

# Bridging the Digital Gender Divide: How AI-Enabled Business Ecosystems Transform Barriers and Opportunities for Malayali Women Entrepreneurs in Emerging Markets

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**Abstract:** The rapid emergence of artificial intelligence (AI) and digital technologies is increasingly pervading entrepreneurial ecosystems globally and is creating new avenues for some entrepreneurs to engage with markets. The present study investigates how AI-based business ecosystems are transforming the opportunities and barriers faced by Malayali women entrepreneurs. Using a multi-stage sampling approach, data has been collected from 380 respondents through structured questionnaire, the study employs a Structural Equation Modelling (SEM) approach to analyze how AI-enabled business ecosystems influence the transformation of opportunities and barriers by introducing AI adoption, digital literacy, fintech, network expansion, institutional support, cultural norms and entrepreneurial outcomes as endogenous constructs. The findings support high measurement validity and good model fit but show that AI adoption does not lead to increased digital literacy or fintech access. While these results are initially surprising given what we know about the potential of technology and AI to boost skills, they highlight that more work is needed to truly leverage technology for development. A decline in network size as AI adoption increases also suggests that depending more on technology may mean less social capital creation. Results further show that digital literacy negatively affects innovation, institutional support and cultural norms encouraging AI adoption had no significant direct effect on AI adoption. The findings advance the research literature on the multi-dimensional nature of the digital gender divide, highlighting interactions between technological, social, and institutional dynamics. The results have important implications for decision makers and practitioners hoping to create sustainable entrepreneurial ecosystems in emerging markets.

**Keywords:** AI-enabled business ecosystems; Digital gender divide; Women entrepreneurship; Digital literacy; Fintech access; Network expansion; Innovation; Sustainability.

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## I. INTRODUCTION

The rapid spread of digital technologies is transforming the entrepreneurial landscape. The rise of artificial intelligence (AI) is increasingly influencing the opportunities and challenges for entrepreneurs and small businesses alike [1]. The AI-enabled business ecosystems built on digital platforms, fintech, big data analytics, and decision-making algorithms are offering opportunities for entrepreneurs to overcome geographical, information, and financial barriers to entrepreneurship and business growth [2]. In emerging markets, digital technologies can often compensate for weaknesses in institutions and encourage wider participation in economic activities [3]. With growing evidence that women entrepreneurs can generate inclusive growth, jobs, and social transformation, their participation in and benefits from entrepreneurship are critical. Despite technology innovation and government initiatives to promote digital inclusion, women entrepreneurs still encounter significant barriers to entrepreneurship and remain vulnerable to uneven outcomes [4]. Women entrepreneurs in India and

particularly in the southernmost state of Kerala are increasingly participating in the micro, small and medium enterprises (MSME). High levels of literacy, significant improvements in other social indicators including health and life expectancy have all combined to create the right environment to fuel women entrepreneurship [5]. However, significant structural barriers remain including financial exclusion and lack of access to formal bank credit. Further, women entrepreneurs also lack collateral, transferable property, and decision-making power that their male counterparts take for granted. Social and cultural impediments including limitations on mobility and risk taking, for women in particular, also shape their entrepreneurial endeavors [6]. Access to markets, social networks and financial resources may be improved through digital platforms and AI-enabled technologies; yet, benefits are unlikely to be equally shared as these interventions may serve to further reinforce existing inequalities related to digital literacy, bias in algorithms, and unequal access to technology [7].

Although there is a growing body of research on women entrepreneurship and digital transformation, there is a significant knowledge gap at their intersection. Most of the existing studies focus on examining the traditional barriers and challenges faced by women entrepreneurs, or they focus on digital entrepreneurship in a gender-neutral manner without analyzing how gender interacts with AI-enabled ecosystems to shape entrepreneurial opportunities and challenges [8]. Specifically, the concept of the digital gender divide, which encompasses differences in access, usage, skills, and outcomes, has not been fully incorporated into the current research on women entrepreneurship in AI-driven entrepreneurial ecosystems [9]. In Kerala, a state with relatively high digital penetration, there is a need for empirical research that examines how AI-enabled business ecosystems affect women entrepreneurs' experiences of both barriers and opportunities [10]. This study attempts to address the digital gender gap by investigating how AI enabled business ecosystems transform the set of barriers and opportunities women entrepreneurs face in Kerala. The study further explores how institutional support and cultural norms may moderate the differences in barriers and opportunities for women entrepreneurs in developing their digital capabilities, fintech access and network expansion for value creation.

