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"If you want something said, ask a man; if you want something done, ask a woman."
Margaret Thatcher

No. 1-2/2025

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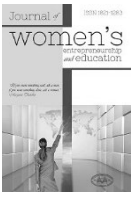

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Note from the Editor in Chief

I am pleased to inform you that the Journal of Women's Entrepreneurship and Education (JWEE) is currently indexed in SCOPUS Q3. In this context, I would like to ask you to recommend the value of publishing in JWEE.

Research on women entrepreneurs has evolved significantly in recent years, with several emerging trends shaping the field. Indeed, the dynamic landscape of female entrepreneurship is characterised by significant growth and persistent challenges, particularly in terms of funding and social support. Therefore, more research on women, entrepreneurship and education should aim to uncover the barriers, incentives and outcomes that shape women's entrepreneurial journey and how education (formal and informal) influences their success over the course of their lives. Women's entrepreneurial trajectories often differ from men's – influenced by family roles, social norms and access to resources. Addressing these issues is critical to fostering an inclusive and thriving entrepreneurial ecosystem. In this regard, we expect to see more high-quality papers that incorporate the latest trends in this area into their research and address them in an interdisciplinary manner to broaden the scope of their research and contribute to the field.

This year, the journal will maintain its high quality and the rigorous selection of papers that characterise its high reputation. In order to fulfil all the high quality requirements, we expect the authors to write their contributions according to the template and to submit only original scientific works.

Yours sincerely,
Prof. Dr Mirjana Radovic-Markovic

Editor in Chief

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ORIGINAL SCIENTIFIC PAPER

Digital Financial Literacy and Entrepreneurial Resilience of Women Entrepreneurs: A Moderated Model of Overconfidence

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A B S T R A C T

Resilience has been known as an essential element in sustaining women's entrepreneurship in MSMEs in developing countries. This study aims to investigate the influence of digital financial literacy on entrepreneurial resilience and the impact of overconfidence in this relationship on female entrepreneurs in Indonesia. A total of 494 women entrepreneurs from MSME participated in this cross-

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sectional survey. Before examining the proposed relationships, CFA was used to evaluate the quality of the measurements. While controlling for demographic characteristics, the impacts of digital financial literacy, overconfidence, and their interactions are assessed using multiple regression analysis and the PROCESS Macro Ver. 4.2 for SPSS. The results emphasize the significance of digital financial literacy and overconfidence in enhancing the resilience of women entrepreneurs. Furthermore, the findings indicate that entrepreneurs with high overconfidence are more adept at leveraging their digital financial literacy to foster greater resilience.

KEYWORDS: *women entrepreneurs, digital financial literacy, overconfidence, entrepreneurial resilience*

Introduction

The entrepreneurship journey is often filled with uncertainties, challenges, and obstacles, requiring individuals to demonstrate resilience to overcome them and succeed (Kotsios, 2023; Panjaitan et al., 2022). This holds particularly true for female entrepreneurs, who encounter unique barriers and challenges in pursuing entrepreneurship (Hernández et al., 2024). Throughout history, women entrepreneurs have grappled with various obstacles, including financial constraints, limited expertise, work-life balance dilemmas, sociocultural impediments, and inadequate governmental endorsement (Abdulla & Ahmad, 2023). Nevertheless, more and more women are choosing to start their own businesses, propelled by a yearning for autonomy, self-fulfillment, and financial stability (ICRW, 2019).

Entrepreneurial resilience (ER) is typically conceptualized as a preemptive capacity that allows entrepreneurs to navigate potential crises, adversities, or obstacles more effectively (Korber & McNaughton, 2018). It is necessary to be aware of the factors that impact how entrepreneurs cultivate resilience and to identify potential actions or training initiatives that can be implemented to foster the augmentation of ER, especially within the realm of small businesses (Halonen & Virkkala, 2023). Understanding the determinants contributing to ER among women is crucial for supporting their success and growth (Cardella et al., 2020). The lack of empirical findings on the resilience of women entrepreneurs is the driving force behind this current research.

As the digital landscape continues to evolve, the importance of digital literacy is increasingly recognized for entrepreneurial success and enhancing

organizational resilience in a competitive business environment (Awad & Martín-Rojas, 2024). Despite recognizing the importance of information technology skills for their employability and entrepreneurship in the 21st century, women often feel underrepresented in the digital era (Pappas et al., 2018). Concurrently, the significance of financial literacy in entrepreneurship is widely acknowledged for its role in facilitating financial access and improving the performance of small businesses (Anshika & Singla, 2022). Recent research indicates that both financial literacy and digital literacy play separate but crucial roles in driving resilience in micro and small enterprises (Ariana et al., 2024). The findings of those previous studies highlight the important impact of financial literacy and digital literacy on strengthening business resilience.

The question "Does digital financial literacy matter for women entrepreneurs?" remains relevant today (Hasan et al., 2023). Research on digital financial literacy (DFL) has evolved from focusing on predictors and relationships with sociodemographic factors to financial factors (Yadav & Banerji, 2023). Regrettably, there is presently limited empirical evidence regarding the relationship between DFL and ER. The ongoing advancements in digital technology present new opportunities to supplement female entrepreneurs with the prominent knowledge and tools to proficiently navigate the intricate financial landscape, thereby increasing their capacity to withstand challenges.

One common psychological attribute that has long attracted substantial attention from entrepreneurship researchers is overconfidence (Salamouris, 2013; Singh, 2020). Entrepreneurial overconfidence is typically characterized and evaluated as entrepreneurs' exaggerated beliefs about their entrepreneurial abilities, as a form of increased entrepreneurial self-efficacy, and overestimation of positive outcomes in their business decisions (Szerb & Vörös, 2021). Recently, Zhang et al. (2024) conducted an analysis using data from listed Chinese companies and showed that managers' overconfidence positively influences company resilience. Meanwhile, existing research has shown that overconfidence can be a major driver of entrepreneurial activity and venture performance (Cheng & Liao, 2017; Invernizzi et al., 2017). Thus, an entrepreneur's level of overconfidence emerges as a crucial factor contributing to resilience. Additionally, Fatma et al. (2021) suggested that certain psychological traits, including overconfidence, exert a more pronounced influence on new businesses done by female entrepreneurs than their male counterparts.

Furthermore, overconfidence has been documented as a moderating factor in some studies examining the relationship between corporate characteristics and outcomes (Nur et al., 2023), financial literacy, and investor decisions in investing (Seraj et al., 2022), and entrepreneurial attitudes and entrepreneurial intentions (Fitzsimmons & Douglas, 2006). Guerrero and Walsh (2023) examined the moderating role of entrepreneurial confidence in the relationship between entrepreneurial persistence and resilience. Further investigation of the potential moderating influence of overconfidence may offer an additional understanding of the intricate dynamics impacting the association between DFL and ER among female entrepreneurs.

Our research aims to study the relationship between DFL and ER, and the moderating role of overconfidence that may impact it among female entrepreneurs engaged in micro, small, and medium enterprises (MSME) in a developing country, Indonesia. The uncertain environment in which small businesses operate in developing countries should not be overlooked; therefore, learning to be resilient in such an environment can yield crucial insights for ensuring the continuity and expansion of a business (Kromidha & Bachtiar, 2024). Enhancing women's ER can be achieved by leveraging expert insights to empower entrepreneurs' attributes, such as psychological capital, as well as developing their competencies in areas like digital literacy and financial management (Hazudin et al., 2023).

Literature Review

Entrepreneurial Resilience

A significant amount of academic research focuses on investigating the connection between entrepreneurship and resilience. The term "resilience" pertains to the ability to adapt and bounce back from adversity (Hedner et al., 2011). In the context of entrepreneurship, it involves bouncing back from challenges and achieving positive outcomes despite hardships (Lee & Wang, 2017). Three crucial aspects of the ER process, which captures the dynamic nature of resilience; capability, which focuses on specific skills and traits; and resource, which includes tangible and intangible assets supporting resilience (Halonen & Virkkala, 2023).

ER is not a steady characteristic but a dynamic and evolving action that adapts to changing environmental factors and individual experiences, as

emphasized by Awad and Martín-Rojas (2024). They interpret ER using dynamic capability theory, indicating ongoing adaptive behaviors and competencies that enable entrepreneurs to recognize, seize, and reconfigure resources to address emerging challenges (Teece et al., 1997). It is necessary to realize that dynamic capabilities allow firms to effectively integrate, build, and reconfigure both external and internal resources to not only adapt to but also influence a constantly evolving business landscape (Teece, 2017). This framework offers valuable perspectives on the significance of ER in the progression and expansion of ventures.

Digital Financial Literacy and Entrepreneurial Resilience

Several studies have highlighted the correlation between financial literacy and the achievement of small businesses (Li & Qian, 2020), underscoring the critical role that sound financial management plays in ensuring the viability and resilience of entrepreneurial ventures. Meanwhile, the emergence of digital financial technologies can potentially disrupt innovation barriers (Xia et al., 2024), providing women entrepreneurs with unprecedented opportunities to gain the necessary financial skills and knowledge to navigate the often-daunting world of business finance. Entrepreneurs in the MSME sector benefit significantly from digital literacy and financial literacy, as it enables them to effectively handle finances, including budgeting, cash flow management, billing, and record-keeping, empowering them to make the right decisions, mitigate financial risks, and enhance the company's overall financial well-being (Ariana et al., 2024; Putra et al., 2023). DFL fosters greater financial inclusion and access to capital for female entrepreneurs (Hasan et al., 2023). Through online lending platforms, digital banking services, and crowdfunding opportunities, people can also circumvent traditional barriers to securing financing, such as the lack of collateral or credit history, and unlock new avenues for funding their businesses (Kass-Hanna et al., 2022). As such, digital financial platforms and applications provide personalized guidance and tailored recommendations, empowering women to develop a deeper awareness of financial strategies and concepts tailored to their unique challenges as entrepreneurs.

DFL also contributes to the overall resilience of women entrepreneurs by enhancing their decision-making capabilities and fostering a greater sense of financial autonomy (Pappas et al., 2018). When women entrepreneurs have a strong understanding of digital financial concepts and

tools, they are better prepared to anticipate and mitigate potential financial risks, adapt to changing market conditions, and make strategic decisions that ensure the long-term sustainability of their businesses (Hazudin et al., 2023). This enhances their capacity to endure and bounce back from difficulties, such as economic recessions, supply chain interruptions, or unforeseen personal hardships, ultimately enhancing their resilience and enhancing their chances for long-term success.

H1: DFL increases ER

Overconfidence and Entrepreneurial Resilience

Entrepreneurship has become a topic of great interest and research, as scholars and practitioners alike seek to understand the motivations, behaviors, and impacts of entrepreneurs and their ventures. An individual's tendency to overestimate the likelihood of favorable outcomes relative to unfavorable outcomes in a given situation is defined as overconfidence, which is a cognitive bias (Invernizzi et al., 2017). Scholarly research has corroborated the prevailing belief that entrepreneurs tend to exhibit greater optimism and overconfidence than the general population (Koudstaal et al., 2015). Although females are generally considered to have lower entrepreneurial abilities than males, Jennings et al. (2023) showed that this does not mean that females are less confident in their entrepreneurial potential and that females are as capable as males of accurately assessing their skills for starting a business.

Kraft et al. (2022) demonstrated that overconfidence can stimulate key entrepreneurial activities, such as opportunity identification, venture start-up, and venture innovation. However, overconfidence can also negatively affect venture performance at more advanced stages. These findings suggested that overconfidence has varying effects across the entrepreneurial process. Meanwhile, some researchers suggest that entrepreneurial overconfidence may play a constructive role by enabling entrepreneurs to overcome setbacks better, stimulating both entrepreneurial initiation and termination, bolstering resilience, and motivating the pursuit of more ambitious objectives (Hayward et al., 2010; Simon & Shrader, 2012). It was argued by Hayward et al. (2010) that even if they are overconfident, highly confident entrepreneurs can elicit positive emotions, enhance their ability to overcome obstacles, and prompt them to make greater investments in their future endeavors.

H_2: Overconfidence increases ER

The study of ER should consider the interconnections between the individual, the firm, and the broader environmental contexts in which they operate (Awad & Martín-Rojas, 2024; Teece, 2017). There is increasing awareness of various issues central to the overconfidence problem, which is widely regarded as common and potentially more harmful than other decision biases (Ilieva et al., 2018). When entrepreneurs view their interactions with the environment as encouraging and fruitful, their welfare improves, leading to increased resilience, which shields them from the challenges of starting a new venture (Yang & Danes, 2015). In this context, if overconfidence increases the effect of increasing DFL on ER, then the interaction between the two should be positive.

H_3: Overconfidence has a moderating effect on the link between DFL and ER

Methods

Sample and Procedures

The study utilized a quantitative approach and distributed a cross-sectional survey to collect data. It is known that the majority of Indonesian women entrepreneurs do not run large businesses but rather run small and medium businesses (Sutrisno et al., 2022). We undertook a study that specifically focused on female entrepreneurs operating within the MSME sector in the Special Region of Yogyakarta, Indonesia. The sampling method employed quota sampling to ensure respondents were distributed across the region's five districts, aiming for a proportional representation. As Hair Jr. et al. (2020) explain that the purpose of quota sampling, which is done based on convenience, is for the overall sample to have a proportional representation of the target population strata.

We collected research data by distributing questionnaires for respondents to complete themselves, using either a paper copy or an online form. The questionnaire covered demographic data about the respondents and the measurement of research variables. Data collection was conducted in July 2024 with coordination by the second and third authors with the assistance of ten student assistants who visited the respondents' locations and met directly with the female entrepreneurs. We asked for the willingness of respondents to fill out the research questionnaire.

Respondents were not asked to fill in their names or any identities. All respondents who completed the questionnaire received small souvenirs as a thank you.

A total of 494 questionnaires were completed and obtained from research respondents. Of the total respondents, 91.3% (451) completed the survey in written form, while 8.7% (43) participated via an online survey. All respondents were women managing MSMEs. The majority were middle-aged (26.01 to 40.00 years; 39.7%), married (69.8%), had a high school education (50.8%), and employed fewer than 10 people (93.1%).

Measures

The study investigates three types of research variables: independent (DFL), dependent (ER), and moderator variables (overconfidence). Respondents were asked to provide closed responses on a 5-point Likert scale, expressing their agreement or disagreement with statement items related to the research variables. We calculated the average score to construct a summation scale for each variable of interest (Hair Jr. et al., 2019).

This study utilized a four-item scale to assess DFL, which was adapted from previous research by Ravikumar et al. (2022). The statement items are as follows: "I know about digital or online financial transaction methods"; "I am aware of various risks such as phishing and spyware when I make digital financial transactions"; "I can overcome errors that occur in digital financial transactions"; and "I understand that there is an appropriate forum or procedure if I become a victim when making digital financial transactions". The scale's Cronbach's alpha was 0.833.

The ER scale, adapted from Santoro et al. (2020), consisted of four items. They are "I actively seek ways to compensate for losses I encounter in business"; "I believe that I can grow positively in the face of difficult situations"; "I seek creative ways to change difficult situations"; and "Regardless of what happens to me, I believe I can control my reaction to it." The scale's Cronbach's alpha was 0.787.

The overconfidence behavior, adapted from Iram et al. (2023), included five items. The items are "I am an experienced entrepreneur"; "When I decide to invest, I feel that my knowledge and actions influence the outcome"; "I expect my investment decisions to be wiser than others"; and

"I feel more confident in my own investment decisions"; and "I tend to invest in things I believe in." The scale's Cronbach's alpha was 0.801.

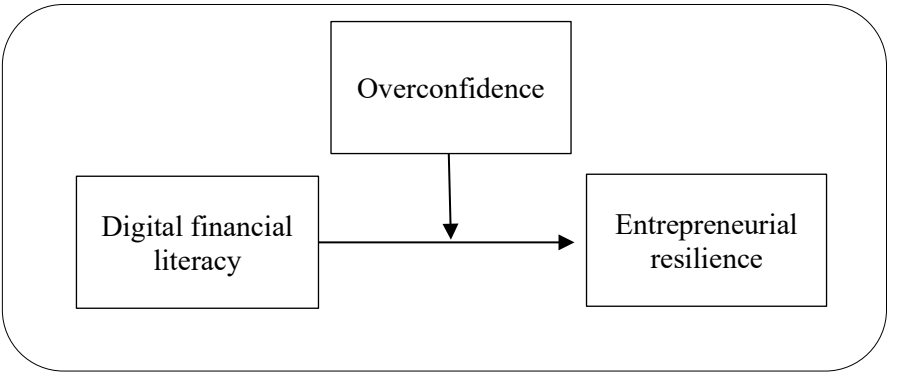
Data Analysis

Initially, descriptive analysis was conducted to gain an initial understanding of the research variables. The next step involved confirmatory factor analysis (CFA), a robust statistical method utilized to examine the fundamental framework of a concept by assessing the proposed connections between observable variables and their corresponding underlying factors (Hair Jr. et al., 2019). By testing the fit of the proposed factor structure, researchers can enhance the one-dimensionality and construct validity of their measures, which are essential for drawing meaningful conclusions from the data. We conducted confirmatory factor analysis using the statistical software Stata 17. Stata utilizes the SEM Builder option or command language to construct a model path diagram (Ramlall, 2017).

Hypotheses 1 and 2 were tested by applying multiple regression analysis. Multiple regression analysis is especially helpful for explanatory research as it simultaneously includes all independent variables in the regression equation to assess the impact of two or more variables on the dependent variable (Keith, 2019). Multiple regression was used to determine the extent to which DFL and overconfidence influence ER while controlling for several variables. Previous empirical studies have used several demographic characteristics in the study of organizational resilience (Croitoru et al., 2017; Kipkosgei, 2022). Accordingly, the control variables examined in this research include age, education level, marital status, number of employees, and length of service. These variables were measured using ordinal categories. The data were analyzed using SPSS Ver. 27 as well as Stata 17.

Next, hypothesis 3 testing regarding moderation analysis was conducted in this study. In accordance with Igartua and Hayes (2021), Figure 1 depicts a conceptual model with one moderating variable, overconfidence, which alters the relationship between DFL and ER. In this case, the statistically significant regression coefficient of DFL × overconfidence supports the claim explained in the moderation model. We estimate the moderation model using the PROCESS macro for SPSS by requesting model = 1 and providing several valuable output options for visualizing and investigating interactions (Hayes, 2018).

Figure 1: Conceptual model



Source: Authors

Results and Discussion

Confirmatory Factor Analysis

Prior to examining the proposed connections, we performed a CFA to assess the effectiveness of our survey tools. The outcomes presented in Table 1 reveal that the assumed three-factor measurement model displayed a strong correspondence with the data, surpassing the accuracy of several alternative two-factor and one-factor models. Specifically, the three-factor model produced a χ^2 (62) = 199.57, SRMR = 0.04, RMSEA = 0.07, CFI = 0.94, and TLI = 0.93, all meet the recommended criteria (Keith, 2019). These findings support the construct validity of our key measures, stating that the items effectively captured the intended underlying constructs in this research.

High Cronbach's alpha values indicate that the individual items within each scale are closely related and measure the same underlying construct, instilling confidence in the internal consistency of the measurement instrument used in the study. The Cronbach's alpha values for DFL, ER, and overconfidence were 0.833, 0.787, and 0.801, respectively, all surpassing the recommended threshold of 0.7, signifying relatively high reliability. This implies that the scales employed in the study effectively and consistently measured the intended constructs.

Table 1: CFA results

Model	χ^2	*Df*	RMSEA	SRMR	CFI	TLI
Three-factor model (DFL, ER, O)	199.57	62	0.067	0.043	0.941	0.926
Two-factor model (DFL+ER, O)	578.95	64	0.128	0.088	0.780	0.732
Two-factor model (DFL, ER + O)	445.68	64	0.110	0.069	0.837	0.802
Two-factor model (DFL+O, ER)	505.45	64	0.118	0.079	0.812	0.771
One-factor model	775.43	65	0.149	0.097	0.697	0.636

N = 494.

Source: Authors' calculation

Descriptive Statistics

Table 2 presents descriptive statistics for the main variables. The results show that the respondents' mean DFL score was 3.72, with a standard deviation of 0.77, indicating a moderate level of DFL among the sample. The mean overconfidence score was 3.80, with a standard deviation of 0.56, also suggesting a moderate level of overconfidence. Additionally, the mean ER score was 4.03, with a standard deviation of 0.51, indicating a relatively high level of ER within the sample.

Table 2: Descriptive statistics

Variable	Mean	SD	Min.	Max.	DFL	O
DFL	3.72	0.77	1.00	5.00	1	
O	3.80	0.56	1.00	5.00	0.4993***	1
ER	4.03	0.51	2.25	5.00	0.3917***	0.4750***

*N = 494. ***p < 0.001.*

Source: Authors' calculation

As anticipated, ER exhibited positive associations with DFL ($r = 0.392$; $p < 0.01$) and overconfidence ($r = 0.475$; $p < 0.01$). These findings provide initial support for Hypotheses 1 and 2, which proposed positive relationships between these key variables. Additionally, Table 2 shows that no pair of independent variables is highly correlated. The results of the study also showed that the variance inflation factor (VIF) value ranges from

1.03 to 2.09 in the estimation with control variables; this indicates that multicollinearity is not a problem in our analysis (Daniels & Minot, 2020).

