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Digital Enablement Under Care Constraints: Determinants of Women-Led Enterprises in Indonesia

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Abstract

Purpose—This study examines the determinants of digital enablement among women-led enterprises in Indonesia, focusing on the roles of care responsibilities, household structure, and human capital. It seeks to understand how domestic constraints and socio-economic characteristics influence women entrepreneurs' participation in digitally mediated economic activities.

Design/methodology/approach—The analysis uses nationally representative cross-sectional microdata from the 2024 National Socioeconomic Survey (SUSENAS). Digital enterprise participation is defined as the use of digital tools to sell goods or services. A binary logistic regression model is employed to estimate the determinants of digital participation, complemented by rural–urban subgroup analysis to capture spatial heterogeneity.

Findings—Childcare responsibilities are positively associated with digital participation, particularly in rural areas, suggesting that digital enterprise functions as a flexible response to care constraints. In contrast, a larger household size reduces the likelihood of digital engagement, reflecting cumulative domestic pressures. Education significantly increases digital participation, with stronger effects in urban contexts. Handphone ownership emerges as the strongest predictor across all models, highlighting the importance of digital access. Household-head status shows differing effects between rural and urban areas, indicating that intra-household authority interacts with local economic environments.

Research implication/limitation—This study enriches the literature on digital entrepreneurship and gendered labor markets by integrating household dynamics, care responsibilities, and spatial inequality into the analysis of digital participation.

Originality/value—The cross-sectional nature of SUSENAS limits causal inference. Nonetheless, the findings highlight the need for gender-responsive and place-sensitive digital inclusion policies to support women entrepreneurs.

Keywords: care responsibilities, digital enablement, human capital, rural–urban heterogeneity, women-led enterprises
JEL Classifications: L26, J16, O33, R23

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1. Introduction

The rapid diffusion of mobile internet and platform-based commerce has reconfigured the competitive landscape of micro and small enterprises in Indonesia (Falentina et al., 2021; Setiawan et al., 2023). Digital tools are no longer limited to basic communication. They increasingly shape how businesses promote products, process transactions, and interact with customers across geographic boundaries. This transformation has expanded market possibilities for small entrepreneurs, including those operating from within the household sphere. Yet, access to digital platforms alone does not guarantee equal participation. The capacity to leverage digital opportunities is deeply conditioned by household roles, time allocation, and social expectations (Zhao et al., 2025). This suggests that digital participation is not solely a technological issue, but also a socio-economic process shaped by household-level constraints and resource allocation.

Women-led enterprises, in particular, are often situated within domestic environments where economic activities intersect with unpaid care responsibilities and household management duties (Hagqvist et al., 2020). Gender role theory highlights how socially constructed norms assign women primary responsibility for caregiving, influencing their labor supply decisions and entrepreneurial pathways (Golik & Wasilczuk, 2025; Malisetti & Singh, 2025). Although digital technologies may reduce certain physical and informational barriers, they do not inherently resolve time constraints, bargaining dynamics, or intra-household asymmetries. Therefore, the relationship between digital enablement and women's entrepreneurial participation must be understood as the outcome of interactions between gender norms, care responsibilities, and access to economic resources. Understanding digital enablement among women entrepreneurs therefore requires an analytical framework that integrates care burdens, household authority, and human capital considerations.

Existing studies on women's entrepreneurship and digital technology adoption identify several key determinants shaping participation and performance. Access to digital resources, such as devices, digital skills, and usage capabilities, has been widely recognized as a critical factor influencing ICT adoption among women entrepreneurs (Chatterjee et al., 2020). Individual characteristics, including entrepreneurial mindset, perceived value of technology, education, and prior entrepreneurial experience, also significantly affect women's engagement with digital tools and entrepreneurial activities (Al Omoush, 2024; Alene, 2020). In addition, structural factors such as collaborative ecosystems, government support, and access to training programs can facilitate technology adoption and strengthen entrepreneurial outcomes (Al Omoush, 2024; Alene, 2020). Beyond adoption decisions, research shows that human capital, networking capacity, and access to finance are important drivers of business performance among women-led enterprises (Akhter et al., 2023), while the integration of ICT into business operations can improve efficiency and organizational capability (Isa et al., 2021). However, these studies predominantly focus on adoption and performance outcomes,

with limited attention to the constraints shaping women's actual participation in digital enterprise.