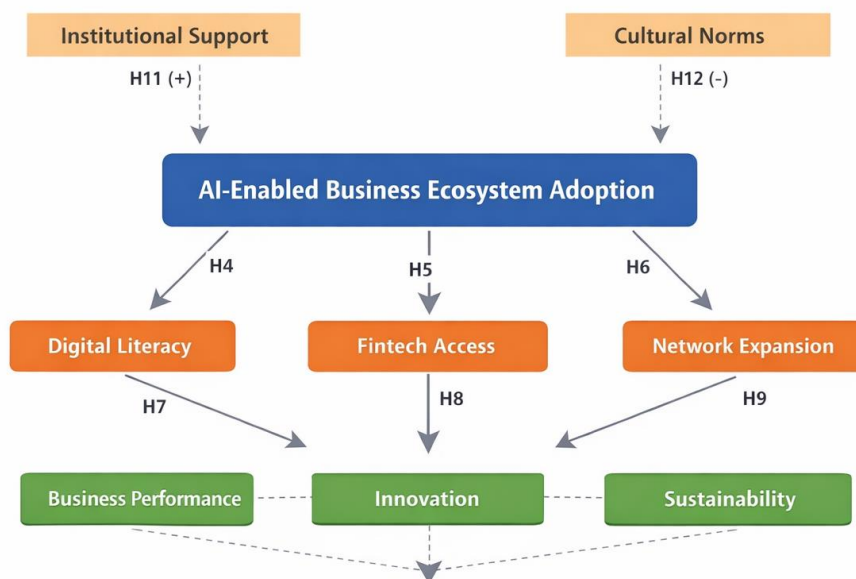
## II. LITERATURE REVIEW

Research on women entrepreneurship has repeatedly noted the host of structural, social and institutional barriers to women's entrepreneurial entry, growth and sustainability. Social and cultural norms and expectations can bar women from entrepreneurship, either directly or indirectly. In predominantly patriarchal societies, women are often restricted to certain mobility patterns, barred from participation in the market and expected to take on the bulk of domestic work and care for children and other family members [11]. Women thus experience "role conflict" as entrepreneurs, facing conflicting expectations and having to juggle demands of business and domestic duties [12]. While women in urban centers such as Mumbai are better able to negotiate work and family roles, these social and cultural barriers are even more deeply ingrained in rural and semi-urban regions where entrepreneurial women must overcome a host of challenges that male entrepreneurs do not face [13]. In many cases, these women encounter difficulty entering networks of professional contacts and gaining access to mentorship. Such male-dominated groups typically do not include women, thereby robbing women of critical opportunities to acquire knowledge, develop their businesses, and tap into networks of resources [14]. Women also face gender bias in terms of funding for their businesses and participation in markets, with ventures owned by women garnering far less investment than those owned by men, and meeting skepticism when trying to break into industries dominated by men (Olsson & Bernhard, 2021). The array of obstacles that women face in setting up and growing a business thus derives from a complex and interdependent set of factors [15].

The digital gender divide refers to the inequalities faced by women and men when accessing the Internet, and also when using the Internet to achieve their goals and better their lives, particularly in the context of entrepreneurship. The digital gender divide can be conceptualized across three levels: first-level, second-level, and third-level digital gender divides [16]. The first-level digital gender divide refers to gaps in physical access to resources for information and communication technology (ICT) use. For instance, fewer women than men possess smartphones and have access to the internet in emerging economies [17]. Women and men also employ the Internet for different purposes, have different ways of using the Internet, and demonstrate distinct levels of basic and advanced Internet skills, including digital marketing, data analytics, and using online marketplace platforms for entrepreneurship in AI-driven economy [18]. The third-level digital gender divide focuses on unequal outcomes from accessing the Internet and deploying different types of ICTs for information, communication, and other purposes [19]. Even where women manage to get around the barriers to access and skills, they may have lower returns from their efforts because of a number of inequalities informal or formal, economic or social, institutional or cultural [20]. The available empirical studies that focus on emerging economies show that digital inclusion alone does not automatically translate into equality of outcomes [21]. Several other socio-cultural and institutional factors continue to shape the uneven effects of technology on both opportunities and challenges faced by women. This means that the digital

gender divide is not only a technology-related issue, but is complex and in many ways reflective of broader socio-economic inequalities [22].

