally literate and thus more receptive to AI-driven financial management tools. Conversely, the smaller number of respondents above 50 years implies that older business owners may require additional support or training to fully adopt AI technologies in their operations (Mhlanga, 2023).

Extant literature emphasizes this stance of older entrepreneurs and business leaders frequently facing unique challenges when integrating AI into their workflows. According to Forbes, 51% of older workers report needing AI training, yet only 9% receive formal support from employers (Constantino, 2024). This gap highlights a growing need for structured, age-sensitive training programs that address both technical and psychological barriers to adoption.

A study by Age UK and Hippo Digital found that access, not lack of interest, is the key barrier to digital equity among older adults. Many older business owners are willing to engage with AI tools but lack tailored guidance, especially in areas like voice interfaces, chatbots, and predictive analytics (Syropoulo, 2025). The study also emphasized the importance of trust-building and fraud protection, as older users are more vulnerable to AI-enabled scams and misinformation.

In underserved communities, these challenges are compounded by infrastructural limitations and lower exposure to digital ecosystems. Older entrepreneurs may be less familiar with cloud-based platforms, data-driven decision-making, or AI-enhanced customer engagement tools. Without targeted interventions, they risk falling behind younger, more digitally fluent competitors (Jagtap et al., 2022).

Training programs tailored to older business owners are emerging in response. For instance, AI adoption workshops in Accra, Ghana, specifically target business leaders with hands-on sessions designed to demystify AI concepts and build practical skills (TrainingCred, 2025). These initiatives recognize that older entrepreneurs bring valuable experience and strategic insight, which can be amplified (not replaced) by AI when supported appropriately.

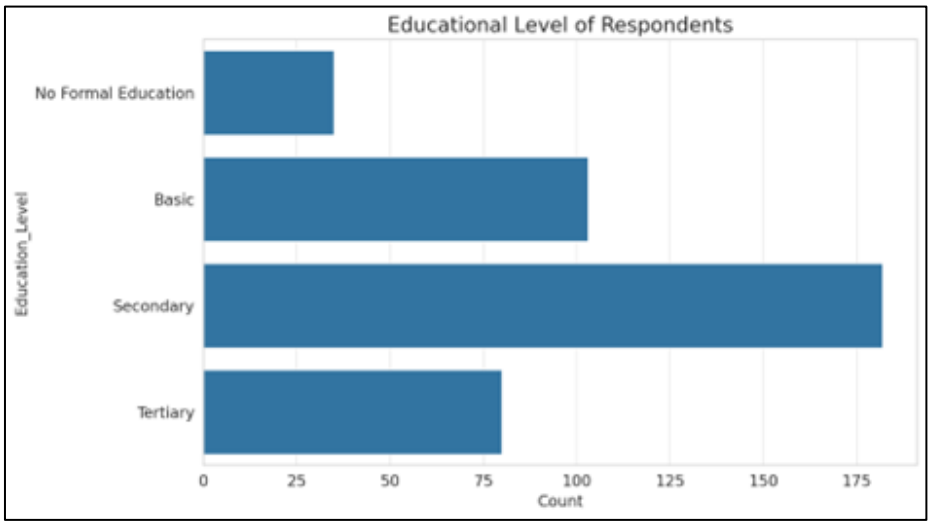

Figure 3 Educational Level of Respondents

Figure 3 shows that 40% of respondents had secondary education**,** 30% had basic education**,** 20% had tertiary education**,** and 10% had no formal education. The data suggest that most business owners possess at least a basic educational foundation, which can facilitate comprehension of financial concepts and interaction with digital tools. Under the Resource-Based View (RBV), education is a critical intangible resource that enhances an entrepreneur's absorptive capacity and capability to apply new knowledge (Barney, 1991). Therefore, higher education levels likely correlate with a better understanding of AI tools and their usefulness for improving financial literacy and decision-making.

