SUSTAINABILITY AND AI ADOPTION IN WOMEN'S ENTREPRENEURSHIP: OVERCOMING FINANCIAL, DIGITAL, AND POLICY BARRIERS

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Abstrack

Artificial intelligence (AI) is progressively revolutionizing business processes, enhancing efficiency, automation, and data-driven decision-making. However, female entrepreneurs face persistent challenges in adopting AI-driven business strategies due to financial, technological, and societal constraints. This study investigates key barriers impeding AI adoption among women entrepreneurs, including limited financial access, disparities in digital literacy, and societal norms influencing technology utilization.

A quantitative research methodology was employed, using structured surveys targeting women entrepreneurs across various industries and geographic locations. Descriptive statistics, regression analysis, and structural equation modelling (SEM) were utilized to identify the primary determinants of AI adoption. Reliability and validity measures were incorporated to ensure the robustness of findings.

The results indicate that access to financial resources, digital literacy, and mentorship significantly influence AI adoption among women entrepreneurs. Structural barriers such as regulatory challenges and restricted networking opportunities remain substantial constraints. The study emphasizes the effectiveness of gender-inclusive AI training programs and financial support mechanisms in bridging the gender gap in AI adoption. Moreover, policy interventions promoting inclusive digital entrepreneurship foster a more equitable economic landscape. These findings provide essential insights for policymakers, educators, and business leaders seeking to enhance AI adoption among women entrepreneurs. Addressing financial and technological challenges through targeted interventions can boost gender-inclusive digital innovation, drive economic growth, and ensure equitable AI integration.

Keywords: Sustainability, AI adoption, Women entrepreneurs, Digital literacy, Financial Access

Introduction

Artificial Intelligence (AI) adoption in entrepreneurship has been widely studied in the context of business efficiency, decision-making, and automation. Prior research has highlighted how AI-powered tools enhance operational productivity, customer engagement, and predictive analytics (Orser et al., 2019; Swartz et al., 2022). However, existing studies often focus on AI adoption in male-dominated industries or large corporations, with limited attention given to how women entrepreneurs navigate AI implementation within their business models. Recent works by Berguiga & Adair (2021) and El-Fiky (2022) emphasize the challenges of gender disparities in digital transformation, but comprehensive studies addressing specific financial, technological, and regulatory barriers remain scarce.

Women entrepreneurs contribute significantly to global economic growth, yet their participation in AI-driven business strategies remains limited. The gender digital divide continues to be a pressing issue, exacerbated by financial constraints, lower digital literacy, and socio-cultural expectations that shape women's access to technology (Tonoyan & Strohmeyer, 2021; Peiris et al., 2023). Despite government and private sector initiatives aimed at fostering digital inclusivity, women entrepreneurs still face structural barriers that prevent them from leveraging AI effectively. This disconnects between policy efforts and on-the-ground implementation creates an urgent need for targeted research and policy recommendations to bridge the AI adoption gap.

Although prior research has acknowledged the gender gap in technology adoption, there is insufficient empirical evidence on the specific determinants affecting AI adoption among women entrepreneurs, particularly in emerging economies. Additionally, existing models do not fully integrate financial access, digital readiness, and regulatory frameworks as interdependent variables influencing AI adoption. This study addresses these gaps by:

Identifying key structural barriers (financial, digital, and policy constraints) that hinder AI adoption in women-led businesses.

Examining the mediating role of digital literacy in AI adoption and business sustainability.

Comparing global AI adoption trends in women's entrepreneurship to derive actionable insights for policy interventions.

By addressing these research gaps, this study contributes to a more comprehensive understanding of gender-inclusive AI adoption strategies and provides policy recommendations that can enhance sustainable digital entrepreneurship for women on a global scale. The rapid evolution of artificial intelligence (AI) has reshaped business landscapes across industries, driving efficiency, automation, and data-driven decision-making. However, AI integration into entrepreneurial ventures has not been equitable, as women entrepreneurs face notable challenges in adopting AI-driven business strategies. Women-led enterprises contribute significantly to economic growth and innovation, yet they encounter systemic barriers that hinder their ability to leverage emerging technologies. These barriers stem from gender disparities in access to financial resources, digital literacy, and societal expectations (Orser et al., 2019; Crane, 2021). As a result, women entrepreneurs frequently lag in AI adoption, exacerbating economic inequalities (El-Fiky, 2022; Berguiga & Adair, 2021).