The AI-enabled business ecosystems represent a new, high level of digital transformation going beyond normal e-commerce platforms, extending into a full-fledged AI-enabled Ecosystem with the involvement of digital platforms, fintech, big data analytics, and AI [23]. Big data and AI play critical functions in the AI-enabled business ecosystems, and support economic activities in a more connected manner by connecting entrepreneurs with markets, resources, and customers through digital channels [24]. The AI-enabled business ecosystems enable innovation and new business opportunities for entrepreneurs, and facilitate better decision-making and optimal performance by optimizing business operations using big data [5]. One of the principal advantages of AI-enabled business ecosystems is the reduction of transaction costs, notably information asymmetry, which is traditionally a major obstacle to entrepreneurship. Digital platforms lower transaction costs in relation to customer acquisition, payment, and supply chain management [7]. Fintech innovations led by online lending and mobile payments have increased financial inclusion by introducing new methods of credit assessment, and by enabling both savings and credit for entrepreneurs and small businesses through digital channels [6]. The digital platforms, with their vast potential, are transforming the way women entrepreneurs operate and develop their businesses. In some cultures, women are restricted from going out, but the digital platforms offer opportunities to reach customers across the globe [4]. In addition, digital platforms enable women to manage and operate their businesses at times that are convenient to them, thus allowing them to be entrepreneurs while also meeting their family responsibilities. Moreover, digital platforms integrate financial services such as payment, credit, and financial record keeping into platforms through digital financial services [3]. This further enhances opportunities for women entrepreneurs. Social media and online marketplaces offer small businesses an affordable channel to promote their products and services, and build their brand in the market. Although digital platforms offer many opportunities, they also have inherent risks [12]. The dependence on a platform can stifle the entrepreneur’s autonomy as businesses are at the mercy of the platform’s rules, algorithms, and high transaction fees [9]. Algorithmic biases can also affect how businesses are ranked and seen on the platform. While some of these biases are starting to receive attention, data exclusion remains a significant obstacle to equal participation of women in the digital economy [21]. This study develops a conceptual framework that investigates the linkages between AI-enabled business ecosystems and women’s entrepreneurial outcomes. On one hand, the adoption of AI-enabled business ecosystems is likely to remove traditional barriers to doing business such as access to finance, markets and information. A set of mediating variables including digital literacy, fintech access and network access explain how these ecosystems can translate into entrepreneurial outcomes. Moreover, institutional support and cultural norms can enhance or constrain the aforementioned relationships. Finally, business performance, innovation and sustainability are the outcomes of women entrepreneurs in emerging markets, reflecting both economic and strategic considerations (Figure 1).



**Fig. 1: Conceptual Framework of AI-Enabled Business Ecosystem Adoption and Women Entrepreneurs’ Outcomes in Emerging Markets**

### III. METHODOLOGY

The global landscape is currently experiencing a dramatic paradigm shift. The rapid evolution of digital technology is transforming how businesses operate, yet across emerging markets, structural inequalities and gender-based inequalities to access opportunities persist. Focusing on the situation of Malayali women entrepreneurs engaged in businesses leveraging on AI and digital technologies such as e-commerce, fintech and marketplaces, this study aims to investigate how gender-based barriers impede their ability to achieve success. The target population consists of women entrepreneurs operating in various sectors, in both urban and semi-urban emerging markets, who use digital technology for their businesses. A multi-stage sampling approach was employed for this study, respondents selected for the data collection includes women entrepreneurs who were operating a registered or informal businesses. In addition, the criteria for selection stipulated that the women entrepreneurs used at least one digital or AI-based technology for running their businesses. A structured questionnaire was used to primary data collection. Initially, a pilot study with 30 women entrepreneurs were engaged with the questionnaire to test its clarity, the reliability of the findings and to make any necessary modifications. Sufficient feedback was obtained to make the modifications required. Structural Equation Modelling (SEM) approach was applied to test the hypothesis of the study.

### IV. RESULTS AND DISCUSSION

The demographic statistics of Malayali women entrepreneurs in the broader landscape and their dealing with AI enabled business ecosystems (Table 1). Both the frequency distributions and their corresponding histograms (Figure 2) show a stable mixed distribution at an emerging stage of maturity which is spread across various socio economic parameters and have growth milestones at various stages of life.