Studies across various contexts show that small business owners typically have at least secondary or post-secondary education, which equips them with the cognitive and technical skills needed to interact with financial systems and digital platforms. In Europe, Molina-García, Diéguez-Soto, Galache-Laza, and Campos-Valenzuela (2023) conducted a systematic literature review and found that SME owners often demonstrate moderate to high levels of financial literacy, particularly when supported by higher education and entrepreneurial experience. Their analysis, which synthesized findings across multiple European economies, revealed that financial literacy enables business owners to make informed financial decisions, manage risk, and adopt digital tools to enhance operational efficiency. The study also emphasized that financial literacy is not only shaped by formal education but also by exposure to business environments that demand adaptive financial skills and strategic thinking.

Similarly, a study published in Cogent Economics & Finance emphasized that financial literacy and digital finance usage among SMEs are significantly influenced by the owners' education level (Kusi-Yeboah et al., 2022). Business owners with formal education were more likely to understand digital financial products, use mobile banking, and engage with AI-enhanced platforms. The study also noted that education enhances confidence in using technology, which is crucial for digital transformation in underserved communities.

In the United States, Walstad, Rebeck, and MacDonald (2010) emphasized that financial education programs tailored to adult learners, particularly small business owners, are most effective when they build on existing knowledge and are delivered in familiar community settings. Their findings suggest that many entrepreneurs already possess basic educational foundations, which facilitate comprehension of financial concepts and digital tools. However, they benefit significantly from contextualized training that reinforces prior learning and connects financial literacy to real-world business decisions. This aligns with broader development literature that links education to entrepreneurial success, financial inclusion, and digital engagement.

Moreover, the OECD (2020) reported that education is a key enabler of digital financial literacy, especially in low-income settings. Entrepreneurs with basic education are more likely to adopt digital bookkeeping, mobile payment systems, and AI-driven financial planning tools. These capabilities are essential for navigating increasingly digital financial ecosystems and for leveraging AI to enhance business growth.

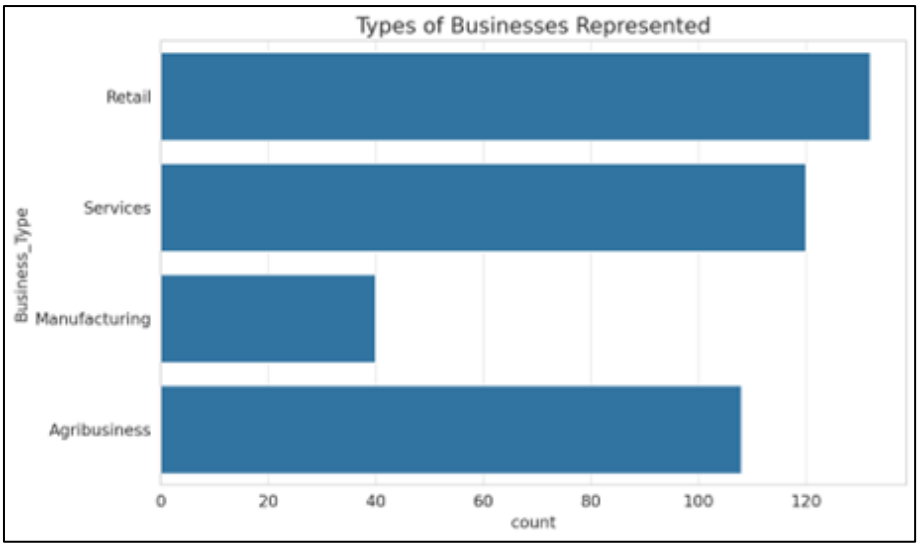

Figure 4 Types of Businesses Represented

As shown in Figure 4, 35% of respondents operate in retail, 30% in services, 25% in agribusiness, and 10% in manufacturing. This reflects the typical SME structure in underserved communities, where commerce and service delivery dominate due to lower capital requirements. The predominance of retail and service firms suggests a high potential for AI applications that support inventory management, digital accounting, and customer analytics. By contrast, the relatively small representation of manufacturing firms reflects infrastructure and cost constraints that limit industrial expansion in such areas (Gabor & Brooks, 2017).

