

APPLYING AI TO WOMEN'S BUSINESS ACTIVITIES: STRUCTURAL BARRIERS AND PRACTICAL ADAPTATION IN URBAN VIETNAM

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ABSTRACT

In the context of rapid urbanization and the strong growth of digital technology in Vietnam, Artificial Intelligence (AI) is increasingly being applied in business operations, particularly for women who run small businesses or manage business projects in urban areas. Grounded in the Social Construction of Technology (SCOT) framework and informed by the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT), this study employs a quantitative approach using a structured survey of 300 female entrepreneurs. To better capture AI readiness under resource constraints, the study develops the AFT Index (Awareness-Finance-Time) as a composite measure reflecting both cognitive understanding and practical conditions for technology use. The findings show that AI provides several practical benefits for women-led businesses, such as improving order management, automating customer service through chatbots, and analyzing user data to support sales strategies. Despite these advantages, challenges related to digital literacy, time availability, and financial capacity persist-particularly among small household businesses and micro-enterprises, where resources are often limited. These constraints highlight the importance of understanding AI adoption not only from a technical perspective but also through the lens of social context and lived experience. This study contributes to the growing body of literature on gender and digital technology by introducing the AFT framework as a context-sensitive tool and emphasizing how structural and everyday barriers shape the ability of women in urban Vietnam to engage with AI in meaningful ways.

Keywords: Artificial Intelligence (AI), AI adoption, women entrepreneurs, digital literacy, resource constraints, AFT Index, urban Vietnam.

1. INTRODUCTION

Vietnam's rapid urbanization and digital transformation have fundamentally reshaped the country's economic landscape. In recent years, Artificial Intelligence (AI) has emerged as one of the most powerful drivers of innovation across industries, transforming how businesses operate, communicate, and compete [1]-[3]. Recent studies indicate that AI adoption can support business scaling, decision-making, and sales performance among women entrepreneurs[4][5]. However, these benefits are not equally realized, as effective AI adoption

depends on users' digital capabilities and access to technological and financial resources [6]. Persistent barriers, including limited technological resources and digital skill gaps, therefore continue to constrain inclusive AI adoption [7].

In Vietnam, women entrepreneurs play a vital role in economic development, accounting for a significant proportion of business ownership and contributing substantially to job creation [8], [9]. Despite this, women-led businesses continue to face structural barriers that constrain their engagement with new technologies. These barriers operate across multiple levels, including limited financial resources, restricted access to digital infrastructure, and persistent gender norms that shape business opportunities [10]-[12]. Such constraints not only limit technological adoption but also reinforce broader patterns of inequality in the digital economy.

Existing research on AI adoption has predominantly focused on technical and economic determinants, with relatively limited attention to the social and cultural contexts shaping technology use. In particular, there is a lack of empirical studies examining gendered experiences of AI adoption in developing countries such as Vietnam. To address this gap, this study adopts the Social Construction of Technology (SCOT) framework, which conceptualizes technology as a socially embedded process shaped by users' lived experiences and structural conditions. This perspective enables a more nuanced understanding of how women entrepreneurs navigate both opportunities and constraints in adopting AI within their everyday business practices.

The study is guided by three main research objectives. First, it aims to operationalize and integrate the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT), and the Social Construction of Technology (SCOT) framework in developing the AFT model as an analytical lens to examine AI adoption behavior. Second, it seeks to identify the key barriers influencing AI adoption, with particular attention to awareness, financial capacity, and time constraints. Third, it examines the relationship between awareness and actual usage, with a focus on understanding how women entrepreneurs adapt to AI within resource-constrained environments.

2. LITERATURE REVIEW

A growing body of literature highlights the transformative potential of artificial intelligence (AI) in small and medium-sized enterprises (SMEs), particularly in enhancing operational efficiency, reducing costs, and enabling data-driven decision-making [13], [14]. From a technological adoption perspective, frameworks such as the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) have been widely applied to explain how perceived usefulness, ease of use, and behavioral intention shape the uptake of new technologies. These models, however, primarily focus on individual-level determinants and often overlook the broader structural conditions under which technology adoption occurs [15].

This limitation becomes particularly salient in the context of women entrepreneurs. While AI adoption has been associated with improved scalability and decision-making in women-led ventures, existing research consistently shows that women face distinct and persistent barriers in accessing and effectively leveraging digital technologies, including limited digital literacy, financial constraints, and socio-cultural restrictions [4], [7]. These constraints suggest that technological readiness cannot be fully understood without considering the social and institutional environments in which women operate [16], [17].