**TABLE 1: Socio-demographic profile of the respondents**

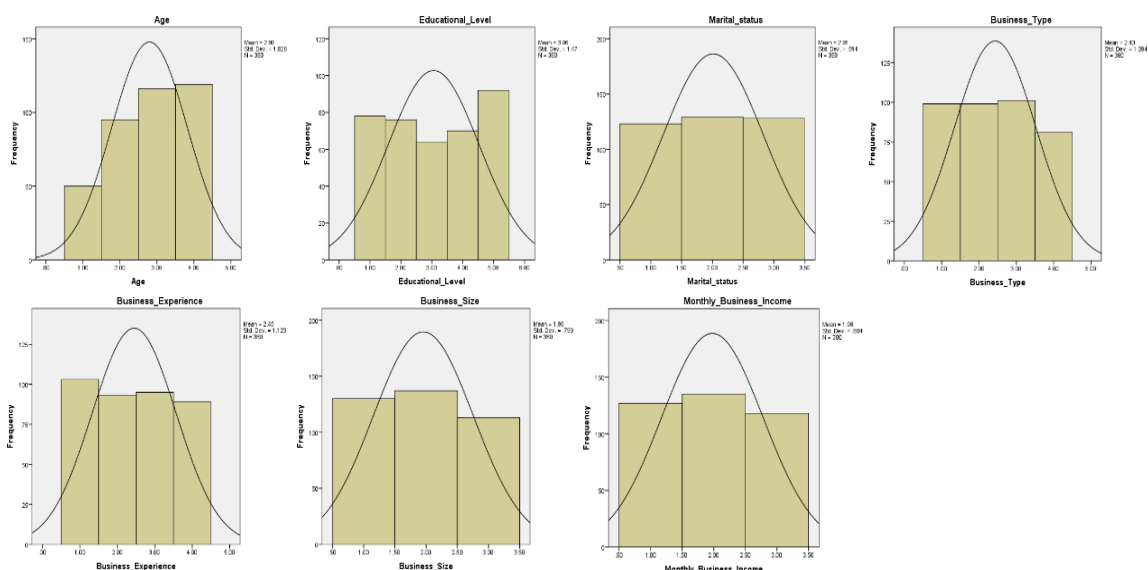
Demographic Variables		Frequency	Percent
<b>Age</b>	Below 25 Years	50	13.2
	25 - 34 Years	95	25.0
	35 - 44 Years	116	30.5
	45 - 55 Years	119	31.3
<b>Educational Level</b>	School Level	78	20.5
	Diploma	76	20.0
	Under Graduate	64	16.8
	Post Graduate	70	18.4
	Others	92	24.2
<b>Marital status</b>	Single	123	32.4
	Married	129	33.9
	Others	128	33.7
<b>Business Type</b>	Manufacturing	99	26.1
	Services	99	26.1
	Trading	101	26.6
	Online/Digital Business	81	21.3
<b>Business Experience</b>	Below 2 years	103	27.1
	2-5 Years	93	24.5
	6-10 Years	95	25.0
	Above 10 years	89	23.4
<b>Business Size</b>	Micro	130	34.2
	Small	137	36.1
	Medium	113	29.7
<b>Monthly Business Income</b>	Below Rs.50000	127	33.4
	Rs.50000 - Rs.100000	135	35.5
	Above Rs.100000	118	31.1

The age distribution of the entrepreneurs surveyed is predominantly mature, 61.8 % being between 35–55 years. This fact implies that women entrepreneurs are mature entrepreneurs whose entrepreneurial experiences are largely influenced by the social capital, financial means and decision-making power they have gained. The relatively small percentage of young entrepreneurs (13.2% below 25 years) points to continued entry barriers when it comes to starting a business, such as a lack of capital and negative experiences of previous entrepreneurs. The nearly normal, slightly right-shifted histogram for the

age distribution of female entrepreneurs nevertheless suggests that the intergenerational transfer of entrepreneurship is occurring. This means that female entrepreneurship is no longer restricted to a specific age group, and female mature entrepreneurs are using digital technologies and adopting AI. Regarding the educational levels of the entrepreneurs surveyed, there is no single category that stands out from the rest. 35.2 % of the surveyed women entrepreneurs have completed undergraduate and postgraduate studies, 20.5 % have completed their secondary education and are thus school-educated, while 24.2 % have gone through other education programmes. The results therefore show that female entrepreneurs do not start a business exclusively because of their formal education. No single indicator can encompass all the aspects that facilitate business activity, hence the most common indicator is the one that measures the role of informal learning, vocational training and experiential knowledge. This diversity of indicators implies very different learning experiences for MSME managers and workers during the digital transformation process. These learning experiences will require very specific, inclusive and contextualized digital literacy and AI readiness training.

The distribution for marital status is remarkably balanced. The percentages for single, married and other categories are 32.4%, 33.9% and 33.7% respectively, and are reflected in the histogram above. In this respect, entrepreneurial participation by women transcends traditional boundaries and the changing socio-cultural context in which they live. In other words, women are participating in businesses at all stages of their lives and in different marital situations. However, this does not mean that women’s marital roles have no impact on their business activities; in fact, they may affect the scale, intensity and autonomy of these activities. A distribution of women entrepreneurs was found to be engaged in manufacturing (26.1%), services (26.1%), trading (26.6%) and online/digital businesses (21.3%). Although there is a mild central tendency with very little variance, women entrepreneurs are engaged in all traditional sectors even as they remain in a transitive phase of adoption of AI-enabled ecosystems. Thus, there is immense potential for digital integration. While experience of running a business was found to be evenly distributed across categories of 23.4–27.1%, the near-normal histogram indicates an ecosystem of novices and experienced entrepreneurs in coexistence, in a state of entry and consolidation at the same time.

This is conducive to knowledge sharing and learning, especially with respect to digital and AI adoption. Of the women entrepreneurs, the majority (70.3%) operated small enterprises, mostly micro (34.2%) and small (36.1%) while 29.7% operated medium-sized businesses. The slightly peaked distribution around small enterprises reflect the characteristics of emerging economies where there is scope for growth of the already existing small enterprises to become slightly bigger. The income distribution from businesses is approximately normal with a slight concentration at the middle income bracket of Rs.50,000 to Rs.100,000 (35.5%). While there is a relatively even distribution across lower (33.4%) and higher (31.1%) income brackets, incomes are progressively distributed with no polarisation. This distribution captures the income of both subsistence-level enterprises and those that are growing. Thus, it provides an appropriate basis for analysis of performance outcomes.