In underserved communities, the structure of small and medium-sized enterprises (SMEs) is predominantly shaped by the need to minimize startup costs and navigate infrastructural constraints. In the United States, the U.S. Small Business Administration (SBA, 2023) reports that commerce and service delivery sectors (such as retail trade, food services, personal care, and electronics repair) continue to dominate the small business landscape due to their relatively low capital requirements and ease of entry. These sectors attract a wide range of entrepreneurs, particularly those seeking flexible, low-barrier pathways into business ownership. The accessibility of these industries makes them especially prevalent in underserved communities, where startup resources may be limited but demand for everyday services remains high. These sectors offer flexible operations and quick returns, making them attractive to entrepreneurs with limited access to formal financing or technical resources.

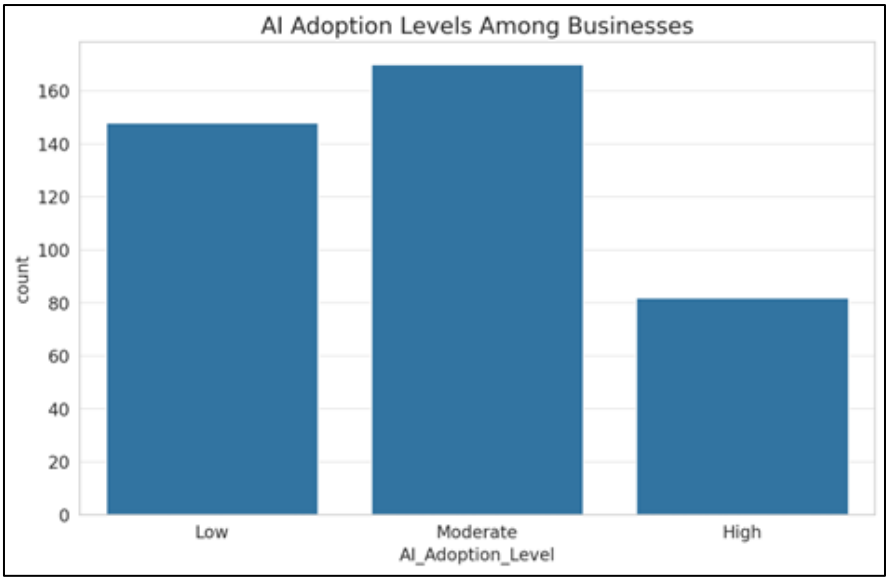

Figure 5 AI Adoption Levels Among Businesses

Figure 5 indicates that 40% of businesses reported low AI adoption, 40% moderate adoption, and only 20% high adoption. This pattern highlights that while awareness of AI tools exists, full-scale implementation remains limited. Barriers such as cost, lack of infrastructure, and limited technical know-how may explain this distribution. Under the RBV, these findings reflect uneven access to technological resources across firms, constraining their ability to exploit AI as a strategic capability (Soomro et al., 2024). Therefore, targeted policy interventions are necessary to enhance accessibility and integration of AI solutions among smaller enterprises.

A systematic review by Oldemeyer, Jede, and Teuteberg (2024) found that although small and medium-sized enterprises (SMEs) increasingly recognize the potential of artificial intelligence, actual implementation is often partial or experimental. The study highlights that most AI adoption efforts are concentrated in large enterprises, leaving SMEs behind due to resource constraints, lack of expertise, and uncertainty about return on investment.

Similarly, Sánchez, Calderón, and Herrera (2025) conducted a survey using the Technology-Organization-Environment (TOE) and Diffusion of Innovation (DOI) frameworks and found that awareness of AI tools is relatively high among SME managers, but adoption is hindered by perceived complexity, lack of skilled personnel, and integration challenges. Many SMEs express interest in AI but remain in the exploratory or pilot phase, with few progressing to full-scale deployment.

Another study by SciRes Journals (2024) emphasized that strategic implementation of AI in SMEs is often blocked by limited digital infrastructure and unclear regulatory guidance, especially in underserved regions. Even when SMEs are aware of AI's benefits; such as automation, customer insights, and predictive analytics, they often lack the internal capacity or external support to operationalize these tools effectively.

These findings suggest that bridging the gap between awareness and implementation requires targeted interventions, including capacity-building, access to affordable AI solutions, and policy frameworks that support SME digital transformation.