To address this gap, scholars have increasingly emphasized the role of context in shaping entrepreneurial behavior. Drawing on the Social Construction of Technology (SCOT) perspective, technology use is understood as being embedded within specific social, cultural, and institutional settings rather than determined solely by technical functionality [18]. For instance,

Welter (2014) argues that entrepreneurship is inherently “gendered” by local norms and institutional structures [19]. Empirical evidence from contexts such as Palestine further illustrates that, even when digital technologies are accessible, restrictive institutional environments can confine women entrepreneurs to limited forms of participation, such as home-based businesses [20]. Conversely, more supportive conditions, such as digital financial inclusion, can enhance women’s entrepreneurial capacity by reducing financial barriers and increasing flexibility, although such benefits remain uneven across socio-economic contexts [21].

In Southeast Asia, women-led SMEs are predominantly concentrated in small-scale sectors such as retail, hospitality, and creative industries, where digital platforms provide new opportunities for market access, learning, and network building [22], [23]. However, these opportunities are accompanied by persistent structural barriers, including limited access to capital, low levels of digital capability, and constraints related to time and social expectations [24]. Recent systematic reviews further conceptualize these barriers as multi-layered, spanning economic access, digital skills, and socio-cultural constraints [25].

Despite these advances, existing literature tends to treat technological adoption and structural barriers as separate lines of inquiry. Models such as TAM and UTAUT explain how individuals decide to adopt technology, while contextual approaches like SCOT highlight the influence of social environments, yet few studies integrate these perspectives to examine how resource constraints shape technology readiness in practice. Moreover, empirical evidence remains limited in the context of women-led SMEs in urban Vietnam, where rapid digital transformation intersects with persistent gendered inequalities.

3. METHODOLOGY

3.1. Research Design

This study employs a quantitative research design to examine AI adoption readiness in urban business operations in Vietnam. Within the framework of this research, the authors developed and operationalized the AFT index, comprising Awareness (A), Finance (F), and Time (T). This index was constructed to operationalize the core concepts derived from the following theories:

From TAM (Technology Acceptance Model) [26]: The Awareness (A) component reflects perceptions of technology acceptance - specifically, an understanding of AI, recognition of its utility, and confidence in using it. While a positive perception of AI is a prerequisite, it does not necessarily translate into actual adoption behavior if users lack the necessary supporting conditions.

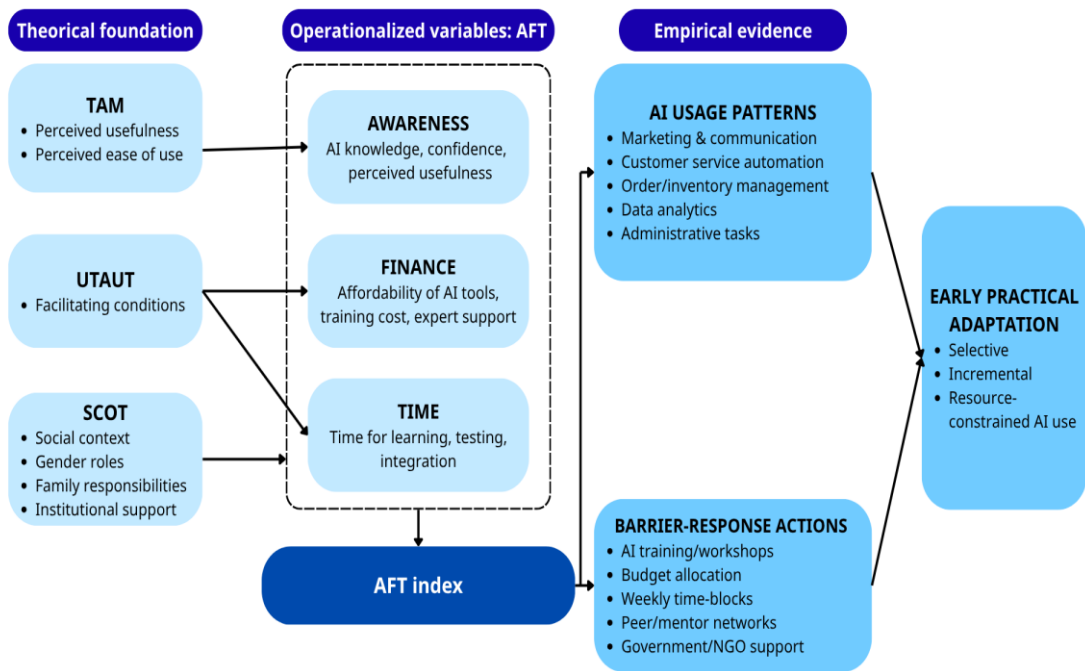
From UTAUT (Unified Theory of Acceptance and Use of Technology) [27]: This study draws upon the concept of “facilitating conditions”, subsequently operationalizing it into two key resources particularly relevant to women-owned businesses. These are Finance (F), which measures the financial capacity to cover the costs of tools, training, and technical support. And Time (T) - which measures the capacity to allocate time for learning, experimentation, and integrating AI into business operations.