**Fig. 2: Distribution of respondents’ socio-demographic and business characteristics, including age, educational level, marital status, business type, business experience, business size, and monthly business income, presented through histograms with overlaid normal distribution curves.**

The measurement model (Table 2) validity was tested using both Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). The KMO value of 0.851 (well above “meritorious” 0.80 benchmark) and Bartlett’s Test of Sphericity ( $p < 0.001$ ) showed meritorious sampling adequacy for data factor analysis. The extracted factors had eigenvalues exceeding 1 (2.707–4.824), explaining corresponding item variances above 24.8%. The internal consistency reliability was exceptionally high, demonstrated by Cronbach’s alpha of 0.949–0.965 (well above 0.70 benchmark). The Average Variance Extracted (AVE) for all constructs exceeded 0.50 benchmark (0.81–0.86). Furthermore, the square root of AVE for each construct was greater than inter-construct correlations thereby fulfilling the Fornell–Larcker criterion condition. The results of CFA revealed that the measurement model was adequate to measure the intended constructs. All standardized factor loadings were significant at  $p < 0.001$  and greater than 0.88.

**TABLE 2: Rotated Component Matrix showing factor loadings of measurement items based on Principal Component Analysis with Varimax rotation and Kaiser Normalization**

	Component								
	1	2	3	4	5	6	7	8	9
AI1	.925								
AI2	.937								
AI3	.928								
AI4	.936								
AI5	.940								
DL1		.946							
DL2		.936							
DL3		.946							
DL4		.944							
FA1				.948					
FA2				.934					
FA3				.944					
FA4				.934					
NE1								.932	
NE2								.942	
NE3								.920	
NE4								.941	
IS1							.936		
IS2							.941		
IS3							.938		
IS4							.936		
CN1			.934						
CN2			.947						
CN3			.939						
CN4			.944						
BP1					.938				
BP2					.944				
BP3					.938				
BP4					.940				
IN1						.930			
IN2						.936			
IN3						.938			
IN4						.944			
SU1									.922
SU2									.934
SU3									.934
SU4									.926
<b>Kaiser-Meyer-Olkin Measure of Sampling Adequacy: .851, Sig. 0.000</b>									
<b>Eigen values</b>	<b>4.824</b>	<b>4.223</b>	<b>3.992</b>	<b>3.778</b>	<b>3.519</b>	<b>3.388</b>	<b>3.282</b>	<b>3.062</b>	<b>2.707</b>
<b>Cronbach's Alpha</b>	<b>0.965</b>	<b>0.961</b>	<b>0.958</b>	<b>0.957</b>	<b>0.955</b>	<b>0.958</b>	<b>0.957</b>	<b>0.956</b>	<b>0.949</b>
<b>AVE</b>	<b>0.846</b>	<b>0.84</b>	<b>0.85</b>	<b>0.86</b>	<b>0.85</b>	<b>0.81</b>	<b>0.83</b>	<b>0.84</b>	<b>0.82</b>
<b>√AVE</b>	<b>0.920</b>	<b>0.916</b>	<b>0.922</b>	<b>0.927</b>	<b>0.922</b>	<b>0.901</b>	<b>0.918</b>	<b>0.916</b>	<b>0.905</b>

The structural model (Table 3) results suggest a mixed pattern of significance between Institutional Support and AI adoption on the one hand, and Cultural Norms on the other. While there is no significant influence noted from Institutional Support ( $\beta = 0.005$ , p-value = 0.924) on women entrepreneurs' AI adoption, the influence of Cultural Norms was found to be negative but non-significant ( $\beta = -0.067$ , p-value = 0.210). This might mean AI adoption is not as influenced by external factors, institutional and socio-cultural respectively. This could be partly attributed to technological advancement and individualization. As predicted, AI adoption did not significantly affect Fintech Access ( $\beta = -0.019$ , p-value = 0.727) and Digital Literacy ( $\beta = -0.027$ , p-value = 0.610). This result reinforces our hypothesis regarding Fintech Access and Digital Literacy as essential antecedent factors that enable the integration of women entrepreneurs into AI ecosystems. Furthermore, AI adoption has a significantly negative influence on Network Expansion ( $\beta = -0.158$ , p-value = 0.003), implying that there is a degree of trade-off between the level of engagement with AI systems and social interactions in business that can potentially be substitutive in nature. As regards the predictors of innovation, results demonstrate that only Digital Literacy had a statistically significant effect ( $\beta = -0.116$ , p = 0.03); albeit negatively contrary to our initial expectations. Network Expansion ( $\beta = -0.023$ , p = 0.663), Fintech Access ( $\beta = 0.004$ , p-value = 0.940), Sustainability ( $\beta = 0.024$ , p-value = 0.658) and Business Performance ( $\beta = -0.05$ , p = 0.346) failed to exhibit any significance. The net effect is that innovation is neither driven by available resources, Fintech access nor business performance. Moreover, it is unlikely that female entrepreneurs are using digital technology creatively to boost innovation.