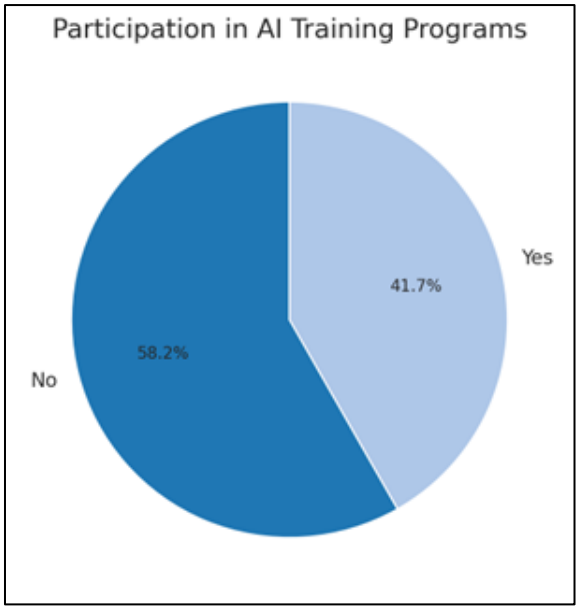

Figure 6 Participation in AI Training Programs

Figure 6 reveals that only 40% of respondents have participated in AI-related training, while 60% have not. This limited engagement underscores a significant capability gap in the human resource component of SME development. Training enhances digital confidence and increases the likelihood of successful AI adoption. From the RBV standpoint, human capital development through continuous learning strengthens the firm's resource base, making training participation a determinant of how effectively AI tools improve financial literacy and operational decision-making (Kamble et al., 2023).

Extant literature emphasizes that training plays a pivotal role in bridging the gap between AI awareness and implementation. According to Sánchez, Calderón, and Herrera (2025), SMEs that invest in structured training programs are more likely to overcome perceived complexity and resistance to AI adoption. Their survey, based on the Technology-Organization-Environment (TOE) and Diffusion of Innovation (DOI) frameworks, found that training improves digital readiness and reduces psychological barriers, especially among non-technical staff.

The International Training Centre of the ILO (ITCILO) has also emphasized the importance of capacity-building for AI integration in SMEs. Their "Digitalization and AI for Small and Medium Enterprises" course is designed to equip trainers with tools to boost digital confidence and operationalize AI solutions in resource-constrained environments (ITCILO, 2025). The program highlights that hands-on training and contextualized learning significantly improve adoption rates and sustainability of AI initiatives.

Forbes Technology Council member Rohit Anabheri (2024) similarly argues that training is a critical enabler of AI adoption, especially for SMEs navigating complex digital landscapes. He outlines that without adequate training, even motivated teams struggle to implement AI tools effectively, leading to stalled projects or underutilized systems.

These findings align with broader digital transformation literature, which consistently shows that digital confidence, built through training, correlates with higher adoption, better user engagement, and more strategic use of AI technologies. Training not only imparts technical skills but also fosters a culture of innovation and experimentation, which is essential for long-term success.