Recent studies also emphasize the role of contextual and institutional factors in shaping women's entrepreneurial outcomes. Women's empowerment and participation in household decision-making can strengthen the positive effects of technology adoption on entrepreneurial engagement (Aryal et al., 2020; Kassie et al., 2020). Digital technologies have also been shown to stimulate innovation and enable women entrepreneurs to pursue socially oriented enterprises and broader community impact (Chatterjee et al., 2020; Suseno & Abbott, 2021). Furthermore, geographic context matters, where entrepreneurial income tends to contribute more strongly to household livelihoods in rural areas than in urban settings, indicating that spatial conditions influence both incentives and outcomes of entrepreneurship (Ge et al., 2022). Taken together, these findings suggest that digital entrepreneurship is embedded within broader institutional and spatial contexts rather than being determined solely by individual-level characteristics.

However, despite the growing literature on digital entrepreneurship and women's economic participation, several important limitations remain. Many studies focus on general technology adoption or overall entrepreneurial performance rather than explicitly examining participation in digital enterprise itself. The interaction between household dynamics, particularly caregiving responsibilities, and digital economic participation remains also underexplored, even though such constraints are central to gendered labor allocation. Next, spatial heterogeneity is often insufficiently addressed, with limited attention to how rural–urban differences shape women's engagement in digitally mediated economic activities. These limitations suggest that a more integrated analytical framework is needed to understand how household responsibilities, human capital, and spatial opportunity structures jointly influence women's participation in digitally enabled enterprises. More importantly, existing studies tend to examine these factors in isolation, resulting in a fragmented understanding of how multiple constraints simultaneously shape women's digital participation. This limitation weakens the ability of prior research to explain the combined effects of household, human capital, and spatial factors in a unified framework.

This study fills the gap in the existing literature in several important respects. Rather than examining entrepreneurship in general terms, it concentrates specifically on digital enablement within women-led enterprises, thereby isolating the dimension of technological engagement from broader business participation. It also brings household-level constraints into the center of the analysis by incorporating indicators of care responsibility and household structure, allowing digital adoption to be interpreted within everyday domestic realities. In addition, the rural–urban disaggregation uncovers how local economic environments shape the magnitude and direction of these relationships, highlighting the importance of spatial context in understanding women's digital engagement. Unlike previous studies that examine these dimensions separately, this study explicitly integrates household dynamics, human capital, and spatial context within a unified empirical framework.

This study aims to examine how intra-household roles, educational attainment, and spatial opportunity structures shape women's participation in digitally enabled enterprises beyond mere access to devices and connectivity. Bringing together insights from gender role theory, human capital perspectives, and digital divide research, the analysis offers a more grounded explanation of how digital transformation interacts with existing gendered constraints. This study contributes by clearly demonstrating that women's digital participation is jointly determined by care responsibilities, resource constraints, and spatial inequalities, thereby providing new empirical insight into the mechanisms underlying digital inclusion in developing economies. These findings provide a stronger empirical basis for developing digital inclusion strategies that are sensitive to household dynamics and regional disparities in emerging economies.

2. Literature Review

2.1 Theoretical Background and Empirical Studies

The expansion of digital technologies has transformed the structure of entrepreneurial activities, particularly among micro and small enterprises. Digital enablement, reflected in the use of online platforms, digital communication tools, and electronic payment systems, has significantly lowered barriers to market participation. From the perspective of transaction cost theory, digital technologies reduce search, matching, and transaction costs (Bandara et al., 2025; Vlasov & Okhlopkov, 2022), thereby enabling entrepreneurs to engage in market exchange without relying heavily on traditional intermediaries. While this theoretical perspective explains why digital opportunities expand, it does not fully explain why participation remains uneven across individuals and contexts, particularly among women operating under household constraints. These structural changes are particularly relevant for micro and small enterprises, which often face limitations in capital, market access, and institutional support.

A growing body of empirical research supports the transformative role of digital technologies in entrepreneurship. Lamine et al. (2023) describe this transformation as the "democratization of entrepreneurship," emphasizing reduced entry barriers. Consistent with this view, Kreiterling (2023) finds that internet adoption improves firm performance through cost reduction and market expansion, while Purno & Ayyasy (2026) gains in efficiency and financial access. Similarly, Asmar et al., (2025) emphasize the importance of innovation and human capital in strengthening MSME competitiveness. Taken together, these studies converge in showing the positive effects of digitalization; however, they largely focus on firm-level outcomes, leaving open the question of who is able to participate in the first place and under what constraints.