Existing literature underscores the need for a more inclusive approach to AI adoption, emphasizing its role in enhancing productivity and enabling women entrepreneurs to expand their businesses (Orser, 2022; Swartz et al., 2022). AI-driven tools such as automated customer service, predictive analytics, and data-driven decision-making provide substantial benefits, especially for small and medium enterprises (SMEs). However, gender disparities in technology access and skill acquisition remain significant obstacles (Tonoyan & Strohmeyer, 2021; Peiris et al., 2023). Women entrepreneurs often struggle with AI-related education and training, further limiting their ability to capitalize on technological advancements (Chen et al., 2021; Constantinidis, 2021).

This study seeks to identify key structural, social, and technological barriers impeding AI adoption among women entrepreneurs. Structural barriers include limited funding access, restrictive regulatory environments, and institutional biases (Hasniati et al., 2022; Woodwark et al., 2021). Social barriers, such as gender stereotypes and cultural norms, discourage women from engaging in AI-driven business activities (Kemppainen, 2019). Technological challenges, including a lack of formal training and mentorship, further constrain women's ability to integrate AI into their business operations (Oliveira et al., 2024).

Additionally, while AI adoption can drive economic growth, its long-term impact remains underexplored. The future of AI-driven entrepreneurship depends on how well businesses integrate automation, predictive analytics, and AI-powered decision-making into sustainable business models. Women entrepreneurs must not only adopt AI but also develop strategies to scale their businesses globally through AI applications in market intelligence and personalized customer experiences.

Research Problem Statement: How do financial, technological, and regulatory factors impact AI adoption among women entrepreneurs, and what strategies can enhance gender-inclusive digital entrepreneurship?

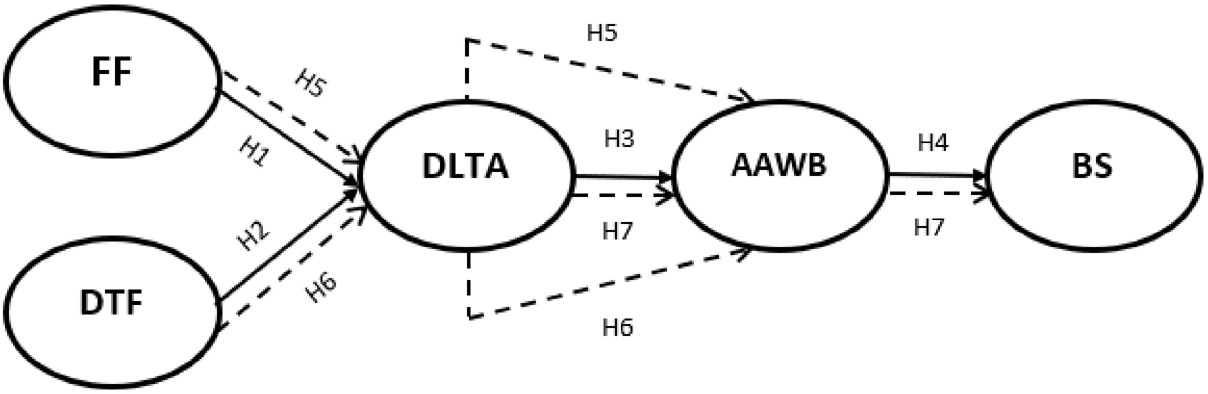

Fig. 1: Research Framework.

Table 1: Variables Information

Abbreviation	Continuation
FF	Financial Factors
DTF	Digital and Technological Factors
DLTA	Digital Literacy and Technology Access
AAWB	AI Adoption in Woman Business
BS	Business Sustainability

Literature Review

Several theories underpin this research. Diffusion of Innovation Theory (Rogers, 1962) explains how AI adoption among women entrepreneurs progresses through various adopter categories, from innovators to laggards. Digital Divide Theory highlights financial and technological disparities affecting AI adoption. Additionally, the Technology Readiness Index (Parasuraman, 2000) describes how optimism and innovation influence AI adoption willingness. These frameworks provide valuable insights into the factors influencing women entrepreneurs' engagement with AI-driven solutions.

To contextualize the study, a global comparison is crucial. In developed economies like the United States and Germany, AI-driven platforms have provided women entrepreneurs with enhanced digital ecosystems, while in emerging economies like Indonesia and Kenya, AI adoption is still constrained by financial and infrastructural gaps. Understanding these regional variations can inform more targeted policies and support mechanisms.