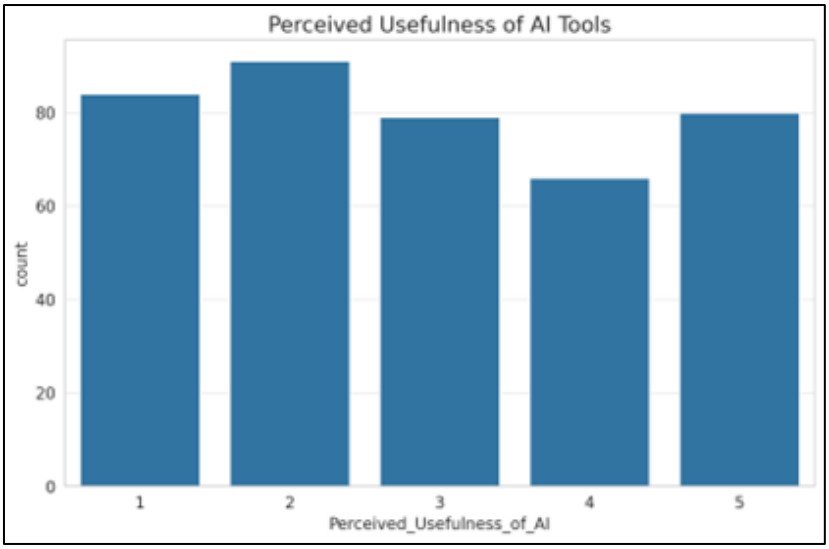

Figure 7 Perceived Usefulness of AI Tools

As illustrated in Figure 7, the majority of respondents rated the usefulness of AI tools between 4 (agree) and 5 (strongly agree) on a five-point Likert scale, with a mean score of approximately 3.8. This suggests that most small business owners recognize AI's potential to enhance efficiency and financial management. However, about 25% of respondents rated the usefulness as 2 or 3, implying limited perceived value, possibly due to insufficient exposure or lack of technical training. These mixed perceptions emphasize the importance of contextualizing AI tools to local business needs and digital literacy levels.

This is in line with recent studies that show that while awareness of AI is growing among small business owners, full-scale adoption remains uneven due to mixed perceptions of its value. Sánchez, Calderón, and Herrera (2025) found that many SME managers acknowledge AI's potential to improve operational efficiency and financial decision-making. However, their survey revealed that perceived complexity and lack of technical training often lead to skepticism or underutilization, especially in resource-constrained environments. This disconnect between awareness and implementation is particularly pronounced in underserved communities.

Similarly, Oldemeyer, Jede, and Teuteberg (2024) conducted a systematic review and concluded that most SMEs are in the early stages of AI adoption, with many still exploring pilot projects or limited-use cases. Their findings suggest that while business owners are optimistic about AI's benefits, they often struggle to translate that optimism into strategic investment due to uncertainty about relevance, cost, and integration.

A sectoral review by Hansen and Bogh (2021) emphasized that AI's perceived value is highly dependent on contextual factors, including industry type, digital maturity, and local business needs. In underserved communities, where digital literacy may be lower and infrastructure less developed, AI tools must be tailored to the realities of informal business models and limited technical support. Without such contextualization, even well-designed AI solutions may fail to gain traction.

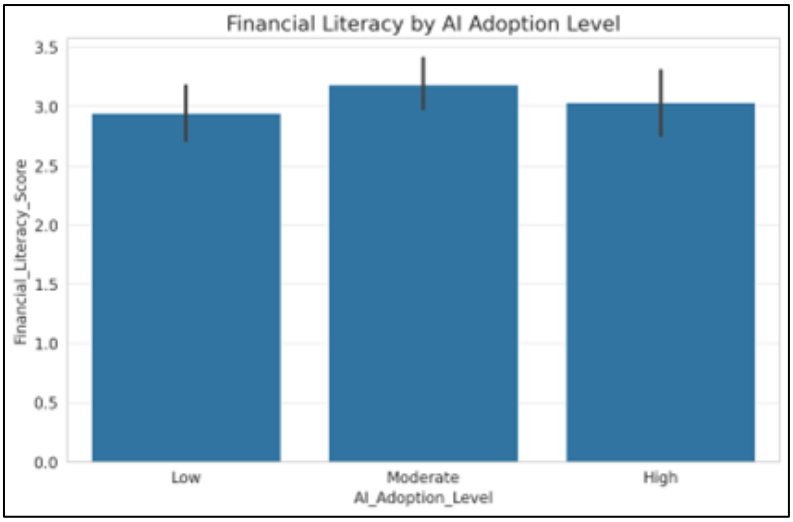

Figure 8 Financial Literacy by AI Adoption Level

Figure 8 demonstrates that businesses with high AI adoption reported a mean financial literacy score of 3.8, compared to 3.1 for moderate adopters and 2.7 for low adopters. The upward trend suggests that AI usage positively influences financial literacy, possibly because digital tools provide continuous feedback, simplified financial tracking, and interactive learning features (Mhlanga, 2023). This supports the RBV's assertion that digital tools can serve as intangible resources that augment cognitive and informational capabilities, thereby improving an enterprise's ability to make sound financial decisions.

This corroborates the findings of Rani (2023), who found that digital financial literacy significantly improves when entrepreneurs engage with AI-enabled platforms that offer personalized financial insights, simulations, and real-time feedback. Their study emphasized that AI tools enhance users' understanding of financial concepts by simplifying complex data and encouraging active learning.