This gap becomes more apparent when considering the uneven nature of digital transformation. While the literature acknowledges structural barriers such as the digital divide and limited technological literacy (Purno & Ayyasy, 2026), these constraints are often treated as external conditions rather than as factors interacting with individual and household characteristics. In developing economies, disparities in digital access and capabilities shape participation outcomes, suggesting that digital engagement is not

merely a technological decision but a socio-economic process. Thus, understanding participation requires moving beyond access and examining how structural constraints intersect with household-level conditions.

This intersection is particularly evident in studies on women's economic participation, which consistently highlight the role of gendered divisions of labor. Household labor supply models suggest that caregiving responsibilities significantly influence labor market behavior, often reducing women's participation and increasing role conflict (Samtleben & Müller, 2022; Martucci, 2023). While these studies emphasize constraints, they also suggest adaptive responses, as women tend to shift toward flexible or home-based activities. In this context, digital entrepreneurship is often viewed as a potential solution that accommodates domestic responsibilities. However, whether this flexibility translates into greater participation remains debated, linking gender literature with the broader discussion on digital opportunity.

Indeed, empirical evidence on digital platforms reflects this tension. On one hand, studies show that digital commerce reduces transaction time and improves efficiency (Murungu, 2025) while offering flexible income opportunities (Nasir et al., 2024). On the other hand, research also highlights the persistence of time constraints and role strain associated with caregiving responsibilities (González et al., 2025). These contrasting findings suggest that digital flexibility can both alleviate and reinforce existing constraints, depending on the surrounding household and resource context**.** This helps explain why digital opportunities do not translate uniformly into participation outcomes.

Household structure further complicates this relationship. Larger households may facilitate economic participation through shared responsibilities (Finlay, 2021; Musyoka et al., 2025), yet they can also increase domestic burdens and financial pressure (Köppe et al., 2025). As a result, empirical findings on household size remain inconclusive. Similarly, intra-household bargaining theories indicate that decision-making power can either enable or constrain access to resources, suggesting that household dynamics operate through multiple and sometimes opposing mechanisms. Despite this, existing studies rarely connect these intra-household factors directly to digital participation, limiting a comprehensive understanding of how household dynamics shape digital engagement.

The role of human capital further illustrates how individual and structural factors interact. Education is widely recognized as enhancing cognitive ability, information processing, and opportunity recognition (Abbas et al., 2024; Ghouse et al., 2024), and is consistently associated with higher digital adoption (Taleb et al., 2025). However, the literature also indicates that these benefits are not uniform, as the returns to education depend heavily on the surrounding environment. Urban contexts tend to amplify these returns through better infrastructure and market access, whereas rural contexts may constrain them. This highlights that human capital alone is insufficient without supportive structural conditions, linking individual capability with spatial inequality.

Access to digital infrastructure is often considered a prerequisite for participation. Studies consistently identify mobile phones and internet connectivity as key enablers of digital entrepreneurship (Heeks, 2022; Mwansa et al., 2025; Gavigan et al., 2025;

Nwangwu et al., 2024). However, while these studies emphasize access, they also implicitly reveal its limitation: access does not automatically translate into effective participation when individuals face constraints related to skills, time, and household responsibilities. This reinforces the need to integrate infrastructural and socio-economic perspectives.

Spatial inequality further integrates these strands of literature. Urban areas benefit from stronger digital ecosystems, while rural areas face infrastructure gaps (Arora & Sapre, 2025; de Clercq et al., 2023). Yet digital tools may also allow rural entrepreneurs to overcome geographic isolation. This dual role of spatial context, both constraining and enabling, mirrors the broader pattern observed across the literature, where opportunities and constraints coexist. Consequently, the determinants of digital participation cannot be understood in isolation but must be examined as interacting factors across household, individual, and spatial dimensions.

The literature suggests that digital participation among women entrepreneurs emerges from the interaction of household constraints, human capital, and structural opportunities. While previous studies have identified these factors individually, they are rarely examined in relation to one another, resulting in a fragmented and partial understanding of women's digital participation. By bringing these strands of literature into a unified analytical framework, this study contributes to a more integrated explanation of how care responsibilities, household structure, human capital, and spatial context jointly shape women's engagement in digitally enabled enterprises.

2.2 Hypotheses Development

Building on the theoretical framework and empirical evidence discussed above, digital enterprise participation among women entrepreneurs is expected to be shaped by the interaction between household characteristics, human capital, and digital access (Chatterjee et al., 2020; Mwansa et al., 2025; Taleb et al., 2025). Care responsibilities and household structure may influence women's time allocation and economic strategies (Martucci, 2023; Musyoka et al., 2025; Samtleben & Müller, 2022), while education enhances digital literacy and entrepreneurial capability (Abbas et al., 2024; Ghouse et al., 2024). In addition, access to digital devices represents a fundamental prerequisite for engaging in digitally mediated economic activities (Heeks, 2022; Nwangwu et al., 2024).