**TABLE 3: Maximum Likelihood Estimates - Regression Weights**

Observed Variables		Latent Variables	Estimate	S.E.	C.R.	P	Label
AI	<---	IS	.005	.050	.096	.924	par_29
AI	<---	CN	-.067	.053	-1.254	.210	par_30
FA	<---	AI	-.019	.054	-.349	.727	par_31
DL	<---	AI	-.027	.058	-.510	.610	par_32
NET	<---	AI	-.158	.052	-2.991	.003	par_33
INN	<---	DL	-.116	.053	-2.174	.030	par_34
INN	<---	NET	-.023	.058	-.436	.663	par_35
INN	<---	FA	.004	.057	.075	.940	par_36
INN	<---	SU	.024	.059	.443	.658	par_37
INN	<---	BP	-.050	.059	-.942	.346	par_38
AI1	<---	AI	.910				
AI2	<---	AI	.927	.033	30.987	***	par_1
AI3	<---	AI	.912	.034	29.597	***	par_2
AI4	<---	AI	.918	.034	30.185	***	par_3
AI5	<---	AI	.932	.033	31.548	***	par_4
IS1	<---	IS	.915				
IS2	<---	IS	.923	.032	30.718	***	par_5
IS3	<---	IS	.918	.032	30.166	***	par_6
IS4	<---	IS	.913	.032	29.748	***	par_7
CN1	<---	CN	.906				
CN2	<---	CN	.938	.033	31.309	***	par_8
CN3	<---	CN	.918	.034	29.536	***	par_9
CN4	<---	CN	.930	.035	30.576	***	par_10
DL1	<---	DL	.929				
DL2	<---	DL	.921	.031	32.232	***	par_11
DL3	<---	DL	.933	.030	33.761	***	par_12
DL4	<---	DL	.929	.030	33.159	***	par_13
FA1	<---	FA	.939				
FA2	<---	FA	.910	.030	31.982	***	par_14
FA3	<---	FA	.932	.029	34.684	***	par_15
FA4	<---	FA	.909	.030	31.851	***	par_16
NE1	<---	NET	.927				

NE2	<---	NET	.931	.031	33.062	***	par_17
NE3	<---	NET	.886	.034	28.441	***	par_18
NE4	<---	NET	.936	.030	33.743	***	par_19
BP4	<---	BP	.920				
BP3	<---	BP	.918	.032	30.767	***	par_20
BP2	<---	BP	.931	.031	32.118	***	par_21
BP1	<---	BP	.916	.033	30.588	***	par_22
IN4	<---	INN	.925				
IN3	<---	INN	.920	.032	31.489	***	par_23
IN2	<---	INN	.921	.032	31.513	***	par_24
IN1	<---	INN	.909	.032	30.299	***	par_25
SU4	<---	SU	.903				
SU3	<---	SU	.915	.036	28.509	***	par_26
SU2	<---	SU	.915	.037	28.483	***	par_27
SU1	<---	SU	.893	.038	26.870	***	par_28

The model fit presents the results of a structural model, which demonstrates an excellent fit to the data. All multiple fit indices indicate a good model fit. The indices demonstrate that the proposed structural model provides a robust and parsimonious representation of the observed data, supporting subsequent hypothesis testing (Table 4).

**TABLE 4: Model fit indices demonstrating the goodness-of-fit of the Structural Equation Model**

Fit Index	Obtained Value	Standard Criterion	Interpretation
CMIN/DF ( $\chi^2/df$ )	1.096	< 3.00	Excellent Fit
p-value	0.048	> 0.05	Acceptable
RMR	0.017	< 0.08	Excellent Fit
GFI	0.917	$\geq 0.90$	Good Fit
AGFI	0.906	$\geq 0.90$	Good Fit
PGFI	0.808	$\geq 0.50$	Good Parsimony Fit
NFI	0.958	$\geq 0.90$	Excellent Fit
RFI	0.955	$\geq 0.90$	Excellent Fit
IFI	0.996	$\geq 0.90$	Excellent Fit
TLI	0.996	$\geq 0.95$	Excellent Fit
CFI	0.996	$\geq 0.95$	Excellent Fit
RMSEA	0.016	< 0.08	Excellent Fit
PCLOSE	1.000	> 0.05	Excellent Fit