Drawing upon SCOT (Social Construction of Technology) [28], this theoretical framework posits that resources (F) and (T) are not merely individual constraints; rather, they represent social conditions shaped by gender roles, family responsibilities, support networks, and the institutional environment.

Consequently, AFT conceptualizes AI adoption readiness as a construct that is simultaneously technological and social. The AFT index is designed to elucidate the relationship between cognitive capacity (A) and implementation conditions (F and T). This provides a practical approach to analyzing the gap between perception and behavior regarding

AI adoption, taking into account resource constraints. The components of AFT are standardized from a 1 - 5 Likert scale to a 0 - 100 scale and aggregated using an unweighted average to serve descriptive purposes, thereby identifying the actual state of technology adoption in a practical context.

Within the scope of this study, “adapting” to AI does not refer to macro-level strategies, complex initiatives, or comprehensive digital transformation plans. Rather, adaptation here is characterized by initial recognition and pragmatism. In other words, it reflects real-world coping practices: using whatever resources are available and adopting whatever tools are needed to solve immediate problems. This form of adaptation manifests in two key aspects: first, the prioritization of accessible, low-cost AI tools designed to address daily operational needs directly; and second, autonomous efforts to overcome systemic barriers, such as proactively allocating small budgets, carving out limited time for learning and experimentation, or engaging with support networks. This study evaluates such practical adaptation by synthesizing three distinct data sets: the AFT Index (reflecting readiness under constrained conditions), the current state of AI adoption, and the specific micro-actions undertaken to mitigate existing barriers.



Note: The AFT Index measures AI readiness under resource constraints, while early practical adaptation is interpreted through AI usage patterns and barrier-response actions.

Figure 1. Conceptual framework of the study (Source: Author's own elaboration)

3.2. Sampling

A non-probability, quota-controlled sampling strategy was implemented. Recruitment utilized purposive and snowball sampling techniques via local business associations, women entrepreneur networks, and online platforms. A sample size of 300 is generally considered adequate for multivariate analysis and is associated with reliable statistical results. First, the study primarily employs a descriptive approach rather than testing causal models or engaging in complex statistical inference. Consequently, a sample size of 300 provides robust statistical stability and reliability for calculating key descriptive metrics [29], such as means, percentages, and the Composite AFT Index. Second, the survey instrument encompasses a broad range of variables [30]. Including AI adoption models, barriers based on the AFT

framework, implemented practical actions, perceived benefits, and policy support. This sample size ensures sufficient data dispersion to accurately capture these multifaceted dimensions without distortion from outliers. Finally, this sample size facilitates allocation across three distinct survey locations. With 135 samples in Hanoi, 105 in Ho Chi Minh City, and 60 in Da Nang, the study retains a sufficient number of observations to characterize trends within each urban center without allowing any single location to dominate the overall results. Eligible participants were women who owned or managed a small or micro-enterprise or conducted independent online business activities for at least six consecutive months.

3.3. Instrument design

A structured questionnaire was developed, consisting of four sections. The instrument was designed to capture three dimensions of AI readiness. The Awareness dimension reflected respondents' knowledge and confidence in understanding and using AI tools. Finance reflected their financial capacity and willingness to invest in AI tools, training, and expert support. Time measured the availability and flexibility of time for learning and experimenting with AI.

The questionnaire included: (1) demographic information;

(2) AI usage across business functions (5 items);

(3) challenges related to Awareness, Finance, and Time (AFT, 12 items);

AFT components were scaled to 0–100:

$$S(x) = \left(\frac{x-1}{4}\right) \times 100 \quad (\text{for } X \in \{A, F, T\})$$

The composite AFT index is the unweighted mean of the three components:

$$AFT = \frac{S(A) + S(F) + S(T)}{3}$$

This scaling converts the original 1–5 Likert mean into a 0–100 readiness score.