Hypothesis Tests

The investigation employed a multiple regression analysis technique to evaluate the influence of diverse independent variables on ER. The predictor variables included DFL and overconfidence, while the model also incorporated various control variables such as age, education, marital status, number of employees, and the length of business operations. We rejected the null hypothesis of constant variance of ER, $\chi^2(1) = 12.23$, $p = 0.0005$. Consequently, we run the regression with Huber–White standard errors (Daniels & Minot, 2020). The results in Table 3 indicate that after accounting for the effects of the control variables, DFL is a significant positive predictor of ER ($b = 0.1446$, $t = 3.86$, $p < 0.001$), thereby supporting Hypothesis 1. Similarly, overconfidence emerged as a significant positive effect of ER ($b = 0.3385$, $t = 7.01$, $p < 0.001$), providing further evidence in favor of H_2.

Table 3: Multiple regression model predicting ER

	Coef.	**Robust SE**	***t***	***p*-value**
DFL	0.1446	0.0375	3.86***	0.000
Overconfidence	0.3385	0.0483	7.01***	0.000
Age	0.0142	0.0327	0.43	0.665
Education	-0.0211	0.0182	-1.16	0.247
Marital status	0.1078	0.0575	1.88	0.061
Number of employees	0.0551	0.0544	1.01	0.311
Length of business time	0.0209	0.0216	0.97	0.334
Constant	2.0156	0.2235	9.02***	0.000
F	15.85			
Prob > *F*	0.000			
R^2	0.268			

*N = 494. ***p < 0.001.*

Source: Authors' calculation

Next, we examined the moderating influence of overconfidence on the relationship between DFL and ER. We conducted moderation analyses

using the PROCESS Macro Ver. 4.2 for SPSS, setting the bootstrap sample to 5,000, choosing robust standard errors (Huber–White standard errors), and then setting variable centering for scaling so that the results for the regression coefficients are rendered interpretable (Hayes, 2018). As indicated in Table 4, the interaction term representing the combined effect of DFL and overconfidence was included in the regression analysis. The significant positive interaction effect suggests that overconfidence moderated the positive link between DFL and ER ($b = 0.1356$, $t = 2.9393$, $p < 0.01$), supporting H_3. Specifically, the results indicate that the positive relationship between DFL and ER was amplified for entrepreneurs who exhibited higher levels of overconfidence.

Table 4: Moderating effects of overconfidence

	Coeff.	**SE (HC0)**	***t***	***p*-value**
DFL	0.1629	0.0374	4.3523***	0.0000
Overconfidence	0.3846	0.0435	8.8446***	0.0000
DFL × Overconfidence	0.1356	0.0461	2.9393**	0.0034
Age	0.0135	0.0325	0.4140	0.6791
Education	-0.0134	0.0177	-0.7586	0.4485
Marital status	0.0968	0.0561	1.7253	0.0851
Number of employees	0.0540	0.0538	1.0039	0.3159
Length of business time	0.0095	0.0213	0.4477	0.6546
Constant	3.8193	0.1432	26.6767***	0.0000
F	28.87			
Prob > F	0.000			
R^2	0.294			

*N = 494. **p < 0.01, ***p < 0.001.*

Source: Authors' calculation

More specifically, as shown in Table 5, the moderator value defining the Johnson-Neyman significance region (Igartua & Hayes, 2021) was 3.2412. This indicates that the conditional effect of DFL was significant when the level of overconfidence was higher than 3.2412. More specifically, the relationship between DFL and the outcome variable was statistically significant for individuals with an overconfidence level of 3.2412 or higher,

but not for those with a level below 3.2412. In other words, the higher the overconfidence, the higher the effect of DFL on ER.

Table 5: The Johnson-Neyman significance region

Overconfidence	**Effect**	**SE(HC0)**	***t***	***p***
1.000	-0.2158	0.134	-1.617	0.1065
1.200	-0.1887	0.125	-1.514	0.1307
1.400	-0.1616	0.116	-1.394	0.1639
1.600	-0.1345	0.107	-1.254	0.2103
1.800	-0.1073	0.099	-1.089	0.2769
2.000	-0.0802	0.090	-0.890	0.3740
2.200	-0.0531	0.082	-0.649	0.5168
2.400	-0.026	0.074	-0.352	0.7250
2.600	0.0012	0.066	0.018	0.9858
2.800	0.0283	0.059	0.483	0.6293
3.000	0.0554	0.052	1.069	0.2854
3.200	0.0825	0.046	1.797	0.0729
3.241	0.0881	0.045	1.965	0.0500
3.400	0.1097	0.041	2.657**	0.0081
3.600	0.1368	0.038	3.571***	0.0004
3.800	0.1639	0.037	4.378***	0.0000
4.000	0.191	0.039	4.921***	0.0000
4.200	0.2182	0.042	5.168***	0.0000
4.400	0.2453	0.047	5.197***	0.0000
4.600	0.2724	0.053	5.109***	0.0000
4.800	0.2995	0.060	4.972***	0.0000
5.000	0.3267	0.068	4.824***	0.0000

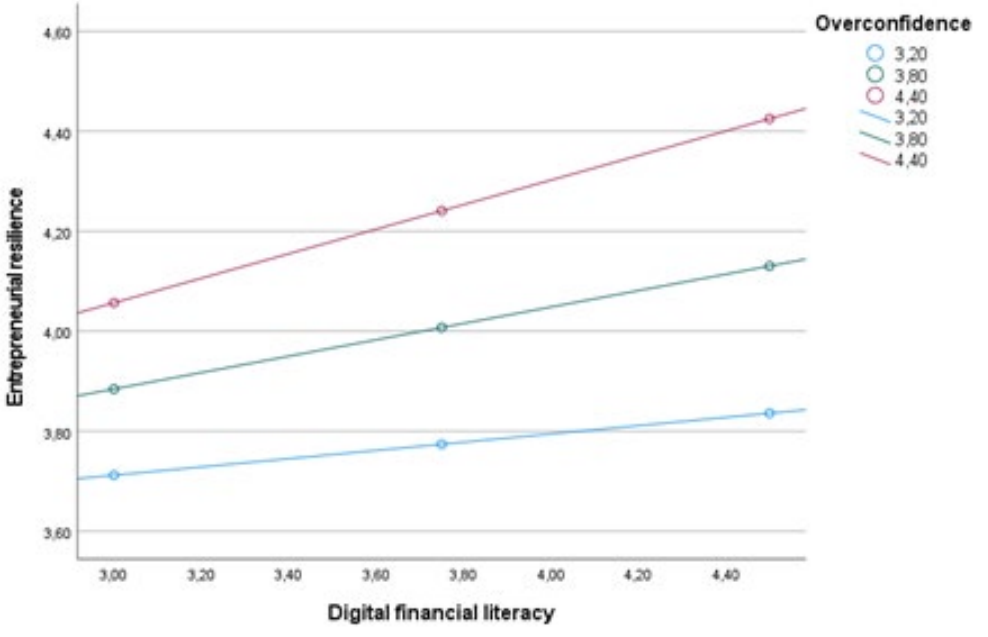
*N = 494. **p < 0.01, ***p < 0.001.*

Source: Authors' calculation

Finally, the PROCESS macro for SPSS also provides a valuable tool for visualizing the conditional impact of the primary predictor variable (Hayes, 2018). By using the SPSS syntax window and executing the macro, we can generate the plot in Figure 2, which illustrates the relationship between DFL and ER at low (3.20), middle (3.80), and high (4.40) levels of overconfidence. The interaction pattern supports the anticipated result, with

the relationship between DFL and ER being stronger for individuals with high overconfidence compared to those with low overconfidence.

Figure 2: Visual representation



Source: Authors, using PROCESS Macro Ver. 4.2 for SPSS

Discussion

The comprehensive analysis of female entrepreneurship has expanded rapidly in recent years, gaining widespread consensus among scholars and contributing to a better understanding of women's challenges in embarking on the entrepreneurial journey (Cardella et al., 2020). The current investigation's findings underscore the critical importance of DFL in bolstering the ability of women entrepreneurs to withstand challenges and adversities. This aligns with previous research, which consistently emphasizes the pivotal role of technology and digital skills in shaping the entrepreneurial experiences and outcomes of women in the rapidly evolving landscape of the 21st century (Kamberidou, 2020), as well as the significance of financial literacy for the venture performance of women entrepreneurs (Tumba et al., 2022). Entrepreneurs require strong digital and financial capabilities to make the right decisions, access funding sources,

and manage the business effectively, making DFL an empowering factor for resilience, particularly for women. In this regard, women's financial inclusion is crucial, as it empowers women by providing opportunities to start and develop businesses, manage resources, and increase their participation in economic activities (Antonijević et al., 2024).

The impact of DFL on ER is not straightforward. The findings of this research suggest that overconfidence played a significant role in shaping ER and had a reinforcing effect on the relationship between DFL and ER. The results indicate that overconfidence influenced how DFL impacted ER, highlighting the interconnected nature of these variables. These results are consistent with prior studies that have emphasized the influence of psychological characteristics on entrepreneurs' ability to learn from failure and their capacity to rebound and thrive in the face of challenges (Zhao & Wibowo, 2021). If entrepreneurs are self-assured and determined, they can utilize the experience of failure to build ER (Guerrero & Walsh, 2023). These insights underscore the need for a more comprehensive understanding of how psychological factors interact with developing essential entrepreneurial skills such as DFL, ultimately impacting the resilience and success of women-led ventures.

The findings imply that women entrepreneurs who possess both strong DFL skills and a heightened sense of overconfidence can leverage these attributes more effectively to build greater resilience in the face of challenges. Hernández et al. (2024) contend that within the realm of female entrepreneurship, resilience serves not only as a method for tackling challenges but also as a vital element in establishing a more fair and varied entrepreneurial atmosphere. Therefore, entrepreneurship training is necessary for the sustainability of small business owners' entrepreneurial careers (Fatima et al., 2024). The existing body of literature suggests that the development of resilience is a skill that can be cultivated. It is advised to implement comprehensive training programs aimed at fostering and effectively managing resilient entrepreneurial activities (Margaça et al., 2023). In addition, the presence of human, financial, physical, and intellectual capital has a positive and significant impact on female entrepreneurs' adoption of digital technology (Feranita et al., 2024). Research on entrepreneurship education shows that providing education to female entrepreneurs can help them build self-confidence and improve their personal character (Pruett, 2023).

Policymakers and entrepreneurship support organizations should prioritize developing comprehensive DFL programs tailored to meet the specific requirements and obstacles female business owners encounter. Financial institutions and FinTech companies should actively collaborate with entrepreneurship support organizations to provide accessible and inclusive digital financial services and educational resources tailored to the unique requirements and obstacles encountered by female entrepreneurs. FinTech significantly reduces inequality directly and indirectly through financial inclusion for a panel of many countries (Demir et al., 2022). Suleiman et al. (2022) emphasize the significance of financial education programs and provide examples of how financial literacy can be integrated with product performance. This integration is particularly evident in the design of financial products tailored for individuals with low financial literacy. These initiatives have the potential to empower women in effectively navigating the intricacies of the digital financial realm, enabling them to make informed business and financial decisions. Ultimately, this equips them to develop more resilient, adaptable, and prosperous enterprises.

Conclusion

The concept of ER provides a crucial framework for understanding the mechanism through which entrepreneurs and their ventures navigate the inherent challenges and uncertainties that characterize the entrepreneurial journey. The current study holds significant importance due to its exploration of the intersection between ER, DFL, and overconfidence within the context of female entrepreneurship. By enhancing the knowledge and skills of women entrepreneurs in navigating the digital financial landscape and understanding the behavioral factors that underpin it, this study aims to empower them to establish more resilient and sustainable businesses.

This study presents significant theoretical insights into the various entrepreneurial traits and competencies essential for success in the contemporary business landscape. By constructing a robust theoretical framework and conducting a comprehensive literature review, this research effectively addresses the existing knowledge gap related to the adaptive behaviors that female entrepreneurs exhibit. Specifically, it examines how these entrepreneurs strategically utilize available resources to navigate and overcome the myriad challenges in their business endeavors.

The findings of this study offer valuable insights that can significantly contribute to the enhancement of female entrepreneurship in developing countries. Policymakers who focus on supporting female entrepreneurs must prioritize the development of psychologically solid attributes, as these traits are essential for fostering resilience among women in business. By creating programs and initiatives targeting female entrepreneurs' mental and emotional fortitude, policymakers can help these individuals navigate the challenges they face more effectively.

Additionally, financial institutions play a pivotal role in this ecosystem and should consider implementing comprehensive activity programs to improve financial literacy. These programs can be designed to incorporate the latest technological advancements, ensuring that women entrepreneurs gain a solid understanding of economic concepts and learn how to utilize modern tools and platforms to manage their enterprises. By enhancing financial literacy and technological skills, female entrepreneurs will be better equipped to make informed decisions, access capital, and succeed in their business.

It is essential to acknowledge that this study's findings are contingent upon the specific geographic context in which the research was conducted. This limitation raises questions about the applicability of the results to different regions or populations with varying cultural and economic backgrounds. Therefore, additional research must assess how these findings can be generalized beyond the original study setting.

Furthermore, future investigations should explore moderated mediation models that elucidate the complex relationships among financial literacy, personal attributes, resilience, and the pathways to achieving financial success. By examining these interconnected factors, researchers can better understand how individual characteristics and external conditions may influence economic outcomes in diverse contexts.

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ORIGINAL SCIENTIFIC PAPER

Empowering Women in Agribusiness: A Fuzzy VIKOR Approach to Personnel Selection

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A B S T R A C T

This study addresses the challenges of personnel selection in modern management, particularly focusing on women's roles in agribusiness - a critical sector for economic stability and sustainability. The research method used in the paper was multi-criteria decision-making, or fuzzy logic, in selecting the most suitable candidate as one of the basic goals of work. In these cases, it is necessary to apply fuzzy decision-making logic, which would reduce the existing uncertainty in the selection process. Research shows that including women in the agricultural sector can significantly enhance productivity and innovation, key for maintaining market competitiveness. Also, the application of the Fuzzy VIKOR method identified Candidate 5 as the optimal choice, demonstrating the method's effectiveness in multi-criteria decision-making. The importance of the research is the existence of a good basis for further research on this topic in other areas, as well as in the further development of multi-criteria decision-making methods that are used for these purposes.

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Introduction

Staff selection in modern management represents a significant challenge, especially regarding women in agribusiness, a sector that is crucial for economic stability and sustainability. Given the global trends emphasizing gender equality and women's empowerment, this topic is becoming increasingly important. Agribusiness, which encompasses all aspects of food production, processing, and distribution, often faces biases and stereotypes that can undermine women's capabilities. Empowering women in this industry is not just a matter of justice but also an economic necessity. Research shows that including women in the agricultural sector can significantly improve productivity and innovation, which are essential for maintaining competitiveness in the market.

However, traditional staff selection methods often rely on subjective assessments and simple quantitative criteria, highlighting the need for innovative approaches that consider the complexity and dynamism of the labor market. One such approach is the fuzzy VIKOR method, which facilitates decision-making under uncertainty by taking multiple criteria into account, such as work experience, education, communication skills, etc. This method can help employers better evaluate candidates and make informed decisions, thereby increasing the chances of success for women in a sector that often favors traditional gender roles.

The initial and main hypothesis of the research is that the research selection process is a complex process that involves the application and inclusion of multiple criteria with the aim of obtaining a rational decision. As a sub-hypothesis in the paper, the question of the role of women in agribusiness, or rather their competence, which is completely equal to men, is imposed, although practice sometimes denies this. For this purpose, it is necessary to use modern methods of multi-criteria decision-making, namely its fuzzy logic due to possible uncertainties and indecision in the decision-maker. The importance of this is especially evident in agribusiness, as a complex business area that includes multiple influencing factors.

Literature Review

As Jovanović (2021) notes, in today's dynamic business environment, there is a constant struggle for survival in the market. Accordingly, the digitalization of organizational units continuously drives the assessment and innovation of existing business models (Perić et al., 2021). The current labor market situation is largely characterized by the employment of efficient personnel. Human resources are an asset in modern business conditions, as they play a crucial role in forming knowledge, education, training, skills, and expertise for work in companies (Aziz et al., 2019). Employees' skills develop over time, respond to the demands of the environment, represent components of behavior structured into coherent models, and, ultimately, cognitive requirements decrease as skills increase (Jovičić et al., 2018). The search for employees with developed awareness of responsibility and self-motivation poses a challenge and an imperative for any serious organization (Dragić et al., 2024). Every employee is a unique individual, and each company is an individual entity (Pavlović et al., 2024). Many authors have studied the phenomenon of unemployment and the factors that influence it (Kovačević et al., 2015; Radović Marković et al., 2019; Cvijanović et al., 2019; Nikitović, Vujičić, 2021; Radović Marković et al., 2021). Tsareva (2021) considers employees to be a unique competitive resource and a source of profit for every organization. Konderman Ilić (2021) states that in modern business conditions, human resources are the most valuable asset that enables the achievement and maintenance of an organization's competitive advantage. Certain skills of employees are crucial for the company's ultimate success and can be considered as competitive advantages. Therefore, they are highlighted during the recruitment process (Rabrenović et al., 2024). Personnel selection presents a significant challenge in modern management, especially in sectors like agribusiness, where gender equality and women's empowerment are particularly important. In recent years, research has focused on the application of innovative methods in the selection process to better meet the complex demands of the labor market. Studies by domestic and foreign authors increasingly apply multi-criteria decision-making methods, especially in the field of agribusiness (Puška et al., 2024; Nedeljković, 2022; Stević, 2019; Puška et al., 2022; Puška et al., 2021; Puška et al., 2023; Joshi et al., 2020; Rahman Muhammad, 2024). Numerous studies have explored the use of MCDM methods in personnel selection. In their study, Alguliyev et al. (2015) propose the application of a multi-criteria model (VIKOR) for

evaluating personnel. Additionally, Liu et al. (2015) combine this model to facilitate the selection of appropriate staff, while Ersoy (2017) suggests an algorithm based on fuzzy logic for the VIKOR method. Similarly, in decision-making regarding staff selection, Chen and Wang (2009) use the fuzzy VIKOR method.

Methodology

This research specifically uses the fuzzy VIKOR method for selecting existing candidates. First, a matrix was created with seven criteria and five alternative candidates. The criteria include interview preparedness, work experience, education, interpersonal skills, communication skills, computer proficiency, and foreign language knowledge. Each criterion was assigned to an equal weight of 0.143, reflecting their equal significance.

Subsequently, positive and negative ideal values were calculated for each criterion, allowing for the normalization of the decision matrix. Based on the normalized values, fuzzy numbers S, R, and Q were calculated, representing the group benefit and individual performance of the candidates. The Fuzzy VIKOR method enables the determination of a compromise solution through the analysis of the obtained values. The results of the research are presented below through the steps of the applied research method.

Research Results

The results of the research will be presented through the defined steps of the applied method. The first step is the formation of the initial decision matrix, where seven criteria were used to evaluate five alternatives, or candidates, in the present study. The names of the criteria with the assigned weight coefficients are provided in the following Table 1. The criteria selected were the personal skills of each candidate, and the same weight value was assigned to each criterion.

Table 1: Used Criteria

	Name	Type	Weight
1	Interview preparedness	+	(0.143,0.143,0.143)
2	Work experience	+	(0.143,0.143,0.143)
3	Education	+	(0.143,0.143,0.143)
4	Interpersonal skills	+	(0.143,0.143,0.143)
5	Communication skills	+	(0.143,0.143,0.143)
6	Computer skills	+	(0.143,0.143,0.143)
7	Knowledge of foreign languages	+	(0.143,0.143,0.143)

Source: Authors

The linguistic scale used for the purposes of this research is provided in the following Table 2.

Table 2: Fuzzy Scale

Code	Linguistic terms	L	M	U
1	Very low	0	0	1
2	Low	0	1	3
3	Medium low	1	3	5
4	Medium	3	5	7
5	Medium high	5	7	9
6	High	7	9	10
7	Very high	9	10	10

Source: Puška et al. (2024)

The results obtained using the previous scale and the initial decision matrix are presented in the following Table 3. The results are ratings in the form of arithmetic means, based on the evaluations of all the experts who participated in the research.

Table 3: Decision matrix

	Interview preparedness	Work experience	Education	Interpersonal skills	Communi-cation skills	Computer skills	Knowledge of foreign languages
Candidate 1	(1.800, 3.800, 5.800)	(2.200, 4.200, 6.200)	(3.400, 5.400, 7.200)	(3.200, 5.000, 7.000)	(3.400, 5.400, 7.400)	(3.800, 5.800, 7.800)	(3.400, 5.400, 7.400)
Candidate 2	(2.200, 4.200, 6.200)	(3.000, 5.000, 7.000)	(2.600, 4.200, 6.200)	(3.200, 5.000, 6.800)	(2.200, 3.800, 5.800)	(2.400, 4.200, 6.200)	(2.800, 4.600, 6.600)
Candidate 3	(1.600, 3.400, 5.400)	(2.400, 4.200, 6.200)	(4.400, 6.200, 7.800)	(3.000, 4.600, 6.400)	(2.800, 4.600, 6.600)	(3.000, 5.000, 7.000)	(2.600, 4.600, 6.600)
Candidate 4	(2.600, 4.600, 6.600)	(2.600, 4.600, 6.600)	(5.000, 7.000, 8.600)	(4.200, 6.2000, 8.000)	(3.800, 5.800, 7.800)	(2.600, 4.600, 6.600)	(2.200, 4.2000, 6.200)
Candidate 5	(2.800, 4.600, 6.600)	(3.800, 5.800, 7.800)	(5.400, 7.200, 8.600)	(4.200, 6.200, 8.200)	(3.400, 5.400, 7.400)	(4.200, 6.200, 8.200)	(4.200, 6.200, 8.000)

Source: Authors

The second step involves determining the positive ideal and negative ideal solutions, which were obtained as follows:

$$\tilde{f}_j^* = \max_i \tilde{f}_{ij} \qquad i = 1, 2, \ldots, n$$

$$\tilde{f}_j^\circ = \min_i \tilde{f}_{ij} \qquad i = 1, 2, \ldots, n$$

$$\tilde{f}_j^* = \min_i \tilde{f}_{ij} \qquad i = 1, 2, \ldots, n$$

$$\tilde{f}_j^\circ = \max_i \tilde{f}_{ij} \qquad i = 1, 2, \ldots, n$$

The following Table 4 shows the results of the previous expressions, i.e., the positive ideal and negative ideal solutions in this case.