The findings (Figure 3) indicate a non-linear relationship between AI-powered business ecosystems and women’s entrepreneurship outcomes. The results suggest a decoupling between technology adoption and traditional structural factors such as institutional support and cultural norms driving AI adoption, thereby calling into question the prevailing assumptions about the role of support in facilitating technology adoption. This also raises important questions for policy makers who seek to support women’s entrepreneurship through institutional support, yet simple availability of support may not translate to adoption in the absence of effective implementation strategies. Moreover, negative effects of AI adoption on women’s network size indicates substitution effects whereby technology is leveraged to enhance efficiency but reduces opportunities for women to build social capital, a critical factor for women overcoming structural barriers to entrepreneurship. Interestingly, while digital literacy is negatively related to innovation, this finding highlights the distinction between having a skill (capability) and the ability to use that skill effectively (capability utilization), and the need for resources to ensure that resources are orchestrated to generate value. Finally, the results are unsurprising but indicate that there are likely other enabling factors at play that were not measured in this study, including market and ecosystem factors, and that innovation is a function of multiple factors that only multi-level, longitudinal studies can uncover.

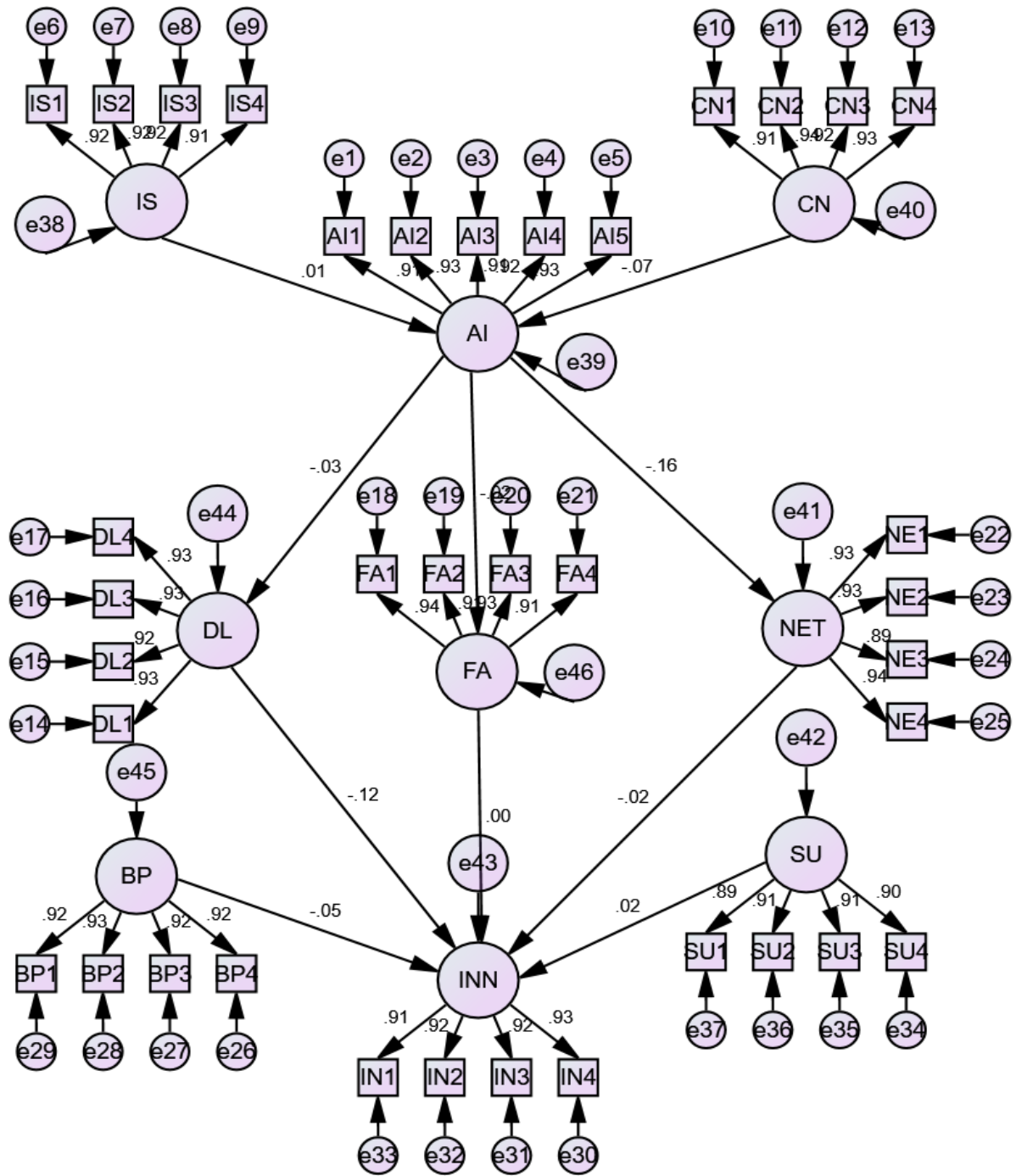


Fig. 3: Structural Equation Model illustrating the relationships among latent constructs with standardized path coefficients and measurement loadings for observed indicators