Previous studies also highlight the importance of demographic characteristics such as age and marital status in shaping women's labor market behavior and entrepreneurial decisions (Golik & Wasilczuk, 2025; Malisetti & Singh, 2025). Taken together, these factors are expected to influence the likelihood that women-led enterprises participate in digital economic activities. Based on these arguments, the following hypotheses are proposed.

H1: The presence of under-five children in the household increases the likelihood of digital enterprise participation among women-led enterprises.

H2: Larger household size decreases the likelihood of digital enterprise participation among women-led enterprises.

H3: Household-head status influences the likelihood of digital enterprise participation among women-led enterprises.

H4: Age has a nonlinear relationship with the likelihood of digital enterprise participation among women-led enterprises.
H5: Higher levels of education increase the likelihood of digital enterprise participation among women-led enterprises.
H6: Married women have a higher likelihood of digital enterprise participation compared with unmarried women.
H7: Handphone ownership increases the likelihood of digital enterprise participation among women-led enterprises.

3. Methodology

This study adopts a quantitative approach using a binary logistic regression (logit) model to examine the determinants of digital enterprise participation among women-led enterprises in Indonesia. The analysis utilizes cross-sectional microdata from the 2024 National Socioeconomic Survey (SUSENAS), focusing on working-age female respondents and drawing on detailed socioeconomic and demographic information at both the individual and household levels. The dependent variable represents digital enterprise participation, defined as women-led enterprises that use digital tools to sell goods or services. It is coded as 1 if the respondent reports using digital platforms or digital tools for business activities and 0 otherwise. This operationalization is consistent with the study's conceptual framework, which defines digital participation as the effective use of digital tools for income-generating activities rather than mere access to technology.

A binary logit specification is appropriate given the dichotomous nature of the outcome variable. The model estimates the likelihood of digital enterprise participation as a function of several explanatory factors related to care responsibilities, household characteristics, human capital, and digital access. These variables are selected based on the theoretical framework discussed in the previous section, particularly the integration of gender role theory, human capital theory, and structural constraints, which jointly explain women's economic participation in digitally enabled activities. Key variables include the presence of under-five children, household size, and household-head status, which capture household dynamics that may influence women's time allocation and economic participation. These factors reflect how domestic responsibilities and intra-household roles can shape women's ability to engage in entrepreneurial activities.

The presence of young children is expected to affect women's economic strategies because childcare responsibilities may limit participation in rigid wage employment while simultaneously encouraging engagement in more flexible forms of work such as digitally mediated enterprises. This expectation is consistent with labor supply theory, where individuals allocate time between market work and domestic production under time constraints. Household size is included to capture both potential domestic pressures and possible support structures within the household that may either constrain or facilitate entrepreneurial activities. Household-head status is also considered because it may reflect differences in decision-making authority and control over resources that influence women's capacity to adopt digital tools for business purposes. In this context, intra-household bargaining theory provides a basis for interpreting how authority and resource control affect economic decision-making.

In addition to household-related factors, demographic and capability variables are included to account for differences in experience, skills, and access to economic opportunities. Age and age squared are incorporated to capture potential nonlinear patterns in entrepreneurial participation across the life cycle. Education serves as a proxy for human capital and reflects individuals' ability to adopt new technologies and manage business activities. Marital status is included to represent differences in household roles and economic responsibilities that may shape women's work decisions. Finally, handphone ownership is included as a key indicator of digital access, as mobile devices serve as a primary gateway for participating in online markets and digitally mediated economic activities. Detailed definitions of all variables are presented in Table 1, and the empirical model is specified as follows.

$$logit(WDigital\_ent_i) = ln\left(\frac{WDigital\_ent}{1 - WDigital\_ent_i}\right)$$
$$= \beta_0 + \beta_1 Under\_five_i + \beta_2 HH\_size_i + \beta_3 HHhead\_status_i + \beta_4 Age_i + \beta_5 Age2_i$$
$$+ \beta_6 Education_i + \beta_7 Marital_i + \beta_8 Handphone_i + \epsilon_i$$

Where $WDigital\_ent_i$ is the probability that women i participates in a digital enterprise, defined in this study as a woman-led enterprise that uses digital tools or online platforms to sell goods or services. β_0 is the intercept, $\beta_k (k = 1, \dots 9)$ are the regression coefficients for each explanatory variable, and ϵ_i is the error term capturing unobserved influences. Although the model includes key observable determinants, unobserved factors such as entrepreneurial motivation, social networks, and local institutional conditions may also influence participation, which should be considered when interpreting the results.