Research Methods

This study employs a quantitative research approach to examine the adoption of AI-driven business practices among women entrepreneurs. A structured survey was designed and administered to a diverse sample of women entrepreneurs across different industries and geographic regions. The survey included closed-ended and Likert-scale questions to measure factors influencing AI adoption, such as access to financial resources, digital literacy levels, and perceived technological barriers (Saikumari & Sunitha, 2023; Peiris et al., 2023).

The sample was selected using a stratified random sampling technique to ensure representation across various business sectors and technological adoption levels. The target population comprised women entrepreneurs who have started or currently run businesses, with a focus on those operating in technology-intensive industries. Data was collected through online survey platforms, allowing for a broad and diverse reach (Chen et al., 2021; Berguiga & Adair, 2021).

The collected data was analyzed using statistical techniques, including descriptive statistics, regression analysis, and structural equation modelling (SEM) to identify key determinants of AI adoption. Descriptive statistics were used to summarize the demographic characteristics of respondents, while regression analysis examined the relationship between independent variables (such as access to funding and digital literacy) and the dependent variable (AI adoption) (Orser et al., 2019; Brush et al., 2020). Structural equation modelling was employed to understand complex interactions between multiple influencing factors.

To ensure accuracy and reliability, validity and reliability tests were conducted. Cronbach's alpha coefficient was calculated to assess internal consistency, while confirmatory factor analysis (CFA) was performed to validate measurement constructs (Orser, 2022; Swartz et al., 2022).

Ethical considerations were strictly adhered to, with informed consent obtained from all participants before data collection. Respondent anonymity and confidentiality were ensured to protect participant identities and maintain research integrity (Mouazen & Hernández-Lara, 2023). By utilizing a robust quantitative approach, this study provides empirical insights into the challenges and opportunities women entrepreneurs face in AI adoption. The findings contribute to the growing body of research on digital entrepreneurship and inform policy recommendations aimed at fostering gender-inclusive technological innovation.

Results and Discussion

Hypothesis Testing Results

The following table presents the results of hypothesis testing based on regression analysis and structural equation modeling (SEM):

Table 2: Hypothesis Table

Hypothesis	Relationship	Coefficient (β)	p-value	Result
H1	Financial Factors → Digital Literacy & Technology Access	0.147	0.008	Significant
H2	Digital & Technological Factors → Digital Literacy & Technology Access	0.660	<0.001	Significant
H3	Digital Literacy & Technology Access → AI Adoption in Women's Businesses	0.700	<0.001	Significant
H4	AI Adoption → Business Sustainability	0.718	<0.001	Significant
H5	Financial Factors → Digital	0.103	0.009	Significant

	Literacy & Technology Access → AI Adoption			
H6	Digital & Regulatory Factors → Digital Literacy & Technology Access → AI Adoption	0.462	<0.001	Significant
H7	Digital Literacy & Technology Access → AI Adoption → Business Sustainability	0.502	<0.001	Significant

Source: Data by authors 2024

These results indicate that financial, digital, and technological factors play a significant role in influencing AI adoption among women entrepreneurs, with a cascading effect on business sustainability. The findings align with Diffusion of Innovation Theory, which suggests AI adoption progresses through stages based on awareness, interest, and decision-making. Digital Divide Theory reinforces the role of financial constraints and digital literacy gaps in AI adoption, while the Technology Readiness Index highlights optimism and resistance to new technologies as determining factors.

A comparative analysis with successful AI-driven women entrepreneurs in developed economies suggests that access to venture capital funding, robust mentorship networks, and governmental support accelerates AI adoption. Meanwhile, in developing economies, community-driven microfinancing and grassroots digital training programs have been more effective in empowering women entrepreneurs.

The long-term impact of AI on women's entrepreneurship is significant. AI-driven tools are expected to transform traditional business models by automating repetitive tasks, enabling hyper-personalized marketing strategies, and optimizing supply chains. In the next decade, AI could enable women entrepreneurs to expand into global markets with minimal physical infrastructure, leveraging AI-powered analytics and automation tools to enhance efficiency and scalability.

Conclusion

The study findings reinforce Diffusion of Innovation Theory, Digital Divide Theory, and Technology Readiness Index, emphasizing the necessity of policy interventions to enhance AI adoption among women entrepreneurs. Additionally, global comparisons suggest that the availability of funding, training programs, and mentorship support systems play a critical role in bridging the AI adoption gap.

Future research should explore how AI-driven businesses led by women evolve over time and how AI can enhance cross-border digital trade for women entrepreneurs. Addressing financial, technological, and regulatory barriers can support AI integration, fostering economic sustainability and equitable digital transformation.

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