(4) actions, perceived benefits, and policy support (15 binary Yes/No items).

All scale-based items used a five-point Likert scale (1 = Not used/Strongly disagree to 5 = Highly used/Strongly agree). Negatively worded items were reverse-coded so that higher scores consistently indicated greater readiness for AI adoption.

The internal reliability was confirmed with Cronbach's alpha > 0.8 for all three AFT dimensions.

3.4. Data analysis

Data were analyzed using SPSS 27. Descriptive statistics (frequency, percentage, mean) were used to summarize patterns of AI usage, challenges, and perceived benefits. No inferential modeling was employed, as the study aimed to construct and use the AFT index as a descriptive tool rather than test causal relationships.

4. FINDINGS

Most respondents (56.7%) were aged 26–40, representing Vietnam's most active entrepreneurial age group. A further 31.7% were between 41 and 55, showing strong participation by mid-career women. Most participants (58.7%) held a bachelor's degree, confirming that urban female entrepreneurs tend to be relatively well-educated. Regarding business type, services (35%) and retail/online commerce (31.7%) dominate, consistent with Vietnam's digital urban economy. Only 5% operate in manufacturing or handicraft sectors, suggesting AI adoption may vary across industries. Nearly half (48.3%) have operated their businesses for 2–5 years, reflecting early-stage entrepreneurs adapting to new technologies.

Table 1. Demographic profile of women entrepreneurs

No.	Demographic profile	No. of respondents	Percentage (%)
Age			
1	Less than 25 years	15	5
2	26 – 40 years	170	56.7
3	41 – 55 years	95	31.7
4	Above 56 years	20	6.6
5	Total	300	100
Education			
1	High school	72	24
2	Bachelor	176	58.7
3	Postgraduate	52	17.3
4	Total	300	100
Business type			
1	Retail / Online Commerce	95	31.7
2	Services	105	35
3	Creative / Media	55	18.3
4	F&B	30	10
5	Manufacturing / Handicraft / Others	15	5
6	Total	300	100
Years in operation			
1	Below 2 years	60	20
2	2 – 5 years	145	48.3
3	Above 5 years	95	31.7
4	Total	300	100

Source: Authors' survey data (2025)

Table 2. Impact of AI in business of Vietnam

AI Usage	Highly used	Used	Moderately used	Rarely used	Not used	Mean
Marketing & Communication (Chatbots, Ads AI, Zalo OA)	80	110	60	35	15	3.58
Customer Service Automation	70	95	80	40	15	3.35
Order / Inventory Management	60	80	90	50	20	3.13
Decision Making / Data Analytics	45	70	90	60	35	2.88
Administrative Tasks	40	65	85	70	40	2.77

Source: Authors' survey data (2025)

AI is most extensively applied by women entrepreneurs in marketing and communication tasks (Mean = 3.58), primarily through tools such as Facebook Ads, Zalo OA, and chatbots. Customer service automation ranks second (Mean = 3.35), indicating active integration of automated response systems.

Applications in inventory management (3.13) and data analytics (2.88) remain moderate, reflecting limited analytical capacity among women-led businesses. Administrative tasks have the lowest mean (2.77), showing that operational automation is still in its infancy. These results indicate selective and functional AI adoption - primarily for visibility and communication rather than for data-driven management.

These figures reflect a pragmatic adaptation in which women-owned businesses prioritize AI applications that are low-cost, user-friendly, and directly tied to customer interactions, rather than more complex, data-driven functions.

Table 3. Challenges of implementing AI in Vietnam

Challenges	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Mean
Lack of technical skills/training	120	115	45	15	5	3.95
High cost of AI tools and maintenance	100	130	45	20	5	3.88
Limited time for learning AI	85	120	55	25	15	3.63
Lack of policy support or mentorship	75	115	70	30	10	3.57
Fear of job replacement by AI	55	90	80	50	25	3.23

Source: Authors' survey data (2025)

The main challenges are a lack of technical skills or training (Mean = 3.95) and high costs of AI tools and maintenance (Mean = 3.88), aligning with the “Awareness” and “Finance” components of the AFT model. Limited time for learning AI (Mean = 3.63) further highlights the “Time” constraint women entrepreneurs face, balancing multiple roles. Institutional barriers - such as insufficient policy support (3.57) - and psychological concerns about AI replacing human work (3.23) are secondary but still relevant. These findings suggest that barriers are not only structural but also shape how and where AI is selectively adopted. While Table 3 presents individual barriers to AI adoption, these items were reverse-coded in the construction of the AFT index to reflect enabling capacity.