Table 4: Positive and negative ideal solutions of the criteria

	Positive ideal	**Negative ideal**
Interview preparedness	(2.800,4.600,6.600)	(1.600,3.400,5.400)
Work experience	(3.800,5.800,7.800)	(2.200,4.200,6.200)
Education	(5.400,7.200,8.600)	(2.600,4.200,6.200)
Interpersonal skills	(4.200,6.200,8.200)	(3.000,4.600,6.400)
Communication skills	(3.800,5.800,7.800)	(2.200,3.800,5.800)
Computer skills	(4.200,6.200,8.200)	(2.400,4.200,6.200)
Knowledge of foreign languages	(4.200,6.200,8.000)	(2.200,4.200,6.200)

Source: Authors

The third step is the calculation of the normalized decision matrix based on the previous positive and negative ideal solutions. These are obtained using the following expressions:

$\tilde{d}_{ij} = (\tilde{f}_j^* \ominus \tilde{f}_{ij})/(r_j^* - l_j^\circ)$ Positive ideal solution

$\tilde{d}_{ij} = (\tilde{f}_{ij} \ominus \tilde{f}_j^*)/(r_j^\circ - l_j^*)$ Negative ideal solution

Where is

$\tilde{f}_\mathrm{j}^* = (l_j^*, m_j^*, r_j^*)$

$\tilde{f}_\mathrm{j}^\circ = \left(l_j^\circ, m_j^\circ, r_j^\circ\right)$

The values of the normalized decision matrix are presented in the following Table 5.

Table 5: The normalized decision matrix

	Interview preparedness	Work experience	Education	Interpersonal skills	Communication skills	Computer skills	Knowledge of foreign languages
Candidate 1	(-0.600, 0.160, 0.960)	(-0.429, 0.286, 1.000)	(-0.300, 0.300, 0.867)	(-0.538, 0.231, 0.962)	(-0.643, 0.071, 0.786)	(-0.621, 0.069, 0.759)	(-0.552, 0.138, 0.793)
Candidate 2	(-0.680, 0.080, 0.880)	(-0.571, 0.143, 0.857)	(-0.133, 0.500, 1.000)	(-0.500, 0.231, 0.962)	(-0.357, 0.357, 1.000)	(-0.345, 0.345, 1.000)	(-0.414, 0.276, 0.897)
Candidate 3	(-0.520 ,0.240, 1.000)	(-0.429, 0.286, 0.964)	(-0.400, 0.167, 0.700)	(-0.423, 0.308, 1.000)	(-0.500, 0.214, 0.893)	(-0.483, 0.207, 0.897)	(-0.414, 0.276, 0.931)
Candidate 4	(-0.760, 0.000, 0.800)	(-0.500, 0.214, 0.929)	(-0.533, 0.033, 0.600)	(-0.731, 0.000, 0.769)	(-0.714, 0.000, 0.714)	(-0.414, 0.276, 0.966)	(-0.345, 0.345, 1.000)
Candidate 5	(-0.760, 0.000, 0.760)	(-0.714, 0.000, 0.714)	(-0.533, 0.000, 0.533)	(-0.769, 0.000, 0.769)	(-0.643, 0.071, 0.786)	(-0.690, 0.000, 0.690)	(-0.655, 0.000, 0.655)

Source: Authors

Step four involves transforming the normalized matrix into a weighted normalized decision matrix then the values $\tilde{S}_i$and $\tilde{R}_i$ can be calculated as follows:

If $\tilde{R}_{\mathrm{i}} = (R_i^l, R_i^m, R_i^r)$ and $\tilde{s}_{\mathrm{i}} = (s_i^l, s_i^m, s_i^r)$

$$\tilde{S}_i = \sum_{\mathrm{j}=1}^{\mathrm{J}} (\tilde{w}_j \otimes \tilde{d}_{ij})$$

$$\tilde{R}_i = \max_j (\tilde{w}_j \otimes \tilde{d}_{ij})$$

Step five calculates the value (Q) based on the following expressions:

If $\tilde{Q}_{\mathrm{i}} = (Q_i^l, Q_i^m, Q_i^r)$

$$\tilde{\mathrm{Q}}_{\mathrm{i}} = v \frac{(\tilde{s}_i \ominus \tilde{s}^*)}{s^{\circ r} - s^{*l}} \oplus (1 - v) \frac{(\tilde{R}_i \ominus \tilde{R}^*)}{R^{\circ r} - R^{*l}}$$

Where is

$$\tilde{s}^* = \min_i \tilde{s}_i$$

$$s^{\circ r} = \max_i \ s_i^r$$

$$\tilde{R}^* = \min_i \tilde{R}_i$$

$$R^{\circ r} = \max_i \ R_i^r$$

The variable *v* representing the maximum group utility is equal to 0.5 in this study.

The fuzzy numbers S, R and Q can be transformed into crisp numbers using the following formula.

If $\tilde{A} = (\mathrm{l}, \mathrm{m}, \mathrm{r})$ ($\tilde{A}$ is expreseed as a fuzzy number)

$$Crisp(\tilde{A}) = \frac{2m + l + r}{4}$$

The following Table 6 shows the fuzzy values S, R, and Q.

Table 6: Values S, R, and Q

	Fuzzy R	Fuzzy S	Fuzzy Q
A1	(0.043,0.043,0.143-)	(0.527,0.179,0.876-)	(0.732,0.127,0.979-)
A 2	(0.019,0.072,0.143-)	(0.429,0.276,0.943-)	(0.648,0.222,1.000-)
A 3	(0.057,0.044,0.143-)	(0.453,0.243,0.913-)	(0.742,0.149,0.991-)
A 4	(0.049,0.049,0.143-)	(0.572,0.124,0.826-)	(0.761,0.124,0.964-)
A 5	(0.076,0.010,0.112-)	(0.681,0.010,0.702-)	(0.856,0.000,0.856-)

Source: Authors

Table 7 below shows the crisp values S, R and Q and Ranking the alternatives based on R, S and Q.

Table 7: The crisp values S, R, Q and alternatives ranking

	Crisp value of R	Rank in R	Crisp value of S	Rank in S	Crisp value of Q	Rank in Q
A 1	0.046	3	0.177	3	0.125	3
A 2	0.067	5	0.267	5	0.199	5
A 3	0.043	2	0.236	4	0.136	4
A 4	0.048	4	0.126	2	0.113	2
A 5	0.014	1	0.01	1	0	1

Source: Authors

Step six involves proposing a compromise solution, where the decision is made based on the values of R, S, and Q in the final descending order of ranking. In this case, there are two conditions under which a set of compromise solutions can be proposed. The conditions and proposed solutions are provided below:

Condition 1. Acceptable advantage: $Q(A^{(2)}) - Q(A^{(1)}) \geq 1/(m-1)$ where $A^{(1)}$ is the alternative with first position and $A^{(2)}$is the alternative with second position in the ranking list by Q. m is number of alternatives.

Condition 2. Acceptable stability in decision making: The alternative $A^{(1)}$ must also be the best ranked by S or/and R.

If one of the previous conditions is not met, a set of compromise solutions is proposed as follows:

Solution 1. Alternatives $A^{(1)}, A^{(2)}, \ldots, A^{(M)}$ if Condition 1 is not satisfied; Alternative $A^{(M)}$ is determined by $Q\left(A^{(M)}\right) - Q\left(A^{(1)}\right) < 1/(m-1)$ for maximum M (the positions of these alternatives are ''in closeness'').

Solution 2. Alternatives $A^{(1)}$ and $A^{(2)}$ if only condition 2 is not satisfied.

Solution 3. Alternatives with the minimum Q value will be selected as the best Alternative if both conditions are satisfied.

Table 8: Provides an overview of the aforementioned

Table 8: Result of the conditions survey

Condition 1	Non acceptance
Condition 2	-
Selected solution	Solution 1

Source: Authors

The final alternatives are the candidates in the following order: Candidate 5, Candidate 4, Candidate 1, Candidate 3, Candidate 2.

Conclusion

Agribusiness is a complex activity whose development is influenced by many criteria. Human resources are of particular importance. For this reason, their proper selection is an important aspect of management in this economic area. The results of the research show that the fuzzy VIKOR method is an effective tool for the selection of women in agribusiness, enabling a systematic approach to decision-making. By analysing the candidates, the best candidates were identified based on defined criteria. Candidate 5 was declared the best according to the criteria R, S, and Q, while the other candidates also demonstrated good performance. This approach can serve as a model for future research and applications in the agribusiness sector, providing support for gender equality and women's empowerment. Further studies could focus on expanding the criteria and including other relevant factors that influence success in this sector.

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ORIGINAL SCIENTIFIC PAPER

Empowering Women in Serbian Rural Areas with Entrepreneurial Initiatives

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A B S T R A C T

Entrepreneurial initiatives represent an important tool for the economic empowerment of women in rural areas, allowing them to generate additional sources of income, reduce poverty rates, and improve their social integration. This research analyzes the role of entrepreneurial initiatives in empowering women in rural areas of Serbia, with a particular focus on their economic and social aspects. The direct economic effects of entrepreneurial initiatives, such as generating additional income and creating new jobs, are key aspects of economic empowerment for women in rural communities. At the same time, women entrepreneurship in rural areas can serve as a tool to mitigate migration and promote more balanced regional development. For the purposes of this research, a survey method was used, and the study was conducted on a sample of 73 women living in rural areas of the Republic of Serbia from July to September 2024. The data was analyzed using SPSS software. The results of this research indicate significant economic and social benefits of entrepreneurial initiatives, which contribute to the economic independence and social empowerment of women in rural areas but also highlight challenges such as limited access to finances, education, and training. This research emphasizes the need for greater support

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from local and state institutions, as well as the importance of networking among women entrepreneurs to enhance their access to resources and markets.

KEYWORDS: *women empowerment, rural areas, entrepreneurial initiatives, female entrepreneurship*

Introduction

Entrepreneurship is widely recognized as a key factor for economic and social development. It not only creates new opportunities but also stimulates innovation and serves as a key driver of competitive advantage in various sectors (Ribeiro-Soriano, 2017). As a fundamental element of economic development, entrepreneurship addresses important societal challenges, such as high unemployment rates, poverty, and regional disparities, making it a powerful tool for creating equitable growth (Majeed et al., 2024; Cardella et al., 2020). Entrepreneurial initiatives, especially in rural areas, can play a significant role in stimulating economic growth and providing new employment opportunities for the local population, thereby positively impacting the reduction of regional disparities (Ramírez, 2023). This is particularly relevant in countries with significant rural populations, where economic challenges are often exacerbated by a lack of infrastructure, limited job opportunities, and a dependency on a narrow set of industries. In Serbia, women's entrepreneurship presents an underutilized potential (Jovanović & Lazić, 2018), with the opportunity to contribute significantly to economic growth, improve living standards, and empower women, particularly in rural communities. The development of women's entrepreneurship plays an important role in the economy, particularly in transition countries like the Republic of Serbia. It helps reduce unemployment, increase GDP, enhances living standards, facilitates the adoption of new technologies and innovations, and fosters regional and rural development (Domazet et al., 2021). Despite the potential to drive substantial economic change, women's entrepreneurial participation has been historically limited due to various social, cultural, and institutional barriers. The position of women in the labor market in the Republic of Serbia remains unfavorable, with numerous challenges in accessing employment and economic resources (Reva, 2012). According to data from the Statistical Office, the Republic of Serbia, as a developing country, faces a double-digit unemployment rate, which is particularly pronounced among women, with annual rates ranging from 10.0% in the north to 15.0% in the

south of the country (SORS, 2023). In this context, promoting self-employment and the development of women's entrepreneurship is one of the keyways to improve the status of women in society. The development of women's entrepreneurship not only enhances women's economic independence but also contributes to overall economic growth and the reduction of gender inequalities (Ameen, 2022).

To support these initiatives, various measures and programs have been implemented in Serbia aimed at empowering women as entrepreneurs and encouraging their involvement in entrepreneurial activities. Despite the challenges, women entrepreneurship in rural areas in Serbia holds a strong potential for society and the economy. Research into specific barriers and the development of targeted support measures can create conditions for more successful inclusion of women in rural areas in entrepreneurial activities, thereby promoting economic independence and the creation of sustainable communities. By doing so, it is possible to create conditions for more sustainable economic growth and empowerment, thereby ensuring that women in rural areas can fully contribute to the development of their communities and the economy.

Literature Review

Women's economic empowerment is a multidimensional process aimed at improving their financial status by ensuring access to key resources, opportunities, and rights that enable their full and equitable integration into the economy (Haque & Zulfiqar, 2016). This includes improved access to employment, financial services, property, productive assets, skill development programs, and market information (ILO, 2019; Domazet & Marjanović, 2024). This concept plays an essential role in reducing gender inequality and achieving sustainable economic development (Bayeh, 2016). Women's economic empowerment is often constrained by various socio-cultural barriers, including limited access to employment opportunities, wage disparities based on gender, and harassment, which restrict their ability to access and control assets (Kabeer, 2018). Globally, entrepreneurial activities are growing, and women are increasingly expected to contribute to economic growth (Achakpa & Radović-Marković, 2018). Women in rural areas face unequal representation in leadership and decision-making roles at all levels (Mandara et al., 2017; Shafinaj, 2024) and lack sufficient access to healthcare, education, social services, financial resources, and other

essential amenities (Khatun & Ghosh, 2021; Abbas et al., 2018; Mishraet al., 2017). The lifestyle of rural women remains rooted in tradition and patriarchy (Abbas et al., 2018), with housework and childcare being primarily their responsibility (Sugawara et al., 2010). In addition to intensive agricultural labour, they often have limited access to income, property, and decision-making within the household (Kanyagui et al., 2024). In developing countries, gender inequality significantly hampers the socio-economic development of rural households by limiting women's income opportunities, decision-making roles, and access to education and healthcare, while increasing their vulnerability to poverty and violence (Ivanović et al., 2021). Antonijević et al. (2022) also found that rural women engaged in small-scale farming significantly improved their livelihood, decision-making power, and income generation, which enhanced their independence and empowerment within the family and society, while also overcoming gender-based discrimination and violence. Social empowerment involves creating opportunities that enhance women's social relations and improve their position in social structures. It seeks to tackle societal discrimination stemming from factors such as disability, race, ethnicity, religion, or gender (Mandal, 2013). Over the past two decades, women's entrepreneurship in Serbia has undergone a significant and challenging journey, transitioning from a social to an economic and developmental category. However, there are still certain risks, given the numerous crises that have impacted the economic situation and the development of the entrepreneurial sector, both in Serbia and globally (Popović-Pantić, 2020; Marjanović et al., 2024). Also, the role of psychological factors in entrepreneurship has gained increasing attention. Psychological capital has become a key concept in understanding entrepreneurial behaviour. Psychological capital has been found to positively influence entrepreneurial spirit and psychological empowerment (Bhandari et al., 2024). Tejada et al. (2024) claimed that psychological factors such as purpose in life, personal growth, and positive societal relations significantly influence the empowerment of women entrepreneurs, with a strong relationship between empowerment and their psychological well-being, which in turn plays a key role in driving entrepreneurial ventures and addressing unemployment and poverty. Efendi et al. (2024) highlighted that entrepreneurial attitudes positively impact entrepreneurial interest, and entrepreneurial subjective norms significantly influence interest in entrepreneurship. Technological advancements have also played a key role in fostering women's entrepreneurship. The use of ICTs by rural

women fosters innovation and entrepreneurial mindset, enhancing their micro-entrepreneurial activities (Chatterjee et al., 2020; Domazet et al., 2022). Laxmi and Gochhait (2023) have examined different factors' effects on women's entrepreneurial success and highlighted those factors such as achievement, risk-taking, technology adaptation, as well as economic and socio-cultural influences significantly contribute to the success of women entrepreneurs. Vujadinović (2024) highlighted that there is a statistically significant and positive correlation between the development of women's entrepreneurship and women's empowerment and the institutional framework plays a crucial and direct role in fostering the development of women's entrepreneurship. This highlights the importance of a supportive institutional environment in fostering the growth of female entrepreneurship, contributing not only to economic growth but also to the social empowerment of women.

Previous studies have identified several key motivations driving women in the Republic of Serbia to start their own businesses. These include the need for higher income, unemployment, which often serves as a catalyst for entrepreneurial ventures, and the desire for economic and professional independence (Popović-Pantić, 2014; Ivanović-Đukić & Petković, 2020; Marjanović et al., 2022). Moreover, many women are motivated to pursue entrepreneurship to better care for their children and families, ensuring a brighter future for their offspring (Ivanović-Đukić & Petković, 2020). Although data from the Serbian Business Registers Agency (SBRA) shows an increase in the number of female entrepreneurs in the Republic of Serbia, women remain underrepresented compared to men in entrepreneurial activities. However, women entrepreneurs in Serbia face numerous challenges that limit their development and success in business, which is especially pronounced in less developed areas. The most significant barriers include a lack of personal capital to start a business, insufficient managerial knowledge and experience, as well as unfamiliarity with the nature of business operations and market mechanisms (Raghuvanshi et al., 2017; Marjanović & Đukić, 2020; Domazet et al., 2018). Additionally, responsibilities related to childcare and family obligations also present a significant barrier to the development of women's entrepreneurship (Tur-Porcar et al., 2016). These studies highlight the need for further support and the development of measures that would enable women to overcome these obstacles and successfully start and manage their businesses.

Rural tourism is a significant factor in the economic empowerment of women in rural areas of Serbia. According to Radović & Radović-Marković (2016), the development of rural tourism can greatly stimulate women's entrepreneurship, providing them with economic opportunities and contributing to their economic empowerment. Beyond economic benefits, the development of rural tourism and women's entrepreneurship can serve as an effective mechanism for preventing depopulation and ensuring balanced regional development. Therefore, this approach highlights the crucial role of women in improving rural communities and emphasizes the potential of rural tourism for the sustainability of these communities. Targeted initiatives to support women entrepreneurs in rural tourism are crucial for ensuring their long-term success and overcoming historical sectoral constraints (Nordbø, 2022).

Methodology

The research was conducted using an integrated approach that combines qualitative and quantitative methods, to provide a comprehensive insight into the topic. The study was carried out in rural areas of the Republic of Serbia, where rural communities are among the most traditional and patriarchal in this part of Europe. Women in these areas face numerous challenges, including limited access to employment, pay inequality, and a lack of financial independence (Kolin & Čičkarić, 2010), which further deepen their social and economic marginalization. For the purposes of this research, a specially designed questionnaire was created in accordance with the objectives of the study. The questionnaire was divided into three parts. The first part collected general data on the age structure, level of education, and other characteristics of women entrepreneurs in Serbia. The second part of the question provides insight into entrepreneurial initiatives, while the third part of the question deals with the challenges that women entrepreneurs in rural areas in the Republic of Serbia face in their daily business.

The study was conducted on a sample of 73 respondents during the period from June to September 2024. The collected data was systematized and processed using *SPSS* software, which specializes in data analysis in social sciences. This methodological approach enabled a detailed identification of trends, challenges, and opportunities for the development of women's entrepreneurship in rural areas of the Republic of Serbia. The data

obtained were analyzed using descriptive statistics, which enabled the presentation of the basic characteristics of the sample and the identification of key patterns. This approach offers a comprehensive insight into the social and economic aspects of women's entrepreneurship in rural areas, as well as into their perspectives and challenges they face.

The main drawback of this study is the small sample size, which can be attributed to the specific characteristics of the research context. The study focused on rural Serbia, where collecting primary data required extensive fieldwork, limiting the number of participants. Additionally, women entrepreneurs in rural Serbia represent a narrow and specific demographic group and identifying active participants within this community naturally resulted in a smaller sample size. Despite these limitations, the findings provide valuable insights into the entrepreneurial landscape for women in rural areas. This study serves as a pilot for future research, helping refine the methodology before conducting a broader, multi-country analysis. Future research should aim to include a larger and more diverse sample, potentially expanding to other rural regions.

Results and Discussion

This section examines the main findings of the research, providing a comprehensive overview of the socio-demographic profile of the respondents, their entrepreneurial motivations, the nature of their business ventures, and the challenges they face in rural areas in the Republic of Serbia. The analysis also highlights key support mechanisms that could enhance the entrepreneurial efforts of women in these areas. By comparing the findings with relevant literature, this discussion seeks to deepen the understanding of the economic and social contributions of women entrepreneurs in rural communities, while identifying systemic barriers that hinder their progress. These insights are crucial for shaping effective policies and programs aimed at empowering rural women and fostering sustainable economic development.

Table 1 presents the socio-demographic characteristics of the respondents included in the sample for this research.