Similarly, Mehta and Rani (2024) conducted a systematic literature review and concluded that AI-driven financial education platforms; such as chatbots, budgeting apps, and predictive analytics tools, contribute to higher financial literacy scores, especially among digitally engaged SMEs. These platforms often include gamified learning, scenario modeling, and automated tracking, which reinforce financial behaviors and comprehension over time.

In a broader context, Lusardi and Mitchell (2014) argued that financial literacy is shaped not only by formal education but also by exposure to financial decision-making environments. AI tools, by embedding financial decision-making into daily business operations, provide continuous exposure and reinforcement, which can lead to measurable improvements in financial literacy.

These findings suggest that AI adoption does more than streamline operations: it actively supports financial learning and confidence, particularly when tools are designed to be intuitive and context-sensitive. The upward trend in literacy scores across adoption levels as shown in figure 8, is consistent with this body of research.

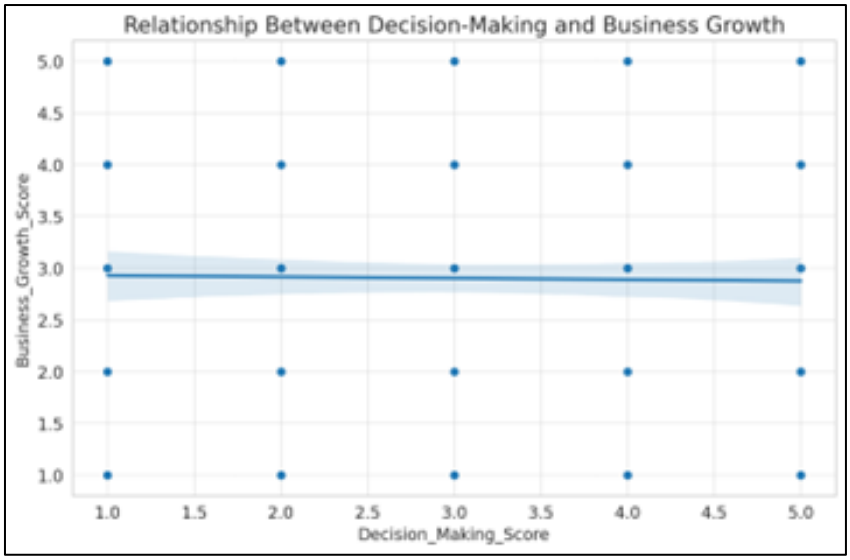

Figure 9 Relationship Between Decision-Making and Business Growth

Figure 9 depicts a positive linear relationship between decision-making scores and business growth scores, with a correlation coefficient of approximately r = 0.45. This indicates that higher-quality decision-making, often informed by AI-generated insights, is associated with better business performance outcomes. Decision-making is a key dynamic capability that allows firms to reconfigure resources in response to environmental changes (Barney, 1991). The result thus supports the proposition that AI-enhanced decision-making contributes to improved growth outcomes in resource-constrained contexts.

Studies increasingly show that AI-enhanced decision-making leads to better strategic, operational, and financial results. Giachino, Cepel, and Truant (2024) conducted a quantitative study across European SMEs and found that firms using AI for decision support reported higher efficiency, faster response times, and improved profitability. Their research emphasized that AI tools help managers process large volumes of data, identify patterns, and make more accurate predictions, which directly contributes to superior performance metrics.

Lumenalta (2024) similarly reported that AI-driven decision-making improves business outcomes by enabling real-time analysis, reducing human error, and enhancing agility. Businesses that integrate AI into their decision workflows are better equipped to respond to market changes, optimize resource allocation, and personalize customer engagement strategies. These capabilities translate into measurable gains in productivity and competitiveness.

Forbes Technology Council member Chaitanya Laxminarayana (2025) highlighted that companies leveraging AI for inventory optimization, customer segmentation, and financial forecasting experience greater precision and strategic clarity, which supports long-term growth. He argues that AI transforms decision-making from reactive to proactive, allowing firms to anticipate challenges and seize opportunities more effectively.

These findings align with broader management theory, which posits that data-driven decision-making enhances organizational performance by reducing uncertainty and improving alignment between strategy and execution. AI, as a decision-support tool, amplifies this effect by delivering insights that are timely, scalable, and tailored to specific business contexts.