Table 4. AFT component scores

Construct	Mean (1 - 5)	Score (0 - 100)
Awareness (A)	3.80	70
Finance (F)	3.10	52.5
Time (T)	2.90	47.5
AFT (average of A, F, T)		56.7

Source: Authors' survey data (2025)

AFT indicates moderate readiness overall; Awareness is relatively strong (70), while Finance (52.5) and Time (47.5) are the binding constraints.

Table 5. Actions taken to overcome barriers (N = 300)

		Frequency	Percent (%)	Cumulative percent (%)
Have you participated in any AI-related training or workshops?	Yes	105	35	35
	No	195	65	100
	Total	300	100	
Have you allocated a budget for AI tools or learning?	Yes	95	31.7	31.7
	No	205	68.3	100
	Total	300	100	
Have you set weekly time-blocks to learn or test AI tools?	Yes	80	26.7	26.7
	No	220	73.3	100
	Total	300	100	
Have you joined any peer group or mentor network about using AI?	Yes	60	20	20
	No	240	80	100
	Total	300	100	
Have you received support from the government/NGO for AI adoption?	Yes	45	15	15
	No	255	85	100
	Total	300	100	

Source: Authors' survey data (2025)

Although awareness of AI is rising, formal engagement in training, budgeting, and support programs remains limited. Only 35% have attended any AI-related training, and 31.7% have allocated a specific budget. Time remains a major issue: just 26.7% reported setting aside weekly hours for AI learning. Participation in mentoring or government/NGO programs is even lower (20% and 15%, respectively). However, this does not imply that female entrepreneurs are sitting on the sidelines. Instead, this suggests that women entrepreneurs may be adapting within their available resources by engaging in incremental learning and prioritizing cost-effective solutions.

Table 6. Perceived Benefits of AI for Women Entrepreneurs in Vietnam (N = 300)

		Frequency	Percent (%)	Cumulative Percent (%)
In your business, has AI contributed to faster or more confident decision-making in the last 3 months?	Yes	255	85	85
	No	45	15	100
	Total	300	100	
Customer service via chatbot/auto-reply (e.g., Zalo, Facebook, website) has improved resolution speed/consistency?	Yes	260	86.7	86.7
	No	40	13.3	100
	Total	300	100	
Do you think AI helps increase your business productivity?	Yes	240	80	80
	No	60	20	100
	Total	300	100	
Do you think AI reduces administrative workload?	Yes	210	70	70
	No	90	30	100
	Total	300	100	
Do you think AI improves marketing and communication efficiency?	Yes	250	83.3	83.3
	No	50	16.7	100
	Total	300	100	

Source: Authors' survey data (2025)

The majority acknowledge the utility of AI: 85% believe it improves decision-making, 86.7% agree that chatbots enhance customer service quality, and 83.3% observe increased efficiency in marketing and communication activities. Improvements in productivity (80%) and a reduction in workload (70%) are also widely recognized benefits. This affirms that women-led businesses view AI as a tool for professionalizing operations and driving business growth. However, when cross-referenced with Table 5, it becomes evident that the level of awareness significantly outpaces actual adoption, thereby highlighting the impact of non-technical barriers, factors previously outlined in the AFT model. This strong awareness of AI's benefits, when juxtaposed with limited actual engagement, further underscores a key reality: the process of adapting to this technology is driven primarily by structural barriers, rather than by a lack of motivation.