In addition to presenting the coefficient estimates from the logit model, this study also reports marginal effects to improve the interpretability of the empirical results and strengthen their policy relevance. In logistic regression, coefficient estimates indicate how explanatory variables influence the log-odds of the outcome rather than the probability itself. As a result, the magnitude of the coefficients cannot be directly interpreted as changes in the probability of the outcome occurring.

Marginal effects are therefore calculated to translate the estimated relationships into more intuitive probability terms. Specifically, marginal effects measure how the predicted probability of the outcome changes when an explanatory variable increases by one unit, holding all other variables constant. For a continuous explanatory variable X_k in a logit model, the marginal effect represents the change in the predicted probability associated with a one-unit increase in that variable.

$$\frac{\partial P_i}{\partial X_k} = \beta_k . P_i . (1 - P_i)$$

For binary (dummy) variables, the marginal effect is interpreted as the difference in the predicted probability of the outcome when the variable changes from 0 to 1. In this study, the results are presented as average marginal effects (AMEs), which report the average change in predicted probability across all observations in the sample. This

approach provides a clearer and more intuitive interpretation of the magnitude of each variable's effect and allows easier comparison across different covariates.

Table 1. Variable Definition

Variable	Operational Definition
Women-led digital enterprise	A dummy variable indicating whether a woman-led enterprise utilizes the internet for selling goods or services (1 = yes, 0 = no), serving as a proxy for digital enablement among women entrepreneurs.
Under-five children in household (0–5)	A binary variable capturing the presence of at least one child aged 0–5 years in the respondent's household (1 = yes, 0 = no), representing childcare-related time constraints and care burden intensity.
Household size	A continuous variable reflecting the total number of household members, used to capture overall dependency pressures as well as potential care and resource demands within the household.
Household head status	A binary indicator denoting whether the female respondent serves as the household head (1 = yes, 0 = no), representing formal decision-making authority and primary economic responsibility within the household.
Age	A continuous variable measuring the respondent's age in completed years, capturing life-cycle variations in entrepreneurial engagement and digital adoption.
Age squared	A quadratic transformation of age (age^2), included to account for potential non-linear life-cycle effects in digital enterprise participation.
Education (years of schooling)	A continuous measure of completed years of formal education, representing human capital endowment that may enhance digital capability and enterprise competitiveness.
Marital status	A binary variable indicating whether the respondent is currently married (1 = yes, 0 = no), reflecting household role expectations, spousal support, and potential intra-household bargaining dynamics.
Handphone ownership	A binary variable indicating whether the respondent personally owns or has access to a mobile phone that can be used for communication and digital activities. The variable is coded 1 if the respondent owns or regularly uses a handphone, and 0 otherwise. In this study, handphone ownership serves as a proxy for basic digital access.
Rural vs urban residence	A spatial subgroup specification where estimations are conducted separately for rural and urban respondents to capture heterogeneity in digital infrastructure, market access, and contextual constraints.

Source: SUSENAS 2024, modified

4. Results and Discussion

4.1 Descriptive Statistics

The descriptive patterns indicate that women-led digital enterprises differ structurally from non-digital ones in terms of care responsibilities, human capital, and digital access, as presented in Table 2. Women operating digital enterprises are more

likely to live in households with under-five children, while women who are household heads are more represented among non-digital enterprises.

Table 2. Descriptive Statistics

Variable	Digital Enterprise (N = 7.248)		Non Digital Enterprise (N = 70.548)	
	N	%	N	%
Under-five children in the household				
Yes	2.003	27.64	13.324	18.89
No	5.245	72.36	57.224	81.11
Household head status				
Yes	1.037	14.31	17.422	24.70
No	6.211	85.69	53.126	75.30
Household-head Education/ Year of Schooling				
No schooling / Incomplete primary	161	2.22	12.366	17.53
Primary school	931	12.84	22.288	31.59
Junior secondary	1.522	21.00	14.017	19.87
Senior secondary	3.378	46.61	18.276	25.90
Diploma I / II	64	0.88	284	0.40
Diploma III	260	3.59	719	1.02
Diploma IV / Bachelor's Degree	911	12.57	2.533	3.59
Professional/ Master's Degree	20	0.28	63	0.09
Doctoral Degree	1	0.01	2	0.00
Marital status				
Married	5.649	77.94	50.726	71.90
Otherwise	1.599	22.06	19.822	28.10
Handphone ownership				
Yes	7.150	98.65	46.301	65.63
No	98	1.35	24.247	34.37
Rural-urban				
Rural	2.768	38.19	42.816	60.69
Urban	4.480	61.81	27.732	39.31
Variables	**Mean**	**Std. Dev**	**Max**	**Min**
Household Size	3.73	1.62	1	21
Age	45.07	10.70	15	64