Table 1: The Socio-demographic profile of the respondents

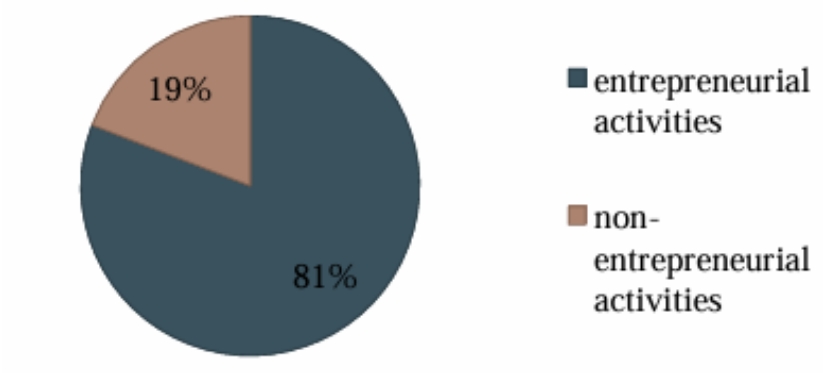
Age	**Frequency (N=73)**	**Percentage (%)**
Up to 30	15	19 %
31-40	24	33%
41-50	20	26%
More than 51	17	22%
Level of education	**Frequency (N=73)**	**Percentage (%)**
Primary school	21	29%
Secondary school	39	53%
College/Faculty	13	18%
Marital status	**Frequency (N=73)**	**Percentage (%)**
Married	59	81%
Unmarried	14	19%
Monthly income (in Euros)	**Frequency (N=73)**	**Percentage (%)**
Up to 250	12	16%
251-400	32	44%
401-550	18	25%
551 and more	11	15%

Source: Authors' calculation

Table 1 provides an overview of the socio-demographic characteristics of the respondents, offering valuable insights into the profile of women engaged in entrepreneurial activities in rural areas in the Republic of Serbia. The age distribution reveals that most respondents fall between 31 and 40 years old (33%), an age group often associated with both career development and family obligations, while 19% are under 30, indicating a growing interest in entrepreneurship among younger women. The education levels highlight a significant concentration at the secondary school level (53%), which may reflect the typical educational attainment in rural areas but also points to a lack of access to higher education that could enhance entrepreneurial skills. At the same time, 29% have only primary school education, which underscores the importance of providing targeted training and capacity-building programs for this group. Marital status data shows that 81% of respondents are married, suggesting that family roles may strongly influence their entrepreneurial activities, potentially shaping the

types of businesses they pursue and their work-life balance. Income levels indicate that a large portion (44%) earn between €251 and €400 per month, which suggests that most of these women operate small-scale businesses with modest profitability. However, the 16% earning below €250 and only 15% earning above €551 highlight the financial challenges and limited economic returns often faced by rural women entrepreneurs.

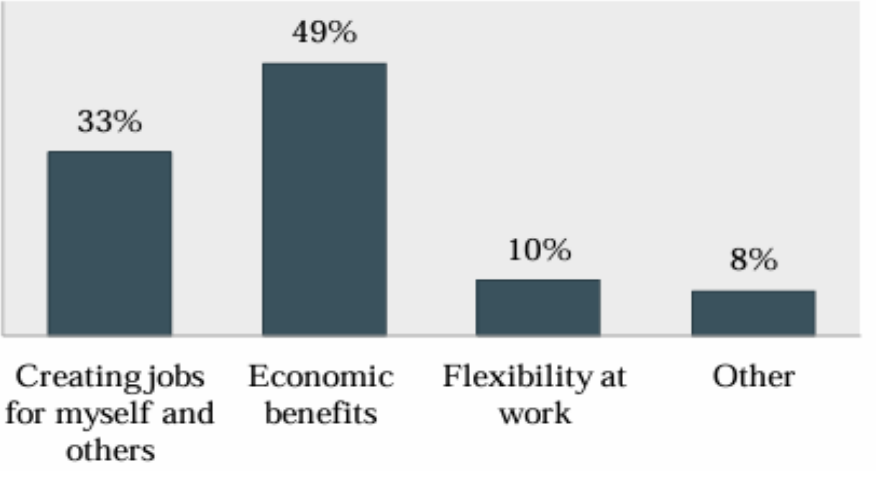
Figure 1: The participation of women in entrepreneurial activities in rural areas of Serbia



Source: Authors

The data presented in Figure 1 highlights the active involvement of women in entrepreneurial activities in rural areas of Serbia. The majority of respondents (81%) in rural areas are engaged in some form of entrepreneurial activities. Women in rural areas in Serbia often turn to entrepreneurship to address local economic challenges, such as low-income employment or the absence of suitable jobs. This trend is consistent with broader patterns, where entrepreneurial activity is seen as a vital solution to poverty, unemployment, and limited access to resources. However, it is also important to consider that 19% of respondents are not involved in entrepreneurial activities for some reason.

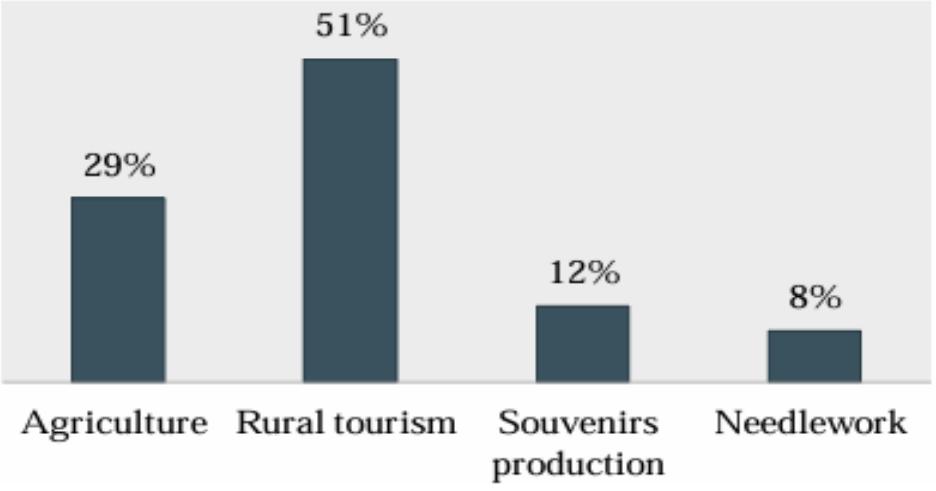
Figure 2: The primary motivation for starting a business



Source: Authors

As shown in Figure 2, the primary motivation for starting a business among the respondents is economic benefits (49%). In addition to economic benefits, 33% of respondents indicate that creating employment opportunities for themselves and others is a key motivator. A smaller proportion of respondents (10%) are motivated by the flexibility that entrepreneurship offers in terms of work-life balance, reflecting the significant role that family responsibilities play in the decision to become self-employed, and other reasons (8%). These results align with other studies that conclude most women entrepreneurs in developing economies are motivated to start their own business out of necessity, reflecting a lack of employment alternatives or dissatisfaction with existing employment opportunities (Ferrín, 2021). Additionally, women often start their own businesses to find a balance between professional obligations, earning potential and family responsibilities (McGowan et al., 2012).

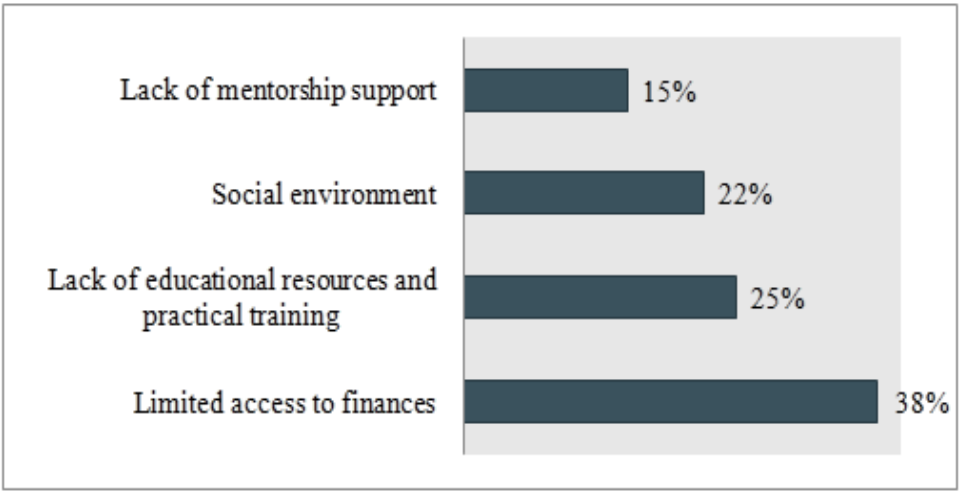
Figure 3: The type of entrepreneurship initiatives



Source: Authors

Figure 3 illustrates the diversity of entrepreneurial ventures undertaken by women in rural areas in the Republic of Serbia. A significant proportion (51%) of respondents is involved in rural tourism, highlighting the potential of this sector to generate income and employment in rural areas. Rural tourism has become an increasingly popular business choice due to its reliance on local heritage, natural resources, and unique cultural experiences, which are in many Serbian rural regions. Agriculture comes second, with 29% of respondents choosing it as their primary business activity. This is unsurprising given the prominence of agriculture in rural areas, where women often engage in farming, livestock, and food production. Souvenir production (12%) and needlework (8%) represent smaller but still important sectors, often driven by local crafts and traditions. These entrepreneurial initiatives reflect the diverse opportunities available to women in rural areas, but they also point to the need for additional support and resources to help women scale and diversify their businesses further.

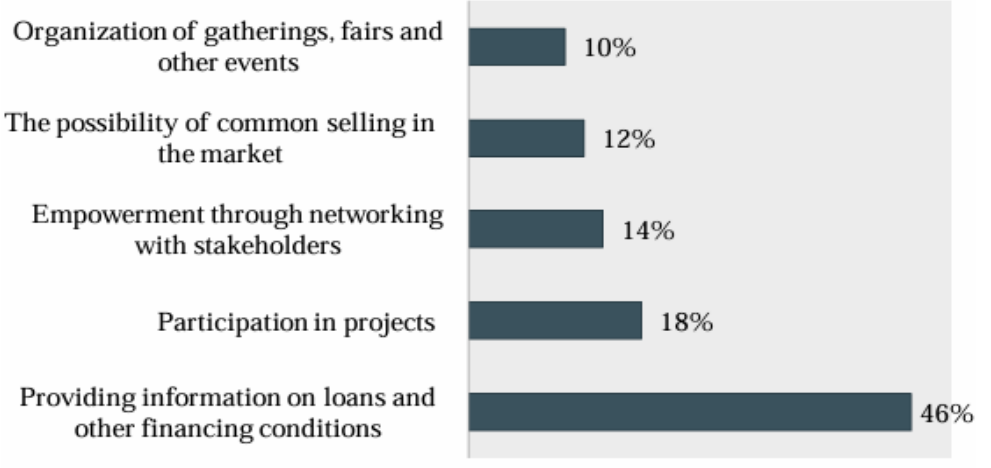
Figure 4: The challenges that women entrepreneurs in rural area of Serbia face in their business



Source: Authors

Figure 4 shows the most common challenges and barriers faced by women entrepreneurs in rural areas of Serbia in their daily business. The most significant challenge, identified by 38% of respondents, is limited access to financial resources. This reflects a widespread issue in developing economies, where women entrepreneurs often face difficulties in obtaining loans or grants due to lack of financial literacy, or trust from financial institutions. In rural areas, these challenges are exacerbated by limited access to banks and financial services, which makes securing capital for business startups or expansions even more difficult. The second most common challenge, reported by 25% of respondents, is the lack of educational resources and practical training. Many women in rural areas do not have access to business development programs or entrepreneurship education, which are essential for acquiring the skills needed to manage a successful business. Social environment challenges were cited by 22% of respondents. Finally, 15% of respondents noted a lack of membership support, which refers to the absence of business networks or organizations that can provide resources, mentorship, and advocacy for women entrepreneurs.

Figure 5: The essential support for women's entrepreneurship in rural areas



Source: Authors

Figure 5 illustrates the key areas of support identified as crucial for empowering women entrepreneurs in rural areas of Serbia. The most significant support, as indicated by 46% of respondents, is access to information on loans and financing conditions. Financial literacy and access to affordable credit are crucial for women who want to start or expand their businesses. Providing accessible information on financial services and loan conditions would empower women to make informed decisions and secure the capital they need to start their businesses. The second most significant form of support, identified by 18% of respondents, is participation in projects, such as government programs or EU-funded initiatives, which provide financial support and networking opportunities. These projects can offer vital resources, such as grants, mentorship, and market access, which are critical for the development of small businesses. Another important area of support, cited by 14% of respondents, is networking with stakeholders. Building connections with other entrepreneurs, business leaders, and potential clients is essential for women entrepreneurs to expand their reach and access new business opportunities. Then 12% of respondents identified the possibility of common selling in the market as a key support. Lastly, 10% of respondents highlighted the importance of organizing gatherings, fairs, and other events to promote their businesses, engage with the community, and enhance their visibility.

The findings of this study highlight that woman in rural areas in Serbia possess strong entrepreneurial potential, evidenced by their high participation rates and diverse business ventures. These findings suggest that while women in rural areas in Serbia are keen to engage in entrepreneurship, they face significant hurdles that should be addressed through targeted policies, financial support, and training programs. Women in rural areas often operate in isolation, limiting their access to resources, markets, and collaborative opportunities. Limited access to financial resources remains the most significant barrier. Additionally, the lack of educational resources and practical training presents a critical gap that prevents women from acquiring the skills necessary for business development and innovation. Beyond financial and educational support, fostering a supportive social and professional environment is crucial. This data underscores the need for a multifaceted approach to supporting women's entrepreneurship, which combines financial support, training, networking, and marketing initiatives to create an environment conducive to business growth and sustainability.

The results of this study align with previous research while also revealing some notable differences. Our findings on financial constraints, reported by 38% of respondents as the most significant challenge, align with Raghuvanshi et al. (2017), who found that limited access to credit remains the primary barrier for women entrepreneurs in developing economies. It corresponds with Chordiya (2013), who also highlights that the main problems faced by women entrepreneurs in rural areas include lack of capital. However, our results differ from those of Ivanović-Đukić and Petković (2020), who found that the lack of education was the most significant barrier to women entrepreneurship in Serbia, our results indicate that financial limitations (38%) pose a greater challenge than educational gaps (25%). Additionally, the role of rural tourism in empowering women, observed in 51% of respondents, aligns with the findings of Radović and Radović-Marković (2016) in Serbia. However, it differs from Nordbø (2022), who noted a lower participation rate of women in rural tourism in Norway due to structural constraints. Research for Serbia emphasizes the importance of enhancing women's entrepreneurial capacities and strengthening their empowerment through different forms of informal support mechanisms such as networking and similar initiatives, which can help women become better equipped to seize available opportunities and navigate the challenges of entrepreneurship more effectively.

Conclusion

The research findings indicate that women's entrepreneurship in rural areas of the Republic of Serbia has significant potential for development and can serve as a key factor in the socio-economic empowerment of women and the improvement of local communities. Although rural women are motivated to engage in entrepreneurial activities, they face numerous challenges, such as limited access to financial resources and the lack of adequate education and practical training. Additionally, women often balance business responsibilities with family obligations, which further hinders their entrepreneurial growth. Therefore, it is essential to enhance support through improved access to financing, education and training, as well as the creation of networks for collaboration and experience-sharing among women entrepreneurs. Empowering women in rural areas of the Republic of Serbia through entrepreneurial initiatives requires a holistic approach that combines economic activities with education, policy support, and local community engagement. By addressing systemic barriers and using opportunities in tourism and agriculture, rural women can achieve economic independence and contribute to the development of sustainable communities. This conclusion highlights the necessity of supporting women-led initiatives in rural areas, thereby improving not only the economic position of women but also the overall sustainability of rural communities.

The results of the conducted research reveal several limitations in this study, which can be addressed in future research by considering specific recommendations. The first limitation is the sample size of respondents, suggesting that increasing the sample size would improve the reliability of the findings. Additionally, the study focused only on rural areas within Serbia, the second recommendation is to expand future research to include rural areas in other countries with similar levels of economic development, which could enable comparative analysis and provide a more comprehensive understanding of the topic. The third limitation is that the research methodology primarily relied on survey methods, which could be enhanced by incorporating diverse approaches, such as face-to-face interviews or focus groups, to gather qualitative insights. The fourth limitation is that this research covers only a shorter period, highlighting the need for future studies to analyze trends over an extended period. These improvements would significantly enhance the relevance and applicability of future research results.

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ORIGINAL SCIENTIFIC PAPER

Economic and Demographic Drivers of Women Entrepreneurs in the Indonesian Textile Market

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A B S T R A C T

Women who actively participate in micro, small, and medium-sized enterprises (MSMEs) can gain empowerment, reduce economic disparities, and improve their living conditions, encouraging more women to become involved in economic activities. This study aims to compare the role of women entrepreneurs in the textile sector, examining demographic and economic aspects that influence the turnover of women entrepreneurs in Klewer Market, Surakarta, and Beringharjo, Yogyakarta. The study included 300 sellers, and the data was processed using multiple linear regression, which was then further evaluated utilizing mosaic display orange data mining. The study's findings indicate that demographic and economic factors influencing the turnover of women entrepreneurs differ in both areas. Women entrepreneurs with substantial money, high-quality education, and self-actualization through women's empowerment are

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deemed more competitive in terms of sales turnover. Gender equality through women's empowerment is the fifth goal of the Sustainable Development Goals, which can be achieved through active support and collaboration to attain independent and transformative competitiveness.

KEYWORDS: *women entrepreneur, women empowering, traditional market, demographic factors, economic factors, turnover, mosaic display, orange data mining*

Introduction

Women's participation in the economy has increased. This is prompted, first and foremost, by shifts in people's perceptions and attitudes regarding the equal importance of opportunities for men and women to achieve their full potential. Second, women want to be economically independent, which means using their money to meet their own living needs as well as those of their dependents.

Another factor contributing to increased women's engagement in the labour force is improved social standing. Women can socialize with the environment in which they work in various ways, including through individual initiatives. Women handle 60% of Indonesia's micro and small companies. Despite the high female participation rate, women's economic contribution in Indonesia is still regarded as low. In 2021, the contribution of women's income only reached 37.22%, a reduction of 0.04% from the previous year (Table 1), when it reached 37.26% (Sulisto et al., 2023)

Table 1: Women's Income Contribution (2018-2022)

Year	Women's Income Contribution (%)
2018	36 .70
2019	37.10
2020	37.26
2021	37.22
2022	37.17

Source: Indonesian Statistic Bureau, 2024

The Indonesian government implements a mechanism for the development of home industries aimed at reducing poverty rates (Hutajulu et al., 2021). enterprises owned by women frequently confront higher

hurdles than enterprises owned by men. The empowerment program is one of the government's initiatives to support women entrepreneurs who face challenges in running their businesses. Global economic empowerment now focuses on women (Sugiyanto et al., 2024). Women's empowerment and entrepreneurship are inextricably linked concepts. Women's entrepreneurship is one of the most effective ways for female empowerment (Sharma et al., 2024)

Women engaged in MSMEs have the potential to achieve empowerment, reduce economic disparities, and improve women's living standards, encouraging women to be actively involved in economic activities (Sugiyanto et al., 2024). Indonesian According to the national definition of MSMEs, a 2016 World Bank survey revealed that 52.9% of micro-enterprises, 50.6% of small enterprises, and 34.0% of medium enterprises in urban areas are owned by women. Micro, small and medium enterprises are considered to have a simple, effective, and easy concept to be carried out by various levels of society, especially the lower middle class (Rodrigues, 2023). The ability to absorb labour encourages MSMEs to use local natural resources more intensively. This demonstrates the role of MSMEs in decreasing poverty and ensuring equal distribution of community revenue (Bhandari et al., 2024). Micro, small, and medium-sized enterprises contribute Rp 9,580 trillion to Indonesia's GDP, and this industry employs approximately 117 million people, accounting for around 97% of the country's total employment. Most Indonesians' economic lives now include the presence of women entrepreneurs in MSMEs. MSME ownership data shows that women manage up to 44.29% of micro-businesses, while small companies account for 10.28%. According to the Minister of State for Women's Empowerment's report, women make up 60% of Indonesia's micro and small entrepreneurs.

Surakarta is one of the regions that emphasizes the importance of MSMEs in promoting economic growth, job creation, and poverty reduction. Surakarta City, located in the center of Java, Indonesia, has 43,804 encouraged MSME units, which are supported in terms of technical production, company management, licensing, and administration, as well as product protection (BPS Surakarta City, 2022). More specifically, according to data from the Central Java Office of SMEs, in 2022, women entrepreneurs led MSMEs in Surakarta City, with 11,857 actors. Meanwhile, Surakarta City has 6,108 male entrepreneurs.

Klewer Market is a batik MSME center in Surakarta City. Every day, the circulation of money at Klewer Market surpasses around 5 billion. (Sekar et al., 2024). This figure is expected to quadruple to 10 billion between the holiday season and the start of the school year. The Klewer Market can support over 10,000 workers. As a result, Klewer Market has grown in popularity both nationally and internationally. The presence of women entrepreneurs in the batik industry at Pasar Klewer has the potential to support a variety of economic activities that benefit the household economy and, more broadly, the National Economy. Women may build enterprises, specifically as managers, assistants, and employees.