Table 7. Suggested solutions and policy support for AI adoption (N = 300)

		Frequency	Percent (%)	Cumulative Percent (%)
Do you think subsidies or financial grants for AI tools/training should be provided?	Yes	270	90	90
	No	30	10	100
	Total	300	100	
Do you think free or short AI training courses for women entrepreneurs are necessary?	Yes	265	88.3	88.3
	No	35	11.7	100
	Total	300	100	
Do you think mentorship or expert advisory programs would help women use AI effectively?	Yes	250	83.3	83.3
	No	50	16.7	100
	Total	300	100	
Do you think improving digital infrastructure (internet access, devices) is necessary?	Yes	240	80	80
	No	60	20	100
	Total	300	100	
Do you think awareness campaigns on safe and ethical AI use are needed?	Yes	235	78.3	78.3
	No	65	21.7	100
	Total	300	100	

Source: Authors' survey data (2025)

Policy preferences are clear: 90% of respondents advocate for financial subsidies or grants, and 88.3% call for free or short AI courses tailored for women entrepreneurs. Mentorship programs (83.3%) and digital infrastructure improvements (80%) are also highly endorsed. Notably, 78.3% highlight the need for awareness campaigns on safe and ethical AI use, showing an emerging concern about responsible technology adoption. These results provide a direct policy roadmap - prioritizing funding, training, and mentorship as prerequisites for gender-inclusive AI readiness.

5. DISCUSSION

5.1. The AFT model and technology adoption theory

The AFT model not only captures the barriers but also explains the conditions that enable practical adaptation. The findings suggest that the AFT framework is a useful descriptive tool for assessing readiness to apply AI, particularly regarding gender factors. This model combines TAM (Technology Acceptance Model) and UTAUT (Unified Theory of Acceptance

and Use of Technology). Within the TAM framework, awareness can be interpreted as a factor that increases perceived usefulness and perceived ease of use, thereby encouraging technology acceptance. When users feel that technology is easy to use, they will accept and use it more. However, “facilitating conditions”, according to UTAUT, limit the level of actual participation in an AI application. The level of women entrepreneurs’ readiness to apply AI is strongly influenced by access to resources (such as money and time) and opportunity costs. The AFT index clarifies the relationship between awareness and actual application, which only occurs when sufficient support conditions (finance and time) exist. Tables 5 and 6 demonstrate the gap between awareness and actual action. This reflects that although many women recognize the benefits of AI, due to insufficient resources, be it time or finances, they cannot proactively apply this technology in their work or life.

5.2. Social Construction of Technology (SCOT) perspective

Through the lens of SCOT theory, the research results reflect that the current approach and application of technology, especially AI, depends not only on technical capacity or technology availability, but is also influenced by social, cultural factors and gender roles in daily life.

In particular, in Vietnam, a country with East Asian culture, urban women often take on dual roles such as caring for the family and managing the business. Therefore, urban women in Vietnam often lack time to learn or experiment with new technology tools such as AI. Although women are aware of the benefits of this technology, survey data shows that only 26.7% of women spend time each week learning or experimenting with AI. This number partly reflects social expectations for women; they still have to prioritize family work over their needs to develop technology or study. This result is similar to some other developed countries, such as Palestine. According to Althalathini research, women have access to digital tools, but the social environment does not create conditions to support them; they are limited to the scope of home-based businesses and lack opportunities for further development [20].

The application of AI is considered a technical individual behavior and a social process negotiated and shaped by the context. Every decision that women make when using technology is associated with social barriers and supports, such as who will look after the children, who will do the housework, whether they have the support of their husband/parents, whether they have access to the internet, and whether they can learn how to use it. To promote women to apply AI most effectively, we cannot just focus on the technical aspects or open superficial technology courses. We need to understand and address the social and structural constraints in their daily lives. Therefore, the adoption of AI should be understood as a context-specific process of adaptation, in which women tailor the technology to suit their own specific social and economic realities.

5.3. Practical and policy implications

The findings suggest that promoting AI adoption in urban women-led businesses cannot be achieved by individual or technical readiness alone but must be shaped by interventions at multiple levels. At the individual level, the creation of intensive yet flexible training can mitigate the technological knowledge and skills gap. For women small business owners, the facilitative structures of AI training must not only be intensive, but also allow for learning and practicing AI at their own pace, as these women have specific time access constraints. At the intermediate level, access to small financial resources such as micro-capital or digital innovation funding can play a practical role in reducing the cost pressures associated with using technological tools. Motivated women still find technology access, especially paid software, equipment or supportive services, a challenge.

Meanwhile, at the policy level, it is necessary to build a comprehensive digital institutional framework. It includes supporting technology tools at reasonable prices, developing personalized consulting programs, and simultaneously investing in upgrading digital infrastructure with a focus on the specific needs of women-led businesses. Integrating AI with real-world applications becomes a genuine possibility when the access barriers of devices, connectivity, and information isolation are eliminated. Incorporating technology ethics and responsible AI use in content in training helps learners develop the requisite critical technology thinking and helps balance the digital transformation process between efficiency and social value, which, in Vietnam, is especially important to gender equality in the digital ecosystem. Crucially, policy interventions should be grounded in existing adaptive practices supported by empirical evidence, rather than merely assuming that the issue stems from a lack of participation.