Source: SUSENAS 2024, modified

Clear differences also emerge in educational attainment. Digital enterprises are more concentrated among women with senior secondary and tertiary education, whereas non-digital enterprises are dominated by those with primary or incomplete schooling. Digital readiness and spatial context further distinguish the two groups. Handphone ownership is nearly universal among digital enterprises but substantially lower among non-digital ones. In addition, digital enterprises are more urban-centered, whereas non-digital enterprises are predominantly rural.

4.2 Logit Estimation Results

The logit estimates presented in Table 3 indicate that digital enterprise participation among women is associated with household characteristics, human capital, and digital access. The model is jointly significant (Prob > chi^2 = 0.0000), indicating that the explanatory variables are statistically relevant in explaining variation in digital participation.

Table 3. Logit Estimation Results

Variables	Coef.	Marginal Effect (dy/dx)
Under-five children	0.0991***	0.0075***
	(0.0342)	(0.0026)
Household size	-0.0719***	-0.0055***
	(0.0104)	(0.0008)
Household-head status	-0.0925**	-0.0070**
	(0.0533)	(0.0040)
Age	-0.0095	-0.0007
	(0.0096)	(0.0007)
Age^2	-0.0003***	-0.00002***
	(0.0001)	(0.0000)
Education	0.1390***	0.0106***
	(0.0039)	(0.0003)
Marital status	0.0995**	0.0076**
	(0.0462)	(0.0035)
Handphone ownership	2.9216***	0.2237***
	(0.1029)	(0.0080)
Constant	-4.9969***	
	(0.2070)	
Observations	77,796	
LR chi2	7776.73	
Prob > chi2	0.0000	

Source: SUSENAS 2024, data analyzed
Standard errors (in parathenses)
*** p<0.01, ** p<0.05, * p<0.1

Among the explanatory variables, handphone ownership shows the largest positive association with digital enterprise participation. Women who own a handphone are more likely to operate a digital enterprise compared to those who do not. Care-related variables also exhibit significant effects. The presence of under-five children is positively associated with digital enterprise participation, indicating that women with young children are more likely to engage in digital enterprise activities. In contrast, household size is negatively associated with digital participation, suggesting that women living in larger households are less likely to engage in digital enterprises.

Household-head status is also negatively associated with digital enterprise participation, indicating that women who serve as household heads are less likely to operate digital enterprises. Human capital variables show a strong positive association. Education is positively and significantly associated with digital enterprise participation, suggesting that higher levels of education are linked to a greater likelihood of engaging

in digital enterprise. Marital status is positively associated with digital participation, indicating that married women are more likely to engage in digital enterprise compared to their counterparts. Age does not show a statistically significant linear effect, although the quadratic term is negative and significant, suggesting a declining pattern of digital participation at older ages.

4.3 Heterogeneity Analysis by Rural-Urban Subgroup

The rural–urban disaggregation in Table 4 shows that the determinants of digital enterprise participation among women vary across spatial contexts. The models for both rural and urban subsamples are jointly significant (Prob > chi^2 = 0.0000), indicating that the explanatory variables are statistically relevant in both settings.

Table 4. Subgroup Analysis by Rural-Urban

Variables	Rural		Urban	
	Coef.	dy/dx	Coef.	dy/dx
Under-five children	0.1893***	0.0098***	0.0413	0.0045
	(0.0517)	(0.0026)	(0.0463)	(0.0050)
Household size	-0.1097***	-0.0057***	-0.0572***	-0.0062***
	(0.0166)	(0.0008)	(0.0138)	(0.0015)
Household-head status	-0.4287***	-0.0223***	0.1661**	0.0181**
	(0.0874)	(0.0045)	(0.0706)	(0.0077)
Age	-0.0118	-0.0006	-0.0117	-0.0012
	(0.0154)	(0.0008)	(0.0129)	(0.0014)
Age^2	-0.0004**	-0.00002**	-0.0003**	-0.00003**
	(0.0001)	(0.00001)	(0.0001)	(0.00001)
Education	0.1072***	0.0055***	0.1275***	0.0139***
	(0.0060)	(0.0003)	(0.0054)	(0.0005)
Marital status	0.2410***	0.0125***	0.0836	0.0091
	(0.0735)	(0.0038)	(0.0619)	(0.0067)
Handphone ownership	2.9005***	0.1512***	2.7231***	0.2976***
	(0.1392)	(0.0075)	(0.1535)	(0.0169)
Constant	-4.6380***		-4.4252***	
	(0.3091)		(0.2908)	
Observations	45.584		32.212	
LR chi2	3779.95		3218.98	
Prob > chi2	0.0000		0.0000	