Yogyakarta places a premium on MSMEs as economic drivers. It is located around southern Indonesia, specifically on the island of Java. According to data from the Yogyakarta Special Region Planning and Development Agency, the number of micro, small, and medium-sized businesses in the Yogyakarta region has climbed year after year since 2022. Yogyakarta City has 342,934 MSME business units. These MSMEs make a vital and strategic contribution to the regional economy (Raja et al., 2023)

Beringharjo Market is one of Yogyakarta City's biggest commerce centers. Women entrepreneurs in the Beringharjo Market make a substantial contribution to the MSME sector, particularly in the clothing and batik fabric industries. Women are often perceived as being more skilled than men at selling and attracting customers. Working as a trader is a public affair because it is tied to interests outside the home that provide financial support for the family. However, the items traded in the market are related to home requirements and household affairs, which women think to comprehend better (Tassya, 2024). Furthermore, Table 2 below presents the differences between the cities of Surakarta and Yogyakarta.

Batik, which is found in Surakarta and Yogyakarta, has been recognized by UNESCO as a heritage site since 2009 and serves as a center for MSMEs. Women play a crucial role in the development of batik in both locations. Since ancient times, women have built a life from their batik abilities (Sugara, 2023). Women in the workplace face the challenge of multiple roles, which require them to perform responsibilities in both the domestic and public realms. Domestic roles include responsibilities as wives, mothers, and household administrators, whereas public roles include their positions as workers, members of society, and participants in social organizations (Septyawati et al., 2023). This also applies to women operating in the Klewer and Beringharjo markets, where women

entrepreneurs must fulfill two tasks, obligations, and responsibilities: managing their households and contributing to family economic growth.

Table 2. The Difference Between Surakarta and Yogyakarta

No		Surakarta	Yogyakarta
1.	History	Surakarta was the of the Islamic Mataram Kingdom after the Giyanti Agreement in 1755.	Yogyakarta became the capital of the Sultanate of Yogyakarta after the Giyanti Agreement in 1755.
2.	Economics	The batik industry sector in Klewer Market drives the Economy of Surakarta City.	The tourism, education, and batik industry sectors in Beringharjo Market support the Economy of Yogyakarta City.
3.	Culture	Surakarta Batik tends to have a darker colour palette, with a predominance of brown and black and a little use of white. Surakarta Batik maintains traditional motifs.	Yogyakarta Batik uses more white and brown colours, making it look brighter. Yogyakarta Batik combines modern motifs.

Source: Juhafa (2023); Fajar et al. (2024); Sari (2022).

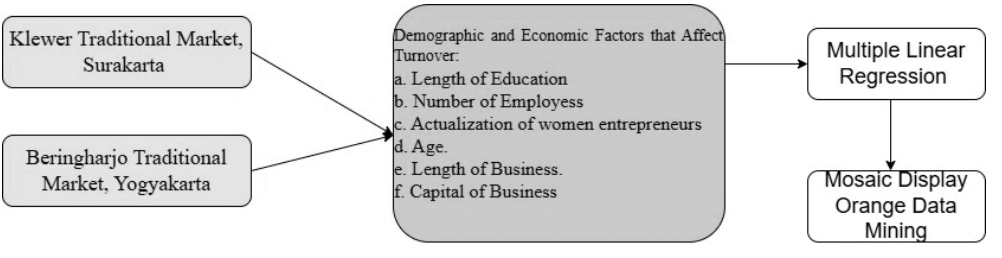
One of these responsibilities is demonstrated by the level of sales or turnover among sellers in both traditional markets. Demographic and economic variables determine how these sellers contribute to increased sales turnover. Based on Nayaka and Kartika (2018), The amount of capital owned has an impact on trader turnover; capital is used to grow inventory, improve product quality, expand marketing efforts, and enhance facilities and services. Furthermore, demographic factors such as trader education level and age have a significant impact on turnover.

Research by Sugiyanto et al. (2024) demonstrates that women's empowerment is affected by their age and education level. The higher a woman's educational level, the more opportunities she has to socialize, gain information, and acquire expertise, particularly in the sphere of entrepreneurship. Other supporting elements, such as the number of workers, the length of business, and actualization through marketing training through women's empowerment platforms, all have an impact on

the increase in turnover among sellers, particularly women (Hendratmi et al., 2024)

Women entrepreneurs play a significant role in advancing the textile industry in Indonesia, particularly within the Klewer and Beringharjo markets, which are the largest textile markets in the region. The income generated by women can substantially influence the growth of the textile sector, thereby enhancing the economic well-being of families and the nation as a whole. Research indicates that women possess superior knowledge and skills in the textile trade compared to their male counterparts (Serrano et al., 2023). Socially, the involvement of women entrepreneurs helps to dismantle the stereotype that income generation is predominantly a male domain. However, in Indonesia, the economic contributions of women remain relatively low due to their dual roles as homemakers and workers. This study examines the role of women entrepreneurs in the textile industry by analyzing the factors that influence the turnover of women sellers in Klewer Market, Surakarta, and Beringharjo, Yogyakarta's largest market. From this background, the concept of this research can be described as follows:

Figure 1: Research Concept



Source: Primary Data Mosaic Display, 2024.

Literature Review

Women's Entrepreneurship

Women's entrepreneurship plays a crucial role both globally and in Indonesia (Jia et al., 2021). Internationally, women entrepreneurs make a significant contribution to economic growth by presenting innovative solutions in various industry sectors (Chakraborty & Chatterjee, 2021). There are numerous international communities and networks, such as the

Modest Fashion & Womenpreneur Summit (MFWS), held in Kuala Lumpur and Turkey, that focus on supporting women's entrepreneurship. However, they also face various challenges, including gender bias, limited access to capital, and the burden of household responsibilities. In Indonesia, around 64% of Micro, Small, and Medium Enterprises (MSMEs) are managed by women, making this sector a key pillar of the national Economy (Luo & Chan, 2021). The Indonesian government has issued various policies to support the development of MSMEs managed by women, including budget allocation and social assistance programs (Welsh et al., 2021). However, women entrepreneurs in Indonesia still face challenges, including limited access to capital and a lack of participation in business networks (Hendratmi et al., 2024). Support from the government and local communities is essential to help them thrive. Women's entrepreneurship not only contributes to economic growth but also encourages positive social change (Sugiyanto et al., 2024). Previous research conducted by Maimuna and Limbong (2024) indicates that female entrepreneurs tend to exhibit strong independence, which is beneficial for the advancement of entrepreneurship. This independence allows women to avoid reliance on others, thereby contributing to family finances and creating job opportunities for many individuals.

Female Dual Role

Female dual roles describe circumstances in which women play more than one or two roles. Women who are married and participate in public activities undoubtedly play a variety of roles. Women serve as spouses and mothers in the home, as well as economic agents in the public sector (Afrizal & Lelah, 2021). Vadya et al. (2023) recommend that women perform a dual function that includes both household and public roles, known as the Triple Function of Women. This concept refers to women having three functions at once: reproduction, production, and social participation. This notion aims to help overcome challenges caused by role preconceptions that have been deeply ingrained in people's minds. Women are expected to make significant contributions in both the domestic and public spheres. Handoko et al. (2024) should highlight that some of the obstacles associated with this dual function include gender ideology in society, particularly work stereotypes and gender-based labour division. Ekawati (2022), in her research, explains that the dual role of women can provide benefits, namely that women can realize the values of life they

believe in, increase family income, and expand opportunities to create jobs for many people.

Opportunity Cost for Career Women

The opportunity cost of a career for women refers to the potential gains or benefits lost when a woman decides to pursue a job over alternative pursuits, such as caring for a family or pursuing further education (Yeni & Marta, 2022). This may encompass revenue that has not been earned, experiences that have been overlooked, or opportunities that have been forfeited due to alternative decisions that were not pursued. For example, a woman who decides to pursue full-time work may have to give up time that would otherwise be spent caring for children or participating in family events. Additionally, there is the emotional strain and pressure that can be felt when trying to balance work and personal life. However, it should be remembered that employment can give major rewards such as skill development, financial success, and personal fulfillment that other hobbies may not deliver. As a result, women must carefully assess the opportunity costs and benefits of each option before making the decision that best aligns with their goals and values. In line with this, previous research conducted by Yeni et al. (2022) stated that women who are married and have children under 5 years of age have a greater chance of leaving the labour market because women have an important role in supporting the growth and development of children at toddler or pre-school age. On the other hand, women with higher education tend to have a lower chance of leaving the labour market after marriage. Women with higher education may choose to work while still fulfilling their responsibilities as housewives.

Demographic and Economic Factors

Women's empowerment in entrepreneurship manifests in numerous forms, including an increase in the turnover rate of businesses owned by women entrepreneurs. Empowered women are more likely to effectively manage their businesses and realize their full potential. Several demographic and economic aspects might influence the amount of business turnover owned by women entrepreneurs, including the quantity of money, the number of personnel, the degree of education, age, length of operation, and actualization through business training (Luo & Chan, 2021; Welsh et al., 2021).

Methodology and Data

The analysis used in this study includes dependent variables, such as women sellers' monthly turnover, as well as several independent variables in the form of demographic and economic factors, such as capital, length of education, number of workers, age, length of business, and actualization of digital technology, as demonstrated by participation in digital economy training. This study utilized a total of 300 respondents, comprising 150 female sellers from the Beringharjo Traditional Market in Yogyakarta and 150 from the Klewer Traditional Market in Surakarta. The sample was gathered using a random sampling procedure in which each member of the population had an equal chance of being chosen as part of the sample (Nurjanah, 2021). The number of samples was obtained based on the computation of the Slovin formula with an error of 10% and the total population of 450 women merchants in the Beringharjo Traditional Market, Yogyakarta, and 454 women sellers in the Klewer Traditional Market, Surakarta, using the equation:

$$N = \frac{n}{1+n\,(e)^2} \qquad (1)$$

Where it is a population size, is a sample size, and is a margin of error. Based on the research of Ilczuk et al. (2023), demographic factors are factors that affect the amount of entrepreneurs' turnover, while Budiastuti and Hartati (2022) argue that the capital or economic sector of women sellers influences their turnover. These factors were then studied using a variety of methodologies, including multiple linear regression, with the relevant factors further examined using mosaic display.

This study uses several research methods to determine the influence of demographic and economic factors that affect the turnover of female sellers, namely:

1. Multiple linear regression

This analysis employs a statistical model to determine the relationship between a single dependent variable and multiple independent variables. The fundamental goal is to forecast the value of the dependent variable using the values of the independent variables. This study uses three equations in multiple linear regression. Equation 2 is to determine the demographic and economic factors of women sellers in Klewer Traditional

Market, Surakarta. In contrast, equation 3 was employed for samples from Beringharjo Market, Yogyakarta, and equation 4 was used for comparison in these two locations.

All the equation is written as follows:

$$LnOmzet = a_k + b_{1k}lnModal + b_{2k}Employ + b_{3k}Edu + b_{4k}Age + b_{5k}Years + b_{6k}Course \quad (2)$$

$$LnOmzet = a_b + b_{1b}lnModal + b_{2b}Employ + b_{3b}Edu + b_{4b}Age + b_{5b}Years + b_{6b}Course \quad (3)$$

$$LnOmzet = a_{kb} + b_{1kb}lnModal + b_{2kb}Employ + b_{3kb}Edu + b_{4kb}Age + b_{5k}Years + b_{6kb}Course + b_{7kb}Dummy \quad (4)$$

Where $Omzet$ is the amount of turnover of women entrepreneurs in a month, $Modal$ is the amount of capital spent on business operations for a month, $Employ$ the number of workers owned, Edu is the level of education of the owner, who is a women entrepreneur, Age the age of the women entrepreneur is the length of business, $Course$ experience in participating in business training is measured through a dummy variable where 1 is a women entrepreneur who has participated in business training and zero who has not have followed, in equation 2, k is a measurement on women entrepreneurs at Klewer Traditional Market Surakarta, in equation 3, b is a measurement at Beringharjo Market Yogyakarta, and equation 4, kb is a measurement in both markets.

2. Mosaic Display Analisis

The influence of the factors analyzed through OLS regression was further examined in depth using a Mosaic Display. Mozaic Display is a graphical representation of a two-way frequency table or contingency table. This tool is used to visualize data from two or more qualitative and quantitative variables. In addition to being used to observe the relationship and number between each factor that affects the turnover of women entrepreneurs, the level of association is also analyzed through Pearson's residual formula:

$$r_{ij} = \frac{(O_{ij} - E_{ij})}{\sqrt{E_{ij}}} \quad (5)$$

Another metric that can be used is Pearson Standard residue (adjusted), which is calculated by:

$$r_{ij} = \frac{(O_{IJ} - E_{ij})}{\sqrt{E_{ij}}\,(1 - n_{i+})(1 - n_{+j})} \quad (6)$$

Residu Pearson, O_{IJ}, E_{ij}, Pi+, dan P+j Each describes the numerous components required to calculate and understand the distribution of data in a table. Pearson Residue (r_{ij}) shows the difference between the observed values (O_{IJ}) and predicted values (E_{ij}). Pi+ dan P+j Each represent the overall proportion of rows and columns in the table.

Discussion

Economic Characteristics and Demographics of Women Entrepreneurs

The two places considered, the Klewer Traditional Market in Surakarta and the Beringharjo Traditional Market in Yogyakarta, have several contrasts and similarities in terms of female businesses. The difference can be observed in Table 3.

Table 3: Economic Characteristics and Demographics of Women Entrepreneurs

Economic and Demographic Indicators	Women Entrepreneurs	
	Beringharjo	Klewer
1. Age (years)		
18 – 24	9	7
25 – 33	21	43
34 – 42	45	30
43 – 51	48	28
52 – 60	23	32
>61	4	10
2. Level of Education		
Elementary School	3	11
Junior High School	18	18
Senior High School	105	55
Diploma	6	16
Strata-1	17	49
Strata-2	1	0

Economic and Demographic Indicators	Women Entrepreneurs	
	Beringharjo	Klewer
Strata-3	0	1
3. Capital (Indonesian Rupiah)		
35.000 – 499.999	0	6
500.000 - 13.000.000	115	112
13.000.001- 25.500.000	24	24
25.500.001 – 38.000.000	7	2
38.000.001 – 50.000.000	3	4
50.000.001 – 62.500.000	0	0
62.500.001 – 75.000.000	0	1
75.000.001 – 87.500.000	1	0
>87.500.000	0	1
4. Number of Workers		
1 – 3	134	138
4 – 6	15	10
7 – 9	1	0
>9	0	1
5. Length of Business (Years)		
1 – 8	39	52
9 – 17	64	39
18 – 26	36	37
27 – 35	9	13
36 – 44	0	7
>44	2	2
6. Turnover (Indonesian Rupiah)		
100.000 – 499.999	0	5
500.000 - 13.000.000	89	97
13.000.001 - 25.500.000	48	32.
25.500.001 – 38.000.000	4	11
38.000.001 – 50.000.000	3	4
50.000.001 – 62.500.000	3	0
62.500.001 – 75.000.000	1	0
75.000.001 – 87.500.000	0	0
>87.500.000	2	1
7. Participating in Business Training		
Yes	23	22
No	127	128

Source: Primary data processed (2024)

Women entrepreneurs in the Klewer Traditional Market, Surakarta, and the Beringharjo Traditional Market, Yogyakarta, exhibit significantly different characteristics. The bulk of women entrepreneurs in both marketplaces are of productive age. However, the academic level of women entrepreneurs in Beringharjo Market is primarily high school, whereas those in Klewer Market are mainly graduates from Strata-1. Furthermore, the majority of women entrepreneurs in the two regions have monthly capital ranging from Rp 500,000 to Rp 13,000,000, which is used for operational expenses and purchasing goods.

Comparison of Factors Affecting the Turnover of Women Entrepreneurs

There are 150 women entrepreneurs in each of the two traditional markets. The differences in demographic and economic features also shape the factors that influence women's empowerment, as evident in the high turnover among women entrepreneurs. The factors impacting turnover were examined using multiple linear regression analysis. The findings of the investigation reveal that the turnover of women entrepreneurs in Klewer Traditional Market, Surakarta, is influenced by capital, education level, and the actualization of women entrepreneurs through participation in digital training. The results are presented in Table 4.

Table 4: Factors Affecting the Turnover of Women Entrepreneurs in Klewer Traditional Market, Surakarta

No	Variable	Coefficient	Probability	Description
1.	C	13.60	0.00	-
2.	LNMODAL	0.15	0.00	Affected
3.	EDU	0.03	0.02	Affected
4.	EMPLOY	0.03	0.24	No Effect
5.	AGE	0.001	0.71	No Effect
6.	YEARS	0.003	0.46	No Effect
7.	COURSE	0.16	0.09	Affected

Source: Primary Data processed, 2024.

$$LnOmzet = 13.60 + 0.15lnModal + 0.03Employ + 0.03Edu + 0.001Age + 0.003Years + 0.16Course \quad (6)$$

The amount of cash available for a month, the level of education of women entrepreneurs, and the concept of self-actualization through entrepreneurship training for women all have an impact on their turnover at Klewer Traditional Market, Surakarta—a 1% increase in capital results in a 0.15% increase in turnover. Furthermore, increasing the education level of women entrepreneurs by one level increases turnover by 0.03%. Women entrepreneurs in the Klewer Traditional Market who participated in the implementation of women empowerment and entrepreneurship training had a higher turnover of 0.16%. Women entrepreneurs at Yogyakarta's Beringharjo Traditional Market face a different situation. Table 5 shows that additional factors influencing the turnover of women sellers include capital, education level, number of staff, length of operation, and the self-actualization of women entrepreneurs through women's empowerment and entrepreneurship training.

Table 5: Factors Influencing Women Entrepreneurs' Turnover in Beringharjo Market, Yogyakarta

No	Variable	Coefficient	Probability	Description
1.	C	13.70	0.00	-
2.	LNMODAL	0.12	0.01	Affected
3.	EDU	0.03	0.09	Affected
4.	EMPLOY	0.10	0.01	Affected
5.	AGE	0.002	0.56	No Effect
6.	YEARS	0.01	0.01	Affected
7.	COURSE	0.25	0.02	Affected

Source: Primary data processed (2024)

$$LnOmzet = 13.60 + 0.15lnModal + 0.03Employ + 0.03Edu + 0.001Age + 0.003Years + 0.16Course \quad (6)$$

A 1% increase in capital for women entrepreneurs at Yogyakarta's Beringharjo Traditional Market is expected to result in a 0.12% rise in turnover. A one-level increase in education will result in a 0.03 percent rise in turnover. The number of female employees owned by the company also influences the turnover of women entrepreneurs, which is 0.10% for each extra female employee. Furthermore, the length of time in business has significant impact on turnover; for every year in business, turnover increases

by approximately 0.01%. Finally, women entrepreneurs who pursue self-actualization through training have a 0.25% higher turnover rate.

The differences in factors influencing the turnover of women entrepreneurs demonstrate that women entrepreneurs and women's empowerment play a critical role. Women entrepreneurs at the Beringharjo Traditional Market have a more diverse demographic than those at the Klewer Traditional Market. Male dealers dominate the Klewer Traditional Market, deciding distribution from both producers and purchasers. The significance of women's empowerment in the traditional market is similarly underappreciated, as seen by the lack of desire to see women entrepreneurs succeed there. Table 6 describes these discrepancies in detail.

Table 6: Differences in The Characteristics of Women Entrepreneurs at Beringharjo and Klewer

No	Demographic and Economic Characteristics	Women Entrepreneurs in Traditional Markets	
		Klewer, Surakarta	**Beringharjo, Yogyakarta**
1.	Age	Tend to be older, even though many are no longer of productive age (over 64 years old)	The majority are of productive age.
2.	Gender	A significant proportion of its male entrepreneurs are primarily owners.	The majority are women entrepreneurs.
3.	Education Level	The level of education is more even; many are in stratum one, but many also have limited education, typically to basic education.	Having a higher level of education, the majority in upper secondary education.
4.	Access to technology	More conservative in using technology	Many have actualized with marketing through social media and e-commerce.

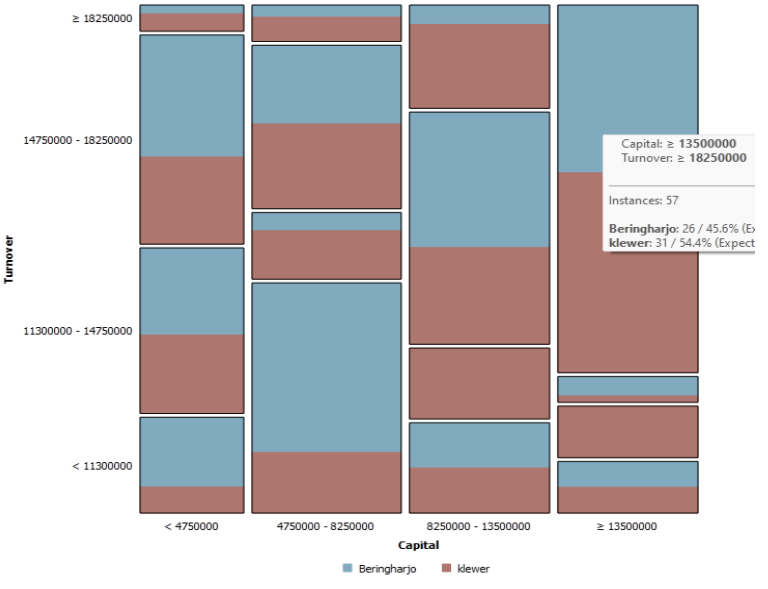
Source: Primary data (2024)

Entrepreneurs' turnover rates vary depending on their demographic and economic characteristics. Women entrepreneurs in the Beringharjo Traditional Market have a higher turnover rate of 0.14% compared to

women entrepreneurs in the Klewer Traditional Market, Surakarta, as indicated by the dummy variable in equation 7.

$$LnOmzet = 13.63 + 0.15lnModal + 0.05Employ + 0.03Edu + 0.0003Age + 0.0007Years + 0.21Course - 0.14dummy \quad (7)$$

Figure 2. Composition of Data on The Relationship Between Capital and Turnover



Source: Primary data processed using Mosaic Display (2024).