### V. IMPLICATIONS OF THE STUDY

This study contributes to our understanding of AI adoption by women digital entrepreneurs by advancing a contextualized socio-technical perspective of digital entrepreneurship. Study findings suggest that institutional support and cultural norms are irrelevant or even negatively affect AI adoption, a result that permits us to extend the Institutional Theory into digitally disembedded contexts without neglecting the role of institutions in mediating technological activity. While technology may not oblige institutions to transform, institutions can transform into indirect or embedded influences in digital platforms. Furthermore, this research refutes the long-held belief that digital literacy influences AI adoption positively and challenges a core assumption of the resource-based view of the firm, arguing that possessing resources does not automatically translate

to value creation. Rather, our findings suggest the need to integrate with Dynamic Capability Theory by focusing on the deployment of digital capabilities. At a more speculative level, our findings also reveal a 'substitution effect' between AI adoption and the expansion of networks and, thus, introduce a novel way of thinking about how technological efficiency can 'displace' social capital, what we term the digital displacement of social capital. This study argues that women entrepreneurs require more than simple access to digital technologies and basic skills to deploy them strategically. While large numbers of women entrepreneurs are using AI-enabled tools to enhance their innovation, much of this is translating into little positive outcomes in terms of increasing their levels of innovation or extending their networks. As a result, support initiatives for women entrepreneurs should focus on capability deepening rather than capability diffusion, moving from basic digital literacy to deep skills such as digital strategy, analytical and data driven decision making, and innovation management. There is also a need to sustain human-technology positive complementarity, rather than allowing technology to replace important relational assets. Hybrid systems that combine the benefits of AI for efficiency and productivity with collaborative networks, formal mentoring and peer learning programs can help to reduce unintended negative consequences.

Shifting the focus to the policy dimension, the study recommends a move from an infrastructure-centric to an ecosystem-centric approach to digital inclusion. Given that institutional support does not translate into meaningful benefits for women entrepreneurs, there is a strong case for more implementation-oriented and contextualized policy designs. Moreover, hidden structural inequalities embedded in digital ecosystems such as algorithmic bias, reliance on platforms and uneven digital visibility, need to be addressed for fostering inclusive digital marketplaces and ensuring that AI-based ecosystems are equitable, transparent, and accountable. A 'capability context alignment framework' for understanding women's digital entrepreneurship and promoting their inclusion in AI-based ecosystems. The study identifies that the outcomes of digital entrepreneurship are shaped by the alignment between digital competencies and the socio-cultural and institutional environments in which women operate. While technology is available and skills are being developed, the negative and insignificant relationships between various measures of digital competencies and outcomes for women entrepreneurs highlight the limitations of technology and skills in enhancing their digital entrepreneurial capabilities.

## **VI. CONCLUSION**

This study explores how AI-enabled business ecosystems alter barriers and opportunities for women entrepreneurs in emerging markets. While AI has been perceived as promising for unleashing substantial opportunities for women entrepreneurs, AI-enabled business ecosystems can potentially restructure entrepreneurial dynamics in unforeseen ways that are both positive and negative. Our empirical findings indicate that traditional determinants such as quality of institutional support and cultural norms are not direct determinants of women entrepreneurs' adoption of AI-enabled ecosystems. Instead, women entrepreneurs experience AI-enabled business ecosystems as individualized, platform-mediated experiences that fall outside the remit of national-level support institutions. Our results further reveal that increased adoption of AI negatively affects network expansion for women entrepreneurs, and that digital literacy is negatively associated with innovation among them. Ultimately, these findings show that digital transformation is a socio-technical phenomenon that fundamentally alters the entrepreneurial ecosystem by intersecting technological capability with skills, competencies and contextual factors. While access to technology has increased for many women, research suggests that integrating ecosystems of technology into daily operations can create additional barriers. These new differences in outcomes, utilization, and ecosystem integration must be addressed as the digital gender divide evolves. To achieve this evolution, it must be addressed from a technological, social, and institutional perspective. As AI is becoming increasingly integral to business, women entrepreneurs have the opportunity to reap rewards from new technology. However, they also face challenges and experience exclusion. Addressing these disparities requires strategic, inclusive, and contextual approaches to fostering innovation, growth, and sustainability that empower women to effectively use technology to reap benefits from emerging AI-enabled business ecosystems. Further research on this topic could benefit from longitudinal data, by industry, or by emerging technology.

### ***Data Availability Statement***

*The data supporting the findings of this study are available from the corresponding author upon reasonable request.*

### ***Conflict of Interest Statement***

*The authors declare that there is no conflict of interest related to this study.*

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