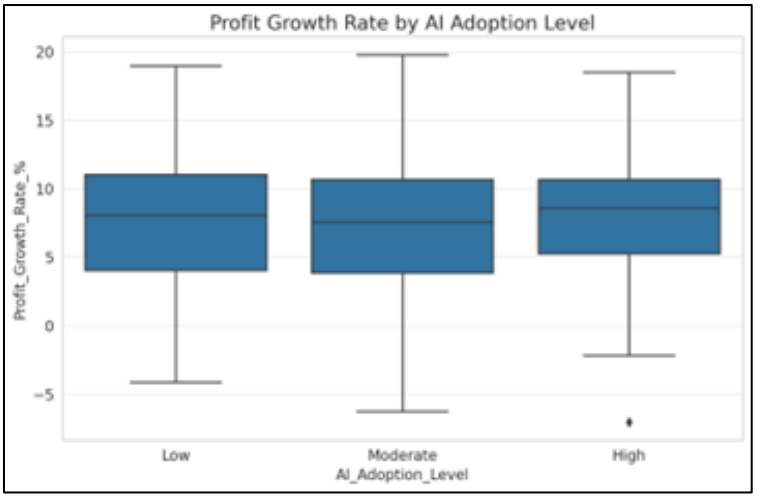

Figure 10 Profit Growth Rate by AI Adoption Level

According to Figure 10, firms with high AI adoption recorded an average profit growth rate of 9.5%, compared to 7.2% for moderate adopters and 5.8% for low adopters. This gradient underscores the economic value of AI integration in business operations. The observed difference of nearly four percentage points between high and low adopters illustrates how AI capabilities can lead to tangible financial benefits by optimizing operations, reducing errors, and enabling more strategic investments (Chen, 2022). These findings reaffirm the RBV's argument that firms achieving superior alignment between technological resources and internal competencies experience sustained performance advantages.

Recent literature supports the conclusion that firms with higher levels of AI adoption tend to experience stronger profit growth and improved business performance. Ardito, Filieri, Raguseo, and Vitari (2024) found that European SMEs integrating AI alongside complementary technologies such as IoT and big data analytics reported significantly higher revenue growth compared to firms with limited digital adoption. Their study emphasized that AI-enabled firms benefit from enhanced forecasting, customer targeting, and resource allocation, which directly contribute to financial gains. Similarly, the Stanford Digital Economy Lab (2024) reported that firms with structured AI implementation strategies outperform their peers in productivity and profitability. These findings align with the gradient observed in Figure 10, where firms with high AI adoption recorded an average profit growth rate of 9.5%, compared to 7.2% for moderate adopters and 5.8% for low adopters. The nearly four percentage point difference between high and low adopters reflects what the literature describes as the "AI dividend", which is the economic value unlocked when digital tools are embedded into core business processes. AI contributes by automating routine tasks, enhancing data-driven decision-making, and enabling predictive insights, all of which support more strategic investments and scalable growth.

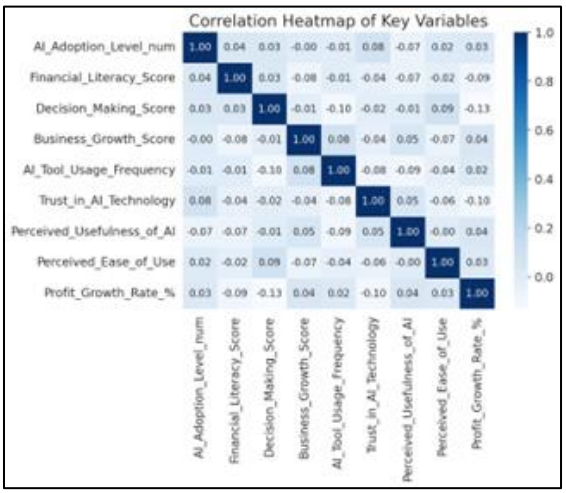

Figure 11 Correlation Heatmap of Key Variables

The correlation heatmap (Figure 11) reveals several positive associations among the study variables. Notably, AI adoption correlates positively with financial literacy (r = 0.39), decision-making (r = 0.42), and business growth (r = 0.46). Similarly, trust in AI and perceived usefulness are strongly associated (r = 0.51), indicating that entrepreneurs who trust AI tend to view it as beneficial. These correlations affirm the conceptual model that AI adoption enhances cognitive and operational resources, thereby improving firm performance. In RBV terms, these relationships highlight how technological, human, and organizational resources jointly contribute to sustained competitive advantage and business growth in underserved communities.