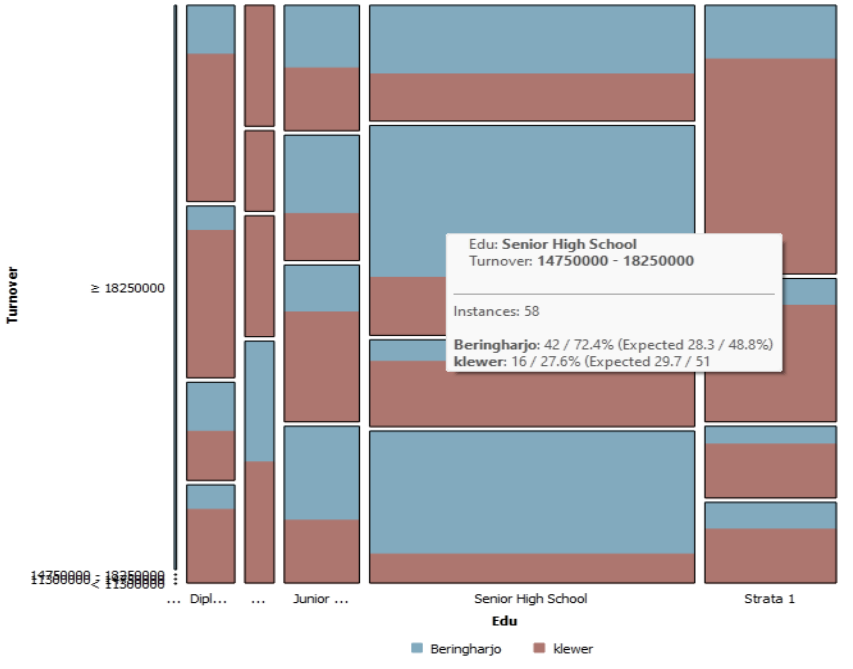
Capital, education level, and the actualization of women entrepreneurs, particularly in the fields of women's empowerment and company development, are among the demographic and economic characteristics that influence women entrepreneurs in the two places. Capital is one of the most critical factors in business development. Capital management by women entrepreneurs is seen as playing an essential role in creating an atmosphere conducive to boosting turnover. Srhoj et al. (2022) assessed that women's creativity in terms of business development can be one of the efforts to survive the recession. The greater the capital that women entrepreneurs possess and cultivate, the more extensive the potential for business development, which has an impact on business turnover for women entrepreneurs (Alenda-Demoutiez, 2022; Hendratmi et al., 2024; İçen & Çil,

2023). The analysis of the mosaic display illustrates the correlation between business capital and turnover among women entrepreneurs operating in traditional market settings.

Figure 2 shows that the majority of women entrepreneurs with a monthly revenue exceeding Rp 18,250,000 have a monthly capital of more than Rp 13,500,000. This is consistent with the initial capital theory, which states that having more capital enables women entrepreneurs to undertake a variety of activities that support business growth, including investing in inventory, enhancing product quality, promoting and marketing, business development, and technological innovation. Women's entrepreneurship is inextricably linked to the setting in which the initial capital theory is particularly relevant, as access to capital is frequently the most significant difficulty faced by women entrepreneurs. Programs that aim to empower women by providing access to financial resources can play a crucial role in overcoming these barriers, enabling women entrepreneurs to expand their businesses and increase their income (Luo & Chan, 2021; Miranti et al., 2022; Welsh et al., 2021).

In addition to the financial resources owned by women entrepreneurs, another crucial aspect is their level of education, which also plays a significant role in business development, as evidenced by an increase in turnover. Research conducted by Dewi & Suci (2023) found that the level of education has an influence on business development among women entrepreneurs, with a relationship that the higher the education possessed by women entrepreneurs, the more likely they are to innovate in their businesses. Figure 3 supports the fact that as many as 42 women entrepreneurs in the Beringharjo Traditional Market and 16 women entrepreneurs in the Klewer Traditional Market, who have completed their high school education, have a total turnover of Rp 14,750,000 – Rp 18,250,000. In addition, women entrepreneurs with the last S1 education also have an average turnover of more than Rp 18,250,000.

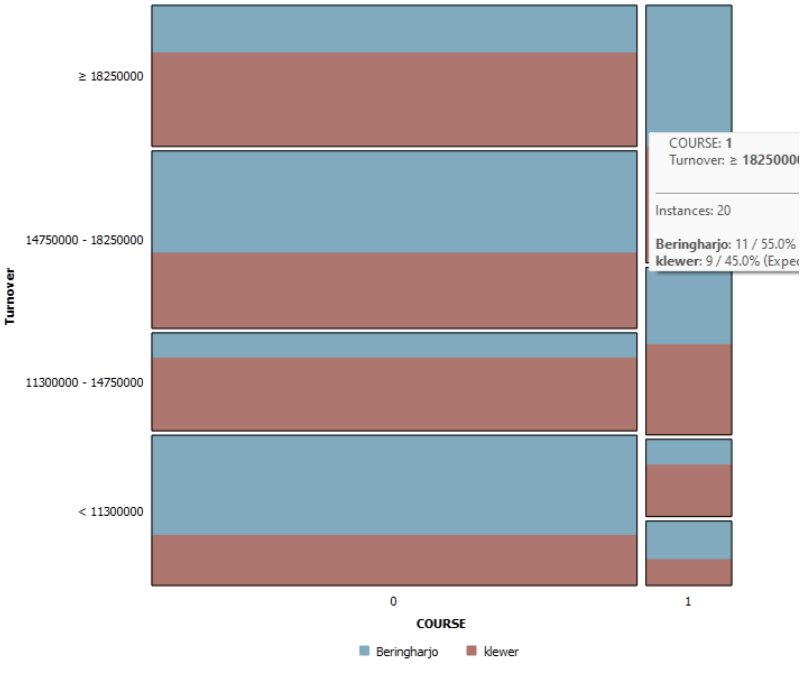
Figure 3. Composition of Data on The Relationship Between Capital and Length of Education



Source: Primary data processed using Mosaic Display, 2024.

The third factor influencing the turnover of women entrepreneurs in the two traditional markets is self-actualization through participation in women's empowerment and entrepreneurship programs. The actualization achieved through these trainings has a significant impact on women entrepreneurs. Specifically, it has the potential to enhance the knowledge base of women entrepreneurs, as well as their abilities, efficiency, discipline, and work ethic. Furthermore, women's empowerment training can boost competitive competitiveness by teaching abilities in product marketing via social media, e-commerce, and digital financial applications. High actualization might pique the interest of women entrepreneurs in the efficacy of capital allocation and marketing technologies. The composition of the data given in the mosaic display analysis below reveals facts concerning actualization through training for women entrepreneurs.

Figure 4. Composition of Data on the Relationship Between Actualization of Woman Entrepreneurs and Turnover



Source: Data primer diolah menggunakan Mosaic Display, 2024.

Figure 4 shows that as many as 11 women entrepreneurs in Beringharjo Traditional Market, Yogyakarta, and nine women entrepreneurs in Klewer Traditional Market, Surakarta, had a larger turnover of more than Rp 18,250,000 than women entrepreneurs who do not receive training. Women's empowerment plays an essential impact in raising the turnover of women entrepreneurs (Kiruthika & Geetha, 2024; Serrano et al., 2023; Sugiyanto et al., 2024; Wood et al., 2024). Enhanced access to financial resources, educational opportunities, and professional networks enables women entrepreneurs to strengthen their management and marketing skills, as well as expand the reach of businesses.

Empowerment initiatives typically include skills training, mentoring, and financial support, enabling women to run their businesses more efficiently and innovatively. Furthermore, women's empowerment strengthens their confidence and resolve to expand their businesses. With these conditions, women entrepreneurs may offer more high-quality and diverse products, attract more customers, and significantly increase their

entire turnover. Support from communities, governments, and financial institutions is crucial to maximizing the benefits of empowerment.

Conclusion

Digitalization has a crucial role in empowering women entrepreneurs in traditional markets, such as Beringharjo Market and Klewer Market, through digital bookkeeping applications, e-commerce marketing, promotions on social media, and digital payment methods. These findings indicate that increasing access to and use of digital technology can significantly increase revenue and business management efficiency, which is in line with the achievement of the Sustainable Development Goals, especially SDGs 5 and 8. Policy implications that can be drawn from this study include the need to develop digital-based entrepreneurship support initiatives by the government and related institutions. Digital literacy training programs, expanding access to technology, and forming strategic partnerships with digital platforms must be priorities to create an ecosystem conducive to the growth of women's businesses. Supportive policies, such as fiscal incentives and regulations that facilitate technology adoption, are expected to facilitate digital transformation in the MSME sector managed by women.

On the other hand, the study has limitations, including geographical coverage limited to only two traditional markets and methods dominated by quantitative approaches, which may not fully describe the complexity of the experience of women entrepreneurs. Recognition of these limitations is important to increase transparency and encourage critical reflection on research results. For future research directions, it is recommended to expand the scope of the area and use alternative methodological approaches, such as in-depth qualitative studies or mixed methods, in order to explore more diverse contextual factors and gain more comprehensive insights into the impact of digitalization on women's empowerment. This further research is expected to provide a stronger basis for formulating policies that support inclusive and sustainable economic growth.

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ORIGINAL SCIENTIFIC PAPER

Financial Inclusion: Boosting Green Practices and Innovation for Female Vendors Well-Being

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A B S T R A C T

This paper examines the factors that influence the quality of life of women street vendors in Serang City, focusing on the contributions of environmentally friendly practices, entrepreneurial innovativeness, and financial inclusion. 100 participants were randomly selected and interviewed using structured questionnaires. Descriptive statistics provided insights into the respondents' profiles, while Structural Equation Modeling with Partial Least Squares (SEM-PLS) was used to analyze the relationships between the study variables. The results show that green practices have a significant positive impact on the well-being of women street vendors. Entrepreneurial innovation also proved to be a crucial factor that had a positive impact on their well-being. Green practices were found to promote entrepreneurial innovation, directly creating a reinforcing dynamic. Furthermore, a positive correlation was found between financial inclusion and well-being. It also played a mediating role by reinforcing the impact of green practices and entrepreneurial innovation on participants' well-being. In conclusion, the study shows that promoting green practices, entrepreneurial

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innovation, and improving access to financial resources are important strategies to improve the quality of life of women street vendors in Serang City. These findings underscore the importance of integrated interventions to promote sustainable livelihoods and economic empowerment of women in the sector.

KEYWORDS: *green, practices, entrepreneurial, innovation, financial, female, street*

Introduction

In Indonesia, women street vendors make an important contribution to the informal sector, which supports the household economy and urban commerce. Many choose this profession because it requires little capital and basic skills that enable financial independence. In the city of Serang, 132 out of 275 street vendors were recorded by the Office of Cooperatives, Micro, Small and Medium Enterprises, Industry and Commerce in 2024.

Despite financial instability and limited access to financial services, women street vendors remain in strategic locations (Muindi & Masurel, 2022; Pineda Duque & Castiblanco Moreno, 2022). While the local government has provided bins for organic and non-organic waste, weak regulations hinder their effectiveness. Training on sustainable practices is needed to improve cleanliness and the use of environmentally friendly materials (Nyamnjoh, 2020; Kaya, 2021). Sustainability strengthens the economy, while technology and marketing innovations improve competitiveness (Grangxabe et al., 2023; Milojevic et al., 2021).

This study highlights the role of inclusive financial services in overcoming economic barriers and improving vendors' livelihoods while addressing the research gap on green practices, business innovation, and financial access in shaping well-being. It contributes to the literature by examining (a) female street vendors' environmental conservation practices, (b) the impact of green practices and entrepreneurial innovation on vendor well-being, (c) the role of financial inclusion in enhancing welfare, (d) the influence of green practices on entrepreneurial innovation, and (e) public perceptions of female street vendors, particularly regarding waste management and business opportunities.

Green practices, such as recycling and biodegradable materials, reduce environmental impact and promote community engagement (Nandru et al., 2021). Financial inclusion provides capital for business growth (Irankunda

& Van Bergeijk, 2020), while entrepreneurial innovation enhances competitiveness and income (Babović & Kočović De Santo, 2023). This study examines how these factors influence the well-being of female street vendors in Serang City.

Accessibility of Inclusion Financial Services (AIFS)

This variable examines female street vendors' access to financial services, considering collateral, risk perception, information asymmetry, household dynamics, and loan interest rates (Ndaba & Reddy, 2024). Limited access arises from structural barriers and vendors' risk-mitigation strategies (Nandru et al., 2021). Operating in strategic urban areas, they balance entrepreneurship and family roles, showcasing resilience and serving as community role models (Moges et al., 2024; Munawir and Suseno, 2024).

Green Practices (GP)

This variable assesses green practice adoption among female street vendors in cleanliness, materials, waste, awareness, and hygiene (Popovic-Pantic et al., 2023). Consumer demand drives eco-friendly initiatives, enhancing livelihoods (Takaza & Chitereka, 2022; Suseno and Dwiatmadja, 2016; Saad, 2022). However, waste management challenges require policy support (Basu & Nagendra, 2020). High adoption rates indicate market potential and business resilience (Ndaba & Reddy, 2024).

Entrepreneurship Innovation (EI)

This variable evaluates female street vendors' entrepreneurial innovation in creativity, technology, adaptability, collaboration, and efficiency (Frare & Beuren, 2023). Innovation fosters eco-friendly, cost-effective solutions and strengthens competitiveness(Suseno, 2019; Soomro et al., 2024). Collaboration reduces costs, improves quality, and enhances credibility (Popovic-Pantic et al., 2023). Ultimately, it sustains businesses and boosts economic well-being (Taskin et al., 2023).

Female Street Vendors' Welfare (FSVW)

This variable assesses female street vendors' welfare in economic, social, and psychological aspects through income, challenges, training, and

local economic conditions (Irankunda & Van Bergeijk, 2020). Gender disparities and sociocultural factors influence their strategies and well-being, with additional pressure from domestic responsibilities (Pineda Duque & Castiblanco Moreno, 2022). Financial education and better banking access can enhance financial stability and empowerment (Nandru et al., 2021).

Research Methodology

This study uses descriptive statistics and a 1–5 scale of 100. The Three Box Method categorizes responses into Low (20–46.27), Medium (47.27–73.54), and High (74.54–100) acceptance levels. The index ranges from 20 to 100. Tables 1–4 present findings on financial access, green practices, entrepreneurial innovation, and female street vendors in Serang City, offering insights into respondents' perceptions.

Table 1: Analysis of Respondent Accessibility of Inclusion Financial Service

Indicator	SD	D	N	A	SA	Total (N)	Ideal Score	% Index	Category
Credit Costs									
AIFS_1	11	19	12	14	43	100	500	71.2	Moderate
fxs	11	38	36	56	215	356			
AIFS_2	12	15	11	26	35	100	500	70.8	Moderate
fxs	12	30	33	104	175	354			
Information Asymmetry									
AIFS_3	12	15	11	19	42	100	500	72.2	Moderate
fxs	12	30	33	76	210	361			
AIFS_4	11	16	5	31	36	100	500	72.4	Moderate
fxs	11	32	15	124	180	362			
Risk Perception									
AIFS_5	9	19	3	42	26	100	500	70.8	Moderate
fxs	9	38	9	168	130	354			
AIFS_6	13	21	8	20	37	100	500	68.8	Moderate
fxs	13	42	24	80	185	344			
Guarantee Requirements									
AIFS_7	12	17	8	20	42	100	500	72.0	Moderate
fxs	12	34	24	80	210	360			
AIFS_8	14	14	5	31	35	100	500	71.2	Moderate
fxs	14	28	15	124	175	356			

Indicator	SD	D	N	A	SA	Total (N)	Ideal Score	% Index	Category
Household									
AIFS_9	11	16	4	42	26	100	500	70.6	Moderate
fxs	11	32	12	168	130	353			
AIFS_10	10	18	5	44	22	100	500	69.4	Moderate
fxs	10	36	15	176	110	347			
Average Index Value								70.94	Moderate

Source: Processed survey data (2024)

Table 1 shows that access to inclusive financial services for female street vendors in Serang remains moderate. Risk perception at 70.8% reflects high financial concerns, while credit costs (70.8–71.2%), information asymmetry (72.2–72.4%), guarantee requirements (71.2–72%), and household factors (69.4–70.6%) indicate limited access. Despite these challenges, 62.6% of the middle economic category still require additional capital, emphasizing the need for external funding.

Table 2: Analysis of Respondent Green Practice

Indicator	SD	D	N	A	SA	Total	Ideal Score	% Index	Category
Environmental Cleanliness									
GP_1	9	11	9	23	47	100	500	77.0	High
fxs	9	22	27	92	235	385			
Materials Used									
GP_2	9	11	12	28	39	100	500	74.8	High
fxs	9	22	36	112	195	374			
Waste Disposal									
GP_3	10	10	11	29	39	100	500	74.8	High
fxs	10	20	33	116	195	374			
GP_4	15	9	4	14	57	100	500	77.2	High
fxs	15	18	12	56	285	386			
Environmental Awareness									
GP_5	5	15	6	19	54	100	500	79.8	High
fxs	5	30	18	76	270	399			
Product Cleanliness									
GP_6	8	17	3	14	57	100	500	78.4	High
fxs	8	34	9	56	285	392			
Average Index Value								77.0	High

Source: Processed survey data (2024)

Table 2 indicates that 79.8% of respondents implement green practices, with an overall adherence index of 77%. However, challenges persist in material use 74.8% and waste disposal. While environmental cleanliness and awareness demonstrate strong commitment, inconsistencies in product hygiene highlight the need for improved sustainable practices.

Table 3: Analysis of Respondent Entrepreneurship Innovation

Indicator	SD	D	N	A	SA	Total (N)	Ideal Score	% Index	Category
Creativity									
EI_1	6	14	12	32	35	100	500	74.6	High
fxs	6	28	36	128	175	373			
EI_2	5	17	3	36	38	100	500	76.4	High
fxs	5	34	9	144	190	382			
Technology Use									
EI_3	8	13	8	9	61	100	500	79.8	High
fxs	8	26	24	36	305	399			
EI_4	8	12	5	9	65	100	500	81.6	High
fxs	8	24	15	36	325	408			
Adaptation									
EI_5	6	18	21	19	35	100	500	71.2	Moderate
fxs	6	36	63	76	175	356			
EI_6	8	14	14	32	31	100	500	72.2	Moderate
fxs	8	28	42	128	155	361			
Collaboration									
EI_7	11	13	7	31	37	100	500	73.4	Moderate
fxs	11	26	21	124	185	367			
EI_8	11	14	12	32	30	100	500	70.6	Moderate
fxs	11	28	36	128	150	353			
Operational Efficiency									
EI_9	16	16	8	25	34	100	500	68.4	Moderate
fxs	16	32	24	100	170	342			
Average Index Score								74.24	High

Source: Processed survey data (2024)

The data in Table 3 indicate that certain aspects of entrepreneurial innovation among female street vendors in Serang require improvement. Operational efficiency has the lowest index (68.4%), followed by collaboration (70.6–73.4%) and adaptation (71.2–72.2%). These challenges

in business effectiveness, cooperation, and flexibility may hinder their competitiveness and long-term sustainability.

Table 4: Analysis of Respondent Welfare of Female Street Vendors

Indicator	SD	D	N	A	SA	N	Ideal Score	% Index	Category
Income									
FSVW_1	23	22	12	22	20	100	500	58.2	Moderate
fxs	23	44	36	88	100	291			
Challenges									
FSVW_2	17	18	22	25	17	100	500	60.8	Moderate
fxs	17	36	66	100	85	304			
FSVW_3	18	20	15	32	14	100	500	60.2	Moderate
fxs	18	40	45	128	70	301			
Skills									
FSVW_4	15	23	16	25	20	100	500	61.8	Moderate
fxs	15	46	48	100	100	309			
Economic Condition									
FSVW_5	18	17	14	31	19	100	500	62.6	Moderate
fxs	18	34	42	124	95	313			
Accessibility									
FSVW_6	15	19	11	30	24	100	500	65.2	Moderate
fxs	15	38	33	120	120	326			
FSVW_7	11	22	8	36	22	100	500	66.6	Moderate
fxs	11	44	24	144	110	333			
Average Index Score								62.2	Moderate

Source: Processed survey data (2024)

The data in Table 4 shows that the welfare of female street vendors in Serang remains moderate at 62.2%. Income is the lowest (58.2%), followed by business challenges (60.2–60.8%) and skills (61.8%), which may hinder business growth. Accessibility is the highest (65.2–66.6%) but still presents challenges. Support is needed to improve income, skills, and economic access.