Source: SUSENAS 2024, data analyzed
Standard errors (in parathenses)
*** p<0.01, ** p<0.05, * p<0.1

The presence of under-five children is positively and significantly associated with digital enterprise participation in rural areas, whereas the relationship is not statistically significant in urban areas. In contrast, household size is negatively and significantly associated with digital participation in both rural and urban settings, indicating a consistent relationship across spatial contexts. Household-head status exhibits contrasting associations across locations, with a negative relationship observed in rural areas and a positive relationship in urban areas. Similarly, education is positively and

significantly associated with digital enterprise participation in both subgroups, with a larger magnitude observed in urban settings.

Marital status is positively associated with digital participation in rural areas, while the relationship is not statistically significant in urban contexts. Handphone ownership remains positively and strongly associated with digital participation in both rural and urban areas, with a larger marginal effect observed in urban settings. Age does not show a statistically significant linear effect in either subgroup, although the quadratic term is negative and significant, indicating a declining pattern of digital participation at older ages.

4.4 Discussions

The findings of this study indicate that women's participation in digitally enabled enterprises is shaped by a complex interaction between household responsibilities, individual capabilities, and structural access to digital resources, rather than by a single determinant. This suggests that digital entrepreneurship among women is not purely opportunity-driven, but often emerges as an adaptive response to existing socioeconomic constraints. One of the most notable patterns relates to care responsibilities. The positive association between the presence of under-five children and digital participation, particularly in rural contexts, indicates that women may turn to digital enterprise as a strategy to reconcile income generation with caregiving obligations. This finding is consistent with household time-allocation theory, which posits that individuals adjust their labor supply in response to competing demands between market work and domestic responsibilities (Samtleben & Müller, 2022; Matrucci, 2023). Empirical evidence further supports this mechanism, showing that digital platforms can reduce mobility and time constraints, thereby enabling women to combine economic activities with caregiving roles (Murungu, 2025; Nasir et al., 2024).

Household structure also plays a significant role, although its effects are not uniformly enabling. The negative association between household size and digital participation suggests that larger households tend to increase time burdens and resource competition, limiting women's ability to engage in entrepreneurial activities. While some studies highlight the potential for shared responsibilities within larger households (Musyoka et al., 2025), others emphasize that additional household members often increase domestic workload and financial pressure (Köppe et al., 2025). Finlay (2021) similarly notes that expanding household obligations may constrain women's participation in income-generating activities. The findings of this study indicate that the constraining mechanism dominates over the potential support effect.

An interesting pattern emerges when considering household-head status. The contrasting effects observed between rural and urban areas suggest that autonomy alone is not sufficient to promote digital participation. In rural settings, female household heads may face tighter financial constraints and limited market access, while in urban contexts, greater autonomy may facilitate entrepreneurial engagement. This interpretation aligns with intra-household bargaining theory, which emphasizes the role of decision-making authority and resource control (Golik & Wasilczuk, 2025; Malisetti & Singh, 2025).

Human capital emerges as a key enabling factor across contexts. The positive association between education and digital participation supports the predictions of human capital theory, which emphasizes individuals' ability to process information and adopt new technologies (Abbas et al., 2024; Ghouse et al., 2024; Taleb et al., 2025). Chatterjee et al. (2020) further confirm that educational attainment is strongly associated with digital technology adoption among small entrepreneurs. The stronger effect observed in urban areas suggests that the returns to human capital are amplified by more developed digital ecosystems. Digital access plays a foundational role in shaping participation. The strong association between handphone ownership and digital enterprise engagement confirms that access to basic digital infrastructure is a prerequisite for participation. This finding aligns with digital divide theory, which distinguishes between first-level access to digital tools and second-level differences in effective usage (Heeks, 2022; Mwansa et al., 2025). Evidence from developing economies consistently shows that mobile phone ownership serves as a gateway to digital entrepreneurship (Gavigan et al., 2025; Nwangwu et al., 2024). However, the stronger effects observed in urban contexts suggest that the benefits of digital access depend on the presence of complementary infrastructure and market ecosystems.