6. CONCLUSION

The findings reveal that women entrepreneurs in urban Vietnam are aware of AI's potential benefits, particularly in marketing and customer service, yet face persistent barriers related to technical skills, financial affordability, and time constraints. The AFT index (Awareness 70; Finance 52.5; Time 47.5) indicates moderate readiness. Despite the high perception of AI benefits, fewer than one-third of respondents have undertaken structured training or budget allocation for AI tools. This highlights a readiness-action gap shaped by socio-economic and cultural factors rather than technology alone. Addressing this gap requires targeted capacity-building, financial support, and gender-sensitive AI training programs.

Based on the survey data collected from 300 women entrepreneurs across Hanoi, Ho Chi Minh City, and Da Nang, the awareness level of AI among these entrepreneurs seems to be adequate, although the other two dimensions, particularly the financial and time constraints, greatly attenuate the capacity to translate this awareness into action. The gap between comprehension and implementation of technology demonstrates that the absence of comprehensive socio-economic conditions for end users will likely hinder any purely technical initiatives aimed at full digital transformation. From the perspective of the SCOT model illustrates how women's use of technology aligns with their circumstances by considering gender roles, family dynamics, and structural conditions influencing technology access and integration. Learning and experimenting with AI is not simply a personal decision, but the result of a negotiation between the need for career development and the pressures of family care, between the motivation to learn and the constraints of time, finance, and social connection. These factors establish a "gendered" technological ecosystem, in which women are both subjects with technological potential and subjects who must overcome systemic barriers to realize it.

The findings confirm that strategies to promote AI adoption in the informal sector and women-led micro-enterprises should focus on digital equity. Expanding access to AI for women should be implemented through multi-layered policies, including: tailoring training to women's lived realities, providing flexible financial support, building inclusive urban digital infrastructure, and developing gender-friendly technical support networks. At the same time, integrating technology ethics into digital transformation programs is essential to ensure that modernization does not exacerbate gender gaps. Overall, the study contributes an integrated approach between the technology behavior model (TAM, UTAUT) and the sociological analysis framework (SCOT), to better understand the relationship between technological capabilities and social conditions - especially when considering gender factors. In the process of promoting Vietnam's digital transformation strategy and gender equality, viewing technology not only as a technical tool, but also as a social space that ensures fairness,

especially in terms of gender, will be the foundation for designing more effective and sustainable policies. This study indicates that the adoption of AI within the community of women-led businesses in Vietnam's urban areas is not merely constrained by structural barriers but is also actively shaped through pragmatic adaptive strategies. Rather than being passive recipients of technology, these entrepreneurs act as proactive agents; they skillfully integrate AI selectively into their business operations, navigating within the constraints of time, financial resources, and societal expectations.

7. LIMITATIONS

This study presents several limitations that warrant acknowledgment. First, the use of a quota-controlled non-probability sampling strategy limits the generalizability of the research findings. Although the sample covers three major urban centers—Hanoi, Ho Chi Minh City, and Da Nang—it may not fully represent female entrepreneurs in rural or less-developed regions, where access to digital technology, financial resources, and institutional support may differ significantly. Second, the study employs a descriptive quantitative design. Consequently, it does not test for causal relationships among Awareness, Finance, Time, and AI adoption behaviors. Therefore, the AFT Index should be interpreted as a descriptive measure of AI adoption readiness within a resource-constrained context, rather than as a predictive or causal model. Third, the AFT Index relies on self-reported data and an unweighted aggregation of its three constituent components. This approach may not fully reflect the relative importance of awareness, financial capacity, and time availability across diverse business contexts. Finally, the study identifies only early-stage practical adaptations, manifested through AI usage patterns and specific actions taken to directly address existing barriers. These findings illustrate how female entrepreneurs adjust their AI usage within the scope of their available resources and immediate needs; however, they do not provide in-depth qualitative evidence regarding long-term, innovative, or systemic adaptation strategies within their daily business operations. Therefore, future studies should adopt a mixed-methods approach, incorporating broader, more diverse research samples, while also examining in greater depth the adaptive strategies across various urban and rural contexts.

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