Table 5: Respondent Distribution

Aspect	Category	Absolute Frequency	Relative %	Cumulative %
Age	19–30 years	26	26	26
	31–40 years	38	38	64
	41–50 years	30	30	94
	>50 years	6	6	100
Years of Selling	1–3 years	43	43	43
	4–6 years	21	21	64
	7–10 years	30	30	94
	>10 years	6	6	100
Daily Income	< €5.80	15	15	15
	€5.80 – €17.40	80	80	95
	€17.40 – €29.00	5	5	100
	> €29.00	0	0	100
Type of Goods	Food	40	40	40
	Beverages	11	11	51
	Clothing	25	25	76
	Accessories	13	13	89
	Fruits	11	11	100
Education	Elementary School	30	30	30
	Junior High School	39	39	69
	Senior High School	31	31	100

Source: Processed survey data (2024)

Table 5 presents the demographic and business characteristics of the respondents. The majority (64%) are between 19 and 40 years old, with most having 1–3 years (43%) or 7–10 years (30%) of selling experience. In terms of daily income, 80% earn between €5.80 and €17.40, while only 5% earn between €17.40 and €29.00. Food products dominate the types of goods sold by 40%, followed by clothing at 25% and accessories 13%. Regarding education, most respondents have completed junior high school (39%) or senior high school (31%), while 30% have only finished elementary school. In the context of the Indonesian education system, junior high school grades 7–9 provides a general educational foundation, whereas senior high school grades 10–12 offers specialized tracks that prepare students for higher education or employment. It is important to emphasize that this structure specifically applies to Indonesia.

Hypothesis Development

The hypothesis testing results highlight the relationships between green practices, entrepreneurial innovation, financial access, and the welfare of female street vendors.

H1: Green practices (GP) positively impact the welfare of female street vendors (FSVW).

Green practices like reducing plastic use improve economic and social well-being (Schenck et al., 2022). Aligning with market demand enhances financial stability (Kirumirah & Munishi, 2021), while efficient waste management reduces costs and boosts reputation (Grangxabe et al., 2024). Compliance builds trust and loyalty (Piazzoni, 2024), strengthening resilience (Kalitanyi, 2021).

H2: Entrepreneurial innovation (EI) positively influences the welfare of female street vendors (FSVW).

Female vendors use technology and creative strategies to stay competitive (Suseno et al. 2019; Matpootorn & Suvittawat, 2023), improving operations and mitigating challenges (Reina Marín et al., 2024; Sharma et al., 2023). Innovation boosts both economic and social well-being (Misiko & Kisiang'ani, 2024).

H3: Green practices (GP) positively influence entrepreneurial innovation (EI).

Eco-friendly practices promote innovation through cost-saving waste management and resource efficiency (Ramprakash et al., 2024; Prevolšek et al., 2021; Soomro et al., 2024). Recycling and biodegradable materials increase creativity, supported by regulations that enhance sustainability and public health (Suseno et al. 2019; Basu & Nagendra, 2020).

H4: Green practices (GP) positively influence the accessibility of financial services (AIFS).

Green practices improve sustainability and financial access (Takaza & Chitereka, 2022). Financial institutions favor eco-friendly businesses (Popovic-Pantic et al., 2023), while policies strengthen vendor-bank ties and funding support (Adera & Abdisa, 2023; Yana Mbena & Yeboah, 2024).

H5: Entrepreneurial innovation (EI) significantly influences the accessibility of financial services (AIFS).

Innovation improves access to finance and business growth (Nandru et al., 2021). Financial services enable strategy implementation and income generation (Adera & Abdisa, 2023; Sun et al., 2022). Supportive policies foster creativity and long-term growth (Nyamnjoh, 2020; Garg, 2024).

H6*:* The accessibility of financial services (AIFS) significantly impacts the welfare of female street vendors (FSVW).

Financial access improves business stability, operations, and livelihoods (Irankunda & Van Bergeijk, 2020; Bernal-Torres et al., 2020; Feranita et al., 2024). Credit and financial support expand capacity and security, enhancing well-being (Fieve & Chrysostome, 2024; Suseno et al. 2024).

H7: Green practices (GP) significantly affect the welfare of female street vendors (FSVW) through the mediation of the accessibility of financial services (AIFS).

Regulatory compliance enhances financial access and vendor welfare (Takyi et al., 2023), though uncertainty may hinder adoption (Nogueira, 2021). Solutions include risk management and training (Ndaba & Reddy, 2024; Meher & Ghatole, 2020). Financial inclusion supports sustainability and better living conditions (Grosu, 2024; Maskudi et al. 2024).

H8: Entrepreneurial innovation (EI) significantly influences the welfare of female street vendors (FSVW) through the mediation of the accessibility of inclusion financial services (AIFS).

Innovation supports financial inclusion via technology and policy engagement (Matpootorn & Suvittawat, 2023; Liu & Liu, 2022). Attitudinal and family support also ease access and adoption (Kelikume, 2021; Munawir and Suseno, 2024), showing innovation improves welfare through finance.

Methods

This study in Serang City employed a quantitative survey to analyze the impact of green practices, entrepreneurial innovation, and financial inclusion on the welfare of female street vendors. A purposive sampling method was used to select 100 respondents based on specific criteria: (a) actively operating a business, (b) engaging in trade activities, (c) aged 18 or older, (d) possessing business-related insights, and (e) willing to participate

(Takaza, 2024). Data collection involved a pre-tested questionnaire, and analysis was conducted using PLS-SEM with SmartPLS 3.2.9, chosen for its effectiveness in exploratory research, small sample sizes, and complex relationships (Hair et al., 2024).

Data Analysis SEM-PLS

Convergent Validity

Each indicator must have a factor loading above 0.7 to confirm its validity in measuring the intended construct. Convergent validity (Figure 1) presents the PLS-SEM model with path coefficients and R^2 values. The PLS-SEM output evaluates the structural model, analyzing relationships between latent variables and the model's predictive capability (Hair et al., 2024).

Figure 1: Path Analysis

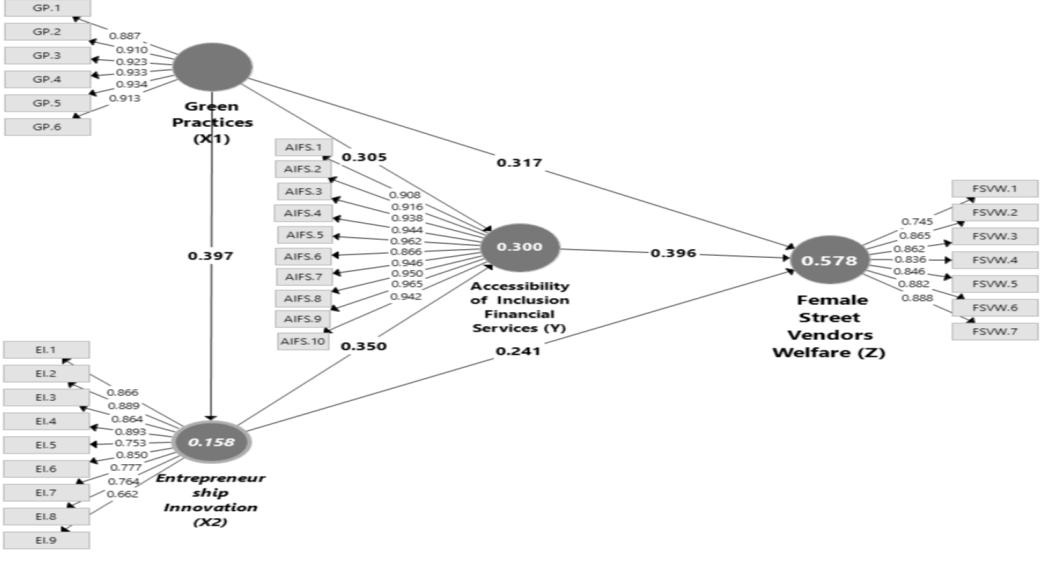

Figure 1 confirms that all indicators meet the convergent validity criteria, with factor loads above 0.7, effectively representing their respective constructs. Path coefficients and R^2 values validate the model's predictive strength, ensuring an accurate explanation of variable relationships.

Discriminant Validity

The discriminant validity was assessed using the Heterotrait-Monotrait Ratio (HTMT). When the HTMT value is less than 0.85, it indicates that discriminant validity has been achieved. Table 6 presents the HTMT values of the constructs examined in this study, all of which are below the threshold of 0.85.

Table 6: Heterotrait-Monotrait Ratio (HTMT)

Construct /Construct	**Accessibility of Financial Inclusion (Y)**	**Entrepreneurship Innovation (X_2)**	**Female Street Vendor Welfare (Z)**	**Green Practices (X_1)**
Accessibility of Financial Inclusion (Y)	-			
Entrepreneurship Innovation (X_2)	0.482	-		
Female Street Vendor Welfare (Z)	0.668	0.581	-	
Green Practices (X_1)	0.451	0.415	0.610	-

Source: Result SEM PLS 3.2.9

Table 6 confirms discriminant validity, as all HTMT values are below the 0.85 threshold, indicating that each construction is distinct and well-measured by its indicators.

Reliability Analysis

Cronbach's alpha and composite reliability values above 0.7 indicate strong internal consistency and effective measurement of latent constructs, as shown in Table 7.

Table 7: Cronbach's Alpha and Composite Reliability Results

Construct	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Green Practices (X1)	0.962	0.965	0.969	0.840
Entrepreneurship Innovation (X2)	0.936	0.941	0.947	0.667
Accessibility of Inclusion Financial Services (Y)	0.984	0.985	0.986	0.873
Female Street Vendors' Welfare (Z)	0.934	0.944	0.947	0.718

Source: Result SEM PLS 3.2.9

Cronbach's alpha and composite reliability (CR) values above 0.7 confirm the strong consistency and accurate representation of the latent constructs, ensuring the instrument's reliability in this study.

Hypothesis Test

The hypothesis testing results indicate the following direct effects between the independent and dependent variables.

Table 8: Hypothesis Test

Variable	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values
Green Practices (X1) -> Welfare of Female Street Vendors (Z)	0.317	0.315	0.101	3.146	0.001
Entrepreneurship Innovation (X2) -> Welfare of Female Street Vendors (Z)	0.241	0.244	0.096	2.515	0.006
Green Practices (X1) -> Entrepreneurship Innovation (X2)	0.397	0.404	0.099	4.001	0.000
Green Practices (X1) -> Accessibility of Financial Inclusion Services (Y)	0.305	0.307	0.114	2.667	0.004
Entrepreneurship Innovation (X2) -> Accessibility of Financial Inclusion Services (Y)	0.350	0.353	0.114	3.073	0.001

Variable	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values
Accessibility of Financial Inclusion Services (Y) -> Welfare of Female Street Vendors (Z)	0.396	0.397	0.123	3.233	0.001
Green Practices (X1) -> Accessibility of Financial Inclusion Services (Y) -> Welfare of Female Street Vendors (Z)	0.121	0.122	0.058	2.084	0.038
Entrepreneurship Innovation (X2) -> Accessibility of Financial Inclusion Services (Y) -> Welfare of Female Street Vendors (Z)	0.139	0.142	0.064	2.158	0.031

Source: Result SEM PLS 3.2.9

Table 8 highlights the significant relationships among green practices, entrepreneurial innovation, financial inclusion, and vendor welfare, followed by a detailed analysis.

First hypothesis, Green practices improve vendor welfare by enhancing sustainability, reducing costs, and attracting eco-conscious customers (Adera & Abdisa, 2023). These practices foster financial stability and long-term success, benefiting both vendors and the environment (Mustofa et al., 2023; Wulandari et al., 2024).

Second hypothesis, Entrepreneurial innovation enhances female vendors' welfare through economic stability and social well-being. Product diversification, digital payments, and social media increase sales, efficiency, and market reach while strengthening customer relations (Suseno & Basrowi, 2023; Sharma et al., 2023).

Third hypothesis, Green practices stimulate innovation by encouraging creativity, eco-friendly products, and waste reduction (Mehta et al., 2024; Kaya, 2021). These align with consumer demand and are supported by training and incentives, improving vendor reputation and long-term success (Taskin et al., 2023; Babović & Kočović De Santo, 2023).

Fourth hypothesis, Green practices promote financial inclusion by improving vendors' access to credit, as sustainable businesses are prioritized

in lending (Bhatia & Singh, 2019; Fieve & Chrysostome, 2024). Energy-efficient practices enhance creditworthiness, while sustainable models and financial literacy broaden economic opportunities (Kalitanyi, 2021; Antonijević et al., 2024).

Fifth hypothesis, Entrepreneurial innovation enhances financial inclusion by expanding vendors' access to financial services and supporting sustainable enterprises (Turner et al., 2021; Adera & Abdisa, 2023). It also drives financial innovation, while stakeholder collaboration ensures effective policy implementation (Yana Mbena & Yeboah,2024; Ndaba & Reddy, 2024). Strengthening vendor welfare further reinforces this link (Thanh & Bao Duong, 2024)

Sixth hypothesis, Financial inclusion improves female vendors' welfare by enhancing financial stability, enabling business expansion, and increasing income through access to savings, credit, and insurance (Misiko & Kisiang'ani, 2024; Irankunda & Van Bergeijk, 2020; Nandru et al., 2021). It also promotes economic independence and financial control.

Seventh hypothesis, Green practices significantly impact vendor welfare through financial inclusion, emphasizing its mediating role (McKay & Osborne, 2022). Sustainable practices enhance credibility, improving financial access (Moges et al., 2024) and fostering socio-economic benefits (Muindi & Masurel, 2022). Policymakers should integrate sustainability with financial inclusion through incentives, microfinance, and financial literacy programs (Bhatia & Singh, 2019; Milojevic et al., 2021).

Eighth hypothesis, Entrepreneurial innovation enhances welfare through financial inclusion by fostering reinvestment, growth, and stability (Feranita et al., 2024). Policy involvement improves financial access (Chibango, 2024), while innovation aligned with market needs boosts efficiency (Kelikume, 2021). This mediation underscores the interconnectedness of innovation, financial inclusion, and welfare (Gehlot et al., 2023). Integrating entrepreneurship and financial strategies supports sustainable growth (Popovic-Pantic et al., 2023).

Conclusion

This study confirms that access to financial services, entrepreneurial innovation, green practices, and the well-being of women street vendors are interrelated in promoting business stability and sustainability. Green practices and entrepreneurial innovation have a positive impact on vendors'

well-being by improving income and business resilience. In addition, access to financial inclusion is an important link that enables women vendors to utilize financial services for their growth. Traders who have access to credit and savings programs are more likely to be able to expand their business, while green practices drive entrepreneurial innovation, promoting competitiveness and adaptability.

To improve the welfare of traders, efforts should focus on improving financial access, promoting business innovation, and supporting sustainable practices. The support of policymakers, financial institutions, and stakeholders is crucial to creating an inclusive, innovative, and sustainable business environment that benefits both individual vendors and broader economic development.

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Appendix

The appendix presents factor loadings for items measuring Green Practice, Entrepreneurial Innovation, Financial Services Accessibility, and Vendor Welfare, all indicating strong indicator reliability and a robust measurement model.

Construct	Item Statement	Factor Loading
Green Practice	I keep my vending area clean.	0.887
	I seek eco-friendly material alternatives.	0.910
	I reduce plastic use with reusables.	0.923
	I use biodegradable materials.	0.933
	I keep my selling area clean.	0.934
	I use recyclable packaging.	0.913
Entrepreneurship Innovation	I vary routines to keep customers interested.	0.866
	I expand promotions to reach more buyers.	0.899
	I use tech for stock and sales records.	0.864
	I use apps and digital payments to ease transactions.	0.893
	I adapt quickly to market changes.	0.753
	I adjust to new regulations.	0.850
	I collaborate with vendors or partners.	0.777
	I join community or local government programs.	0.764
	I set daily sales targets.	0.662
Accessibility of Financial Services	High loan interest makes me hesitant.	0.908
	Bank fees make loans costly.	0.916
	I struggle to get clear loan info.	0.938
	I find credit terms easy to meet.	0.944
	I'm concerned about repaying loans.	0.962
	I fear losing assets if I default.	0.866
	Banks demand high collateral.	0.946
	Providing collateral is difficult.	0.950
	Credit helps grow my business.	0.965
	My business relies on credit for urgent needs.	0.942

Construct	Item Statement	Factor Loading
Female Street Vendors' Welfare	My income is unstable.	0.745
	I feel safe and comfortable selling.	0.865
	Levy fees disrupt my business.	0.862
	Training has improved my skills.	0.836
	High prices hinder marketing.	0.846
	I easily access capital.	0.882
	My location is accessible to customers.	0.888

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ORIGINAL SCIENTIFIC PAPER

Empowering Female Leadership for Enhanced Innovation Performance of Companies in Vietnam

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A B S T R A C T

This study examines the relationship between female board representation and firm innovation within Vietnam's private sector. It applies panel data from the World Bank Enterprise Survey for the years 2009, 2015, and 2023 to examine how having women on company boards influences innovation at the firm level. It employs a bivariate probit model and considers distinct characteristics of firms and industries. The findings reveal a significant positive association between female board representation and innovation, particularly in the initial stages of female board membership. However, the impact of female ownership on innovation is more complex, with higher levels of female ownership potentially leading to increased risk aversion. Additionally, firm size, growth, industry affiliation, and export orientation are identified as key determinants of innovation. This study contributes to the growing literature on gender diversity and innovation by providing empirical evidence from the Vietnamese context. It offers actionable insights for Vietnamese policymakers aiming to enhance private sector innovation and competitiveness by promoting gender diversity in corporate governance.

KEYWORDS: *female board representation, firm innovation, bivariate probit model*

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Introduction

In recent years, the Vietnamese government has introduced numerous policies to promote gender equality. Complementing these efforts, research highlights the benefits of gender diversity on corporate boards, linking it to improved financial performance, innovation, and corporate social responsibility (Byron & Post, 2016; Schiebinger, 2017; Griffin, Li, & Xu, 2021). Companies with higher gender diversity, particularly in leadership, tend to outperform their less diverse counterparts, achieving better innovation outcomes and financial results (Opstrup & Villadsen, 2015; Moreno-Gómez et al., 2018). This relationship arises from diverse perspectives that foster creative solutions and innovative ideas. Bernile et al. (2018) further demonstrate that greater board diversity, including gender diversity, reduces stock return volatility, lowers financial leverage, and increases investment in research and development, indicating more prudent decision-making.

In the context of corporate innovation, striking a balance between creativity and risk management is crucial. Excessive managerial risk-taking can lead to poor project selection, undermining long-term value (Adam et al., 2015). Female directors can play a pivotal role in mitigating excessive risk-taking and short-termism, contributing to sustainable innovation strategies. However, some theories, such as Similarity Attraction Theory (Byrne, 1971) and Social Identity Theory (Hogg, 2016), suggest potential challenges of diversity. Individuals are naturally drawn to those with similar demographics and values, which may hinder collaboration and cohesion on diverse boards. Women and members of minority groups may face biases, which can limit their participation and hinder idea sharing, ultimately negatively affecting board performance (Ely et al., 2011). These challenges highlight the complexity of fostering diversity without compromising cohesion.

Despite these theoretical concerns, empirical research on the impact of gender diversity on innovation is limited. Most studies emphasize racial or ethnic diversity, leaving a gap in understanding the specific role of gender dynamics in innovation. Nonetheless, recent studies, such as Ruiz-Jiménez and Fuentes-Fuentes (2016), explore how gender composition influences a firm's innovation capacity. This research gap also extends to the influence of firm size on the relationship between gender diversity and innovation. Large firms with greater resources may better harness gender diversity,

while smaller firms could struggle due to limited structures. Addressing these gaps could help managers and policymakers design tailored diversity initiatives to optimize innovation across firms of varied sizes.

The relationship between gender diversity and company innovation has received more attention in recent academic discourse. This study contributes to the growing body of research on the impact of gender diversity on firm innovation by examining the specific context of Vietnam. Utilizing a panel dataset from the World Bank Enterprise Survey for the years 2009, 2015, and 2023, this paper applies a bivariate probit model to analyze the relationship between female board representation and firm-level innovation, while accounting for potential endogeneity issues. The dataset includes observations from 2009, 2015, and 2023. These years were chosen to highlight important economic and regulatory changes in Vietnam. Specifically, 2009 follows the global financial crisis, 2015 marks increased economic integration due to trade agreements, and 2023 indicates the recovery from the pandemic and the rise of digital transformation. As detailed in Section 3, the dataset provides comprehensive firm-level and industry-level information, enabling a robust analysis of the interplay between gender diversity and innovation outcomes. The findings provide novel insights into the complex interplay between gender diversity, firm characteristics, and innovation outcomes. By exploring the differential impact of female board membership on innovation, this study adds to the existing literature and highlights the potential mechanisms through which gender diversity can enhance firm performance. Based on the theoretical framework and empirical evidence reviewed, the following hypothesis is proposed:

Hypothesis: Increased female representation on company boards in Vietnam is positively associated with enhanced firm-level innovation.

The paper is organized as follows. Section 2 presents a literature review of the relationship between gender equality in board composition and firm innovation. The following section explains the econometric methodology and the data. Section 4 presents the results, and the final section contains the conclusions.