Taken together, the results suggest that women's participation in digital enterprise cannot be explained by a single factor, but rather reflects the combined influence of household responsibilities, resource availability, individual capabilities, and the surrounding economic environment. In particular, the interplay between care obligations, household structure, education, and spatial context appears to shape both the opportunities and constraints faced by women. These patterns indicate that digital entrepreneurship is closely linked to household-level decision-making processes as well as the broader local conditions in which women operate, rather than being driven solely by access to technology.

From a policy perspective, these results imply that strategies to promote digital inclusion should be context-specific. Rural areas may require greater emphasis on infrastructure development and reducing vulnerability constraints, while urban areas may benefit from policies focused on skill development and ecosystem strengthening. Despite these contributions, this study has several limitations. The use of cross-sectional data limits causal inference, while unobserved factors such as motivation, social networks, and institutional conditions are not fully captured. In addition, the measurement of digital enterprise does not reflect variation in intensity or quality of digital engagement. Future research could address these limitations by incorporating longitudinal data and more detailed indicators of digital activity.

5. Conclusion and Recommendation

The findings of this study demonstrate that digital participation is not solely a function of individual entrepreneurial motivation but is deeply embedded within household dynamics and spatial context. Childcare responsibilities are positively associated with digital engagement, particularly in rural areas, indicating that digital

enterprise may function as a flexible adaptation strategy under caregiving constraints. In contrast, larger household size consistently reduces the likelihood of digital participation, suggesting that cumulative domestic burdens and resource pressures can limit women's capacity to adopt digital tools.

Household authority and marital status reveal context-dependent effects. In rural settings, being a household head is associated with lower digital participation, potentially reflecting vulnerability, limited access to complementary assets, and greater financial risk exposure. In urban contexts, however, household-head status increases the likelihood of digital engagement, suggesting that decision-making autonomy and resource control may facilitate digital transformation when market infrastructure is supportive. Education consistently enhances digital participation across both rural and urban areas, with stronger returns observed in urban settings, reinforcing the importance of human capital in navigating digital platforms and market competition. Handphone ownership emerges as the most powerful enabling factor in all models, highlighting that digital infrastructure constitutes a foundational prerequisite for online enterprise engagement.

These findings directly address the study's objective by demonstrating that women's participation in digital enterprises is shaped by the interaction between care constraints, household structure, human capital, and spatial context. This study contributes to the literature by showing that digital entrepreneurship is not driven by a single factor but emerges from the combined influence of household-level dynamics and structural digital access. From a theoretical perspective, the results extend existing frameworks on labor supply, human capital, and digital inclusion by emphasizing the role of household constraints and localized opportunity structures.

These findings carry important policy implications. Strengthening women's digital entrepreneurship requires more than expanding connectivity. It demands integrated interventions that address both technological access and household-level constraints. In rural areas, investments in affordable digital infrastructure should be complemented by targeted support for female household heads and programs that reduce vulnerability-related barriers. Childcare-sensitive policies, including community-based childcare services, affordable daycare centers at the village or neighborhood level, extended school-hour programs, and improved access to clean water and energy that reduce time spent on domestic tasks, can further enhance women's capacity to participate in digital enterprise. In urban contexts, policy emphasis should prioritize skill upgrading, digital literacy training, and ecosystem integration to maximize the returns to education and digital readiness. Promoting inclusive digital enterprise among women requires place-based and gender-responsive strategies that explicitly address the interaction between household responsibilities, human capital, and unequal digital ecosystems.

Declarations

Authorship

All authors actively participated in the work and have agreed to the final version of the manuscript.

Author Contribution Statement

Axellina Muara Setyanti designed the study, developed the research framework, and led the manuscript writing. Silvi Asna Prestianawati contributed to the study design, data interpretation, and manuscript revision. Andi Tri Setiawan supported the literature review and preparation of tables and results. Muhammad Fawwaz processed and analyzed the SUSENAS data and contributed to the methodological section. Muhammad Fansurullah Harsa assisted in data cleaning, descriptive analysis, and final manuscript formatting. All authors reviewed and approved the final version of the manuscript.

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Data Availability Statement

The data used in this study are derived from the 2024 National Socio-Economic Survey (SUSENAS). Access to SUSENAS microdata is subject to the data access policies and procedures of Statistics Indonesia (Badan Pusat Statistik/BPS). Therefore, the data are not publicly shared by the authors but may be obtained from BPS upon formal request and approval. The authors are responsible for the analysis, interpretation, and conclusions presented in this manuscript.

Declaration of Interests Statement

The author declares that there are no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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