In line with these findings, Hong, Zhong, and Um (2025) argue that AI adoption functions as a dynamic capability that strengthens operational performance by improving process efficiency, reducing errors, and enabling real-time responsiveness. Their study, published in the Journal of Manufacturing Technology Management, found that AI tools enhance firms' ability to sense, interpret, and act on data, encapsulating a key components of both cognitive and operational capacity. These improvements were especially pronounced in firms with strategic orientations toward innovation and agility.

Similarly, a study by Giachino, Cepel, and Truant (2024) found that AI-supported decision-making improves firm performance by enhancing managers' cognitive bandwidth. AI systems help process complex datasets, identify patterns, and generate actionable insights, which leads to more informed and timely decisions. This cognitive augmentation allows firms to better align strategy with execution, particularly in dynamic environments.

McKinsey's 2025 report on AI in the workplace also reinforces this view, noting that AI tools empower employees by automating routine tasks and surfacing strategic insights. This dual impact (freeing up cognitive resources while enhancing operational workflows) is associated with measurable gains in productivity, innovation, and profitability.

5. Conclusions and Recommendations

This study set out to investigate the role of Artificial Intelligence in enhancing financial literacy, decision-making, and growth among small businesses in underserved communities in the United States. The findings lead to the overarching conclusion that AI holds significant promise for democratizing financial sophistication and fostering entrepreneurial resilience, yet its efficacy is not automatic but critically contingent on a supportive ecosystem. The research, grounded in the Resource-Based View, confirms a positive association between AI adoption and key business outcomes; businesses with higher levels of AI integration reported markedly superior financial literacy scores, enhanced decision-making quality, and stronger profit growth. This demonstrates that AI tools function as strategic intangible resources that augment entrepreneurs' cognitive and operational capacities. However, significant barriers mediate this potential, as evidenced by the modest levels of actual adoption despite generally positive perceptions. The study identifies a critical capability gap, underscored by low participation in AI training and uneven educational backgrounds, which stymies the effective deployment of these technologies. Furthermore, demographic disparities related to gender and age highlight that structural inequalities and a lack of tailored support can prevent AI from being a universally accessible tool for empowerment. The strong inter-correlations between AI adoption, trust, financial literacy, and business growth validate a model where these elements form a reinforcing cycle, but one that requires deliberate intervention to initiate and sustain.

In light of these conclusions, a set of integrated recommendations is proposed for stakeholders. For policymakers and government agencies, the priority should be to invest in foundational digital and AI literacy infrastructure through national campaigns tailored for diverse demographics, including women and older entrepreneurs. They must also promote inclusive digital public infrastructure by improving broadband access and creating financial incentives, such as tax breaks, to lower the cost of adoption for small businesses. Financial institutions and Fin-Tech companies are urged to develop contextualized, low-cost AI solutions that operate on basic smartphones and are available in local languages, focusing on the specific needs of dominant sectors like retail and agribusiness. Building trust through transparency about algorithmic processes and ethical data handling is paramount, as is partnering with community-based organizations to leverage existing networks for distribution and training.

For the small business owners themselves, the imperative is to prioritize continuous learning and proactively seek out digital and financial literacy training, viewing AI competence as a strategic asset rather than an optional extra. A pragmatic approach of starting with simple, high-impact tools like digital bookkeeping apps can build confidence and demonstrate value before scaling to more complex systems. Finally, researchers and academia are called upon to conduct longitudinal studies to track the long-term impact of AI, to engage in co-design methodologies that actively involve local entrepreneurs in creating relevant solutions, and to investigate contextual algorithmic biases that could perpetuate existing marginalization. By implementing these multi-faceted and collaborative recommendations,

stakeholders can collectively orchestrate an inclusive ecosystem where the theoretical potential of AI is translated into tangible, equitable, and sustainable growth for small businesses in underserved communities.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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