Literature Review

The relationship between gender diversity and firm innovation is grounded in agency theory, upper echelons theory, and gender socialization theory (Ting et al., 2015; Lewellyn & Muller-Kahle, 2016; Amin et al., 2022). As highlighted by recent studies by Poletti-Hughes and Briano-Turrent (2019) and Amin et al. (2022), agency theory suggests that gender-diverse boards can mitigate agency problems by broadening perspectives and enhancing governance. This is achieved through improved monitoring and transparent decision-making processes. Upper echelons emphasize how the demographic composition of top management teams, including gender diversity, shapes organizational outcomes. (Ting et al., 2015; Tonoyan & Olson-Buchanan, 2023). Gender socialization theory highlights the distinct skills and experiences that women bring to boardrooms, thereby fostering more informed and innovative decision-making (Cronqvist & Yu, 2017; Nadeem et al., 2020).

Recent research has consistently demonstrated the positive impact of female directors on board effectiveness (Boivie et al., 2016; Katmon et al., 2019; Tran et al., 2024). These attributes contribute to better innovation and strategic decision-making. However, challenges arise when managing diversity. While diverse perspectives can drive creativity, they may also reduce group cohesiveness and employee satisfaction if conflicts are poorly managed (Nishii, 2013; Schwab et al., 2016). Differences in viewpoints or approaches may generate tension, potentially undermining group harmony.

The growing body of literature underscores the significance of gender diversity in driving innovation and enhancing organizational performance. Research by Opstrup and Villadsen (2015) and newer studies by Tran et al. (2024) suggest that gender-diverse organizations are more likely to consider environmental, social, and governance reputational risks in their strategic decision-making. However, the relationship remains complex and context-dependent. Evidence suggests that the impact of gender diversity varies based on industry type, firm size, organizational culture, and technological intensity, making broad generalizations challenging. This study examines the complex relationship between gender diversity and firm innovation, drawing on insights from agency, upper echelons, and gender socialization theories. It hypothesizes that female board representation has a positive influence on firm innovation by enhancing decision-making, risk-taking, and long-term strategic thinking. However, the extent of this impact is

moderated by firm-specific factors, such as size, industry characteristics, and technological intensity. This study aims to examine the complicated relationship between gender diversity and firm innovation within the context of Vietnam, considering the unique socio-economic and institutional factors that characterize this emerging market.

Data and Methodology

Methodology

A well-specified empirical model should align with both the data and the underlying theory (Box, Hunter, & Hunter, 2005). To examine the determinants of various innovation activities, this study employs a bivariate probit (MVP) model, a suitable technique for analyzing multiple correlated binary choices (Calia & Ferrante, 2013; Agwuet al., 2020). By accounting for the potential interdependence among different innovation types, such as the decision to engage in product innovation or process innovation, the bivariate model provides a more nuanced understanding of the factors influencing firm-level innovation. Following the methodological approach of Chib and Greenberg (1998) and Donkoh et al. (2019), this study utilizes a bivariate probit model to investigate the impact of female board presence on firm innovation.

$$Y^*_{ik} = \beta_k X_{ik} + \alpha_k A_{ik} + \varepsilon_k \quad (1)$$

$$Y_{ik} = 1 \text{ if } Y^*_{ik} > 0 \text{ and } 0 \text{ otherwise} \quad (2)$$

In this model, the latent variable Y^*_{ik} represents the unobserved propensity of firm i to adopt innovation type k (k = 1 denotes product innovation, k = 2 denotes process innovation). The observed binary variable Y_{ik} indicates whether firm i has adopted innovation type k (1 for adoption, 0 otherwise). The model assumes that the two innovation types are correlated, suggesting that unobserved firm-specific factors may simultaneously influence decisions across different innovation domains. The bivariate probit (MVP) model is well-suited for analyzing such correlated binary choices. The model specification includes a set of observed firm characteristics (X_{ik}) and unobserved factors (A_{ik}), such as unobserved heterogeneity across industries and time periods that may influence

innovation decisions. The parameters to be estimated are the coefficients associated with the observed and unobserved factors (β_k and α_k, respectively). The error terms (ε_k) are assumed to follow a bivariate normal distribution. For two types of innovations, the error terms (ε_1, ε_2) are jointly distributed as: (ε_1, ε_2) ~MVN (0, V). After controlling for firm characteristics, if the correlation coefficient between two innovation decisions is statistically significant, it implies that unobserved firm-specific factors, such as firm size, ownership structure, firm age, firm growth, and export incentives, may simultaneously affect the likelihood of adopting both innovations. Firms' adoption of each of the innovation types follows the empirical model specified below:

$$Y_{ik} = \beta_0 + i{=}1m\beta_{ik}\, FC_{ik} + i{=}1m\beta_{ik}\, SC_{ik} + i{=}1m\beta_{ik}\, TE_i + \varepsilon_i \qquad (3)$$

$\forall = 1 \ldots$ m regressors

where β' is a vector of parameters to be estimated. FC_{ik} denotes firm characteristics such as firm size, ownership structure, firm age, firm growth, and export incentives. SC_{ik} denotes sector characteristics, TE_i denotes time effect an ε_i denotes the error term. The Geweke-Hajivassiliou-Keane (GHK) simulator provides unbiased estimates of bivariate normal probabilities, crucial for analyzing complex models with correlated decisions (Gates, 2006; Abay, 2015). By simulating the bivariate normal distribution, GHK accurately estimates model parameters and marginal effects, addressing endogeneity and capturing interdependence among innovation decisions. The error term variance-covariance matrix reflects correlations among unobserved factors influencing these decisions, highlighting interdependence among different innovation types (Gebremariam & Tesfaye, 2018). Cross-equation correlation coefficients, as emphasized by Calia and Ferrante (2013), offer insights into these interdependencies. While reverse causality between firm performance (including innovation) and female board membership lacks empirical support, endogeneity remains a concern, as high-performing firms may be more inclined to appoint female directors. A bivariate probit model, suitable for binary outcomes, addresses potential correlations between innovation types and controls for unobserved heterogeneity. A likelihood ratio test validates the model's use by confirming the significance of error term correlations. While the Hausman test is traditionally used for endogeneity detection, it is less reliable with binary explanatory variables in probit models. Therefore, following Arendt

and Larsen (2006) and Giles et al. (2009), the Wald test is employed as a more robust alternative for assessing endogeneity in this context.

Data

The empirical analysis in this study applies the Vietnamese World Bank Enterprise Surveys (WBES) for the years 2009, 2015, and 2023. This dataset, collected through a thorough categorized random sampling methodology, provides a comprehensive overview of the Vietnamese business landscape. By surveying a diverse range of firms across various sectors and regions, the WBES ensures the representativeness of the sample. The surveys capture essential firm-level information, including characteristics such as size, ownership, sector, and innovation activities. This longitudinal dataset allows for a robust analysis of the determinants and outcomes of innovation activities in Vietnam. Previous studies, including Coluccia et al. (2020), often use R&D expenditures as a proxy for innovation, but this study considers a firm's patenting activities to provide a more comprehensive measure of innovation. Because R&D expenditures only represent one type of observable input to innovation, while there are many other unobservable inputs, such as organizational culture, employee skills, and knowledge management processes. Patenting reflects the tangible outcomes and productivity of a firm's innovation efforts extending beyond the mere inputs.

The Specification of the Model's Explanatory Variables

This study employs two proxies to measure the independent variable of gender diversity. The first is a binary indicator reflecting whether a firm has at least one female director on its board (Rasheed et al., 2021). The second is a continuous variable representing the proportion of female directors on the board, used as a robustness check. Covariate selection, informed by prior research on firm innovation, is summarized in Table 1. These covariates include firm-level characteristics such as age, size, growth, ownership structure, industry, and export status (Stock et al., 2002; Liu et al., 2010; Yildiz et al., 2013; Coad & Segarra, 2014; Gërguri-Rashiti et al., 2017; Brunswicker & Chesbrough, 2018; Anand et al., 2021). Ownership structure significantly impacts innovation. Foreign ownership often enhances innovation through access to advanced technologies, managerial expertise, and global markets (Yiu et al., 2007; Dong et al., 2022).

Conversely, state-owned enterprises (SOEs) may prioritize non-commercial objectives, which can hinder innovation. However, SOEs can leverage government support and resources for large-scale R&D. Strategic partnerships between SOEs and foreign-owned firms combine policy support with technological and managerial expertise (Dong et al., 2022). Firm age and growth also influence innovation. Larger firms have more resources for R&D but may lack the agility of younger firms, which are often more entrepreneurial and innovative (Protogerou et al., 2017). Rapidly growing firms, particularly those in high-growth sectors, are incentivized to innovate to maintain competitiveness (Akcigit & Kerr, 2018). Exporting firms, exposed to global competition and technological advancements, tend to be more innovative, while innovation can also stimulate exports (Siedschlag & Zhang, 2015; Ribau, Moreira, & Raposo, 2017). This study categorizes industries based on the Economic Foundations Sectors framework (Rennings & Rammer, 2011; Blind, 2016), emphasizing sectors with high innovation potential due to regulatory incentives and structural characteristics.

Table 1: The Variables and Their Descriptions

Variables	**Description**
Product Innovation	New products/services introduced over the last 3 years.
Process Innovation	New establishments / improved processes introduced in the past 3 years.
Female Owner	The firm has at least one female owner on its board (1: Yes; 0: No).
Female Ownership Proportion	The proportion of female ownership in the firm.
Firm Growth	Real annual sales growth is measured as a percentage change in sales between the last completed fiscal year and a previous period.
Foreign Ownership	Percentage of the firm owned by foreign individuals, companies or organizations.
State Ownership	Percentage of the firm owned by the government or state.
Domestic Ownership	Percentage of the firm owned by domestic individuals, companies or organizations.
Age	The age of the firm is based on the year in which the firm began operations.

Variables	Description
Size	Firm size: Categorized based on the number of employees: large (100 or more), medium (20-99), or small (5-19).
Export Status	1 if the percentage of sales (direct export) or the percentage of sales (indirect export) is greater than 0.
Economic Foundations Sector	1 if the firm belongs to one of the following industries: Construction, Retail, Manufacturing, Wholesale, Accommodation / Food Services, or Finance and Insurance; 0 otherwise.

Source: Vietnamese World Bank Enterprise Survey

Result and Analysis

Summary Statistics

The panel dataset incorporates time-series and cross-sectional dimensions, examining variations in female board representation and innovation measures across three years (2009, 2015, and 2023). Given the dataset's limited time-series aspect, the paper emphasizes cross-sectional differences among firms, highlighting firm-specific factors like size, ownership structure, and industry type in shaping board composition and innovation outcomes. Larger firms consistently demonstrate higher innovation levels, while high-tech industries exhibit diverse effects, underscoring the interplay between corporate governance and firm characteristics.

Table 2 presents descriptive statistics for key variables. It reveals that 54.8% of firms report product innovation, measured by new or improved products/services (SD = 0.498), while 46.1% achieve process innovation, reflecting improved processes or establishments (SD = 0.499). Female ownership is notable, with 50.3% of firms having at least one female owner and an average ownership stake of 51.92%. The ownership structure is predominantly domestic (88.8%; SD = 28.86), with limited foreign ownership (8.562%; SD = 26.99). Although foreign ownership can foster innovation via technological and managerial expertise (Liu et al., 2010; Anand et al., 2021), its low representation may constrain these benefits. Domestic firms, often family-operated, prioritize sustainability and market-specific innovations, encouraging calculated risk-taking (Rondi et al., 2019).

Firm characteristics are critical determinants of innovation. Larger firms leverage financial and human resources to drive R&D (Brunswicker & Chesbrough, 2018), while rapid growth, averaging 35.8% (SD = 0.776), often fuels innovation to sustain competitiveness. Younger firms excel in radical innovation due to their agility, while older firms capitalize on experience to achieve incremental advancements (Coad & Segarra, 2014). The dataset's average firm age of 23.494 years (SD = 10.478) reflects this balance. Export activity, averaging 31.7% (SD = 0.465), highlights moderate international market engagement. Exporting firms innovate to meet global standards, reinforcing the innovation-export nexus (Ribau et al., 2017). Additionally, 46.5% of firms belong to Economic Foundations Sectors (SD = 0.498), benefiting from regulatory frameworks and government partnerships that support R&D and innovation (Rennings & Rammer, 2011; Blind, 2016). This sample composition allows for a thorough analysis of the factors driving innovation across different firms and sectors.

Table 2: Descriptive Statistics

Variables	Obs.	Mean	SD	Min	Max
Product Innovation	3,029	0.548	0.498	0.00	1.00
Process Innovation	3,039	0.461	0.499	0.00	1.00
Female Owner	3,045	0.503	0.500	0.00	1.00
Female Ownership Proportion	914	51.92	35.84	1.00	100.00
Foreign Ownership Proportion	3,040	8.562	26.99	0.00	100.00
State Ownership Proportion	3,043	2.181	10.40	0.00	99.00
Domestic Ownership Proportion	3,041	88.80	28.86	0.00	100.00
Firm Age	3,033	23.494	10.478	10	122
Size	3,031	1.931	0.7997	1.00	3.00
Firm Growth Rate	3,045	0.358	0.776	-2.00	2.00
Export Status	3,045	0.317	0.465	0.00	1.00
Economic Foundations Sector	3,045	0.465	0.498	0.00	1.00

Source: Vietnamese World Bank Enterprise Survey and Author's calculations

Marginal Probabilities

Table 3 presents the results of bivariate probit models examining the relationship between female ownership and firm innovation strategies, using two independent variables: Female Owner and Female Owner Proportion.

The findings reveal how female leadership influences innovation and reflect the heterogeneity in firms' innovation strategies. Rather than adhering to a uniform innovation model, firms adopt diverse approaches, either focusing on one type of innovation or combining multiple types. Firms with at least one female owner positively influence process innovation (Marginal Effect (ME) = 0.0416, $p < 0.001$) and joint innovation (ME = 0.0280, $p < 0.05$). These results suggest that innovations are complementary for female-led firms, with strategies emphasizing process and collaborative innovation. However, the percentage of female ownership negatively impacts all innovation types, with the strongest effect on joint innovation (ME = −0.0010, $p < 0.001$). This implies that while female leadership supports innovation, higher proportions of female ownership may indicate structural challenges, such as limited resources or risk-averse tendencies, which constrain broader innovation strategies. Thus, having at least one female owner is beneficial, but a high percentage of female ownership might reflect resource constraints or institutional barriers.

Firms with female owners may also benefit from positive societal perceptions, aligning with expectations of diversity and inclusion. This alignment can enhance their reputation, attract diverse talents, and provide access to innovative-related resources such as grants for diversity-forward companies. These findings partially align with studies by Abdullah et al. (2016) and Chen et al. (2018), which emphasize the role of gender diversity in corporate governance and innovation by introducing different perspectives into decision-making. Regarding ownership structure, foreign ownership positively impacts product innovation (ME = 0.0048, $p < 0.05$) but does not significantly influence process or joint innovation. Foreign firms tend to focus on product innovation to establish market presence and brand identity, often prioritizing proprietary technologies over collaborative efforts. State ownership has a significant impact on joint innovation (ME = 0.0100, $p < 0.05$), likely due to the government's encouragement of strategic collaborations and technological development in key industries. Conversely, domestic ownership shows no significant effect across innovation types, suggesting a focus on short-term profitability over long-term innovation.

Firm growth has a strong influence on all types of innovation, particularly product innovation (ME = 0.0736, $p < 0.001$), as growing firms prioritize innovation to capture market share and enhance their competitiveness. Similarly, older firms exhibit a higher probability of engaging in joint innovation (ME = 0.1235, $p < 0.001$), leveraging their

accumulated experience and resources. These findings are consistent with the study of Akcigit and Kerr (2018), which emphasize the role of growth and age in fostering innovation. Firm size significantly enhances innovation, especially process innovation (ME = 0.3118, $p < 0.001$). Larger firms benefit from superior R&D capabilities and access to resources, enabling them to scale innovations efficiently. Exporting firms also exhibit significant positive effects on all innovation types, particularly product innovation (ME = 0.0624, $p < 0.001$), driven by the competitive demands of global markets. These results align with those of Ribau et al. (2017) and Dong et al. (2022), who also highlight the importance of innovation for export performance.

Operating in foundational sectors strongly promotes innovation, particularly process innovation (ME = 0.0716, $p < 0.001$). Foundational sectors provide critical infrastructure and resources for innovation, as emphasized by Rennings and Rammer (2011). Additionally, the year 2009 shows a significant positive impact on all innovation types, with the strongest effect on process innovation (ME = 0.4307, $p < 0.001$), reflecting policy-driven recovery measures post-2008 financial crisis (Brancati et al., 2022). The model's statistical validity was confirmed through a Wald test, rejecting the null hypothesis that all coefficients are simultaneously zero. Significant correlations between innovation types validate the use of the bivariate probit model over a standard probit model, confirming the nuanced relationships between ownership, firm characteristics, and innovation strategies.

Table 3: Marginal effects (ME) of covariates on innovation types

Variable	Product Innovation	Process Innovation	Joint Innovation	Product Innovation	Process Innovation	Joint Innovation
Firm with female ownership	0.0028	0.0416***	0.0280*			
Female Ownership Percentage				-0.0009*	-0.0016**	-0.0010***
Foreign Ownership	0..0048*	-0.0009	0.00008	0.0052	-0.0026	0.0001
State Ownership	0.0019	0.00005	0.0017	0.0100*	-0.0037	0.0006
Domestic Ownership	0.0023	-0.0008	0.0003	0.0059	-0.0020	0.0006
Firm Growth	0.0736***	0.0567***	0.062***	0.0167	-0.0169	-0.0028
Age of firm (log)	0.1538***	0.1084***	0.1235***	0.1202**	-0.0047	0.0285
Small Firm	0.0444	0.2431*	0.1728	-0.0065	1.014**	0.5427***
Medium Firm	0.0793	0.3118***	0.2295*	0.0901	1.1211**	0.6162***

Variable	Product Innovation	Process Innovation	Joint Innovation	Product Innovation	Process Innovation	Joint Innovation
Large Firm	0.0683	0.3122***	0.2260*	0.0878	1.1078**	0.6121***
Export Status	0.0624***	0.0488***	0.0532***	0.0278	0.0395	0.0257
Economic Foundations Sector	0.0680***	0.0716***	0.0670***	0.0305	0.0504*	0.0327*
Year 2009	0.3826***	0.4307***	0.4117***	-0.01186	-0.0494	-0.0259
Observations		3,008			900	
The arctangent of the correlation coefficient		0.962***			0.516***	
Wald test of rho=0: chi^2		478.519***			58.4112***	

*Note: *** p<0.001, ** p<0.01, * p<0.05*

Source: Author's calculations

Discussion and Robustness Tests

The findings of this study provide sophisticated insights into the relationship between female ownership and firm innovation. The hypothesis, which posited that female ownership would positively influence firm innovation, is partially confirmed. Specifically, having at least one female owner significantly enhances process and joint innovation. This aligns with the study by Abdullah et al. (2016), Chen et al. (2018), and Griffin et al. (2021). Female leadership brings diverse perspectives and collaborative approaches, fostering these specific types of innovation. However, the negative impact of higher female ownership percentages suggests that beyond a certain threshold, structural limitations, such as resource constraints or risk aversion, may impede broader innovation strategies. The positive impact of foreign ownership on product innovation is consistent with the established literature. For example, Dong et al. (2022) emphasize the focus of foreign firms on establishing a market presence through product differentiation. Similarly, the authors also discuss the positive effect of state ownership on joint innovation. It reflects the government's role in promoting strategic collaborations, as seen in various national innovation policies. The strong positive influence of firm growth, age, size, and exporting status on innovation aligns with the findings of Ribau et al. (2017), Akcigit et al. (2018), and Dong et al. (2022). These factors provide firms with the necessary resources, experience, and market pressures to innovate. The significant impact of foundational sectors and the year 2009 underscores the importance of sectoral context and

macroeconomic factors in driving innovation, as highlighted by Brancati et al. (2022).

Furthermore, this study examines the potential endogeneity in the impact of female board representation on innovation using an instrumental variables (IV) approach. Director appointments are influenced by internal firm dynamics, including strategic goals, operational needs, and organizational culture. Male-dominated sectors, such as heavy industry, construction, and manufacturing, exhibit a lower propensity for female director appointments (Arena et al., 2015). Furthermore, self-selection bias may exist, with innovative firms potentially attracting more female directors due to their alignment with the values or career aspirations of these individuals. Following Nadeem et al. (2020), this study employs the system-generalized method of moments (SGMM) and IV-Probit to account for this endogeneity. As suggested by Nadeem et al. (2020), average industry gender diversity is used as an instrument. This instrument is likely correlated with a firm's gender diversity, as firms in gender-diverse industries may face social or competitive pressures to conform to industry norms, which in turn influence their board composition and leadership diversity. This approach aims to isolate the exogenous component of female board representation to assess its impact on innovation outcomes accurately.

The key assumption in using an instrument is that it should not directly affect the dependent variable—in this case, a firm's innovation. Industry average gender diversity reflects broader trends and norms rather than specific firm-level factors, making it less likely to have a direct impact on a focal firm's innovation capabilities or outputs. Once again, the presence of female board members is positively significant in all specifications, indicating that the main results are robust to endogeneity from omitted variable bias and reverse causality. The unreported results of the specification tests of GMM and 2SLS indicated that our instruments were valid and correctly identified.

Table 4: Endogeneity tests

Independent Variables	IV-Probit		SGMM	
	Product Innovation	Process Innovation	Product Innovation	Process Innovation
Firm with female ownership	0.863***	0.779***	1.691***	1.743***
	(0.281)	(0.262)	(0.191)	(0.201)
Foreign Ownership	0.00522*	0.00252	0.0103**	0.00571
	(0.00292)	(0.00237)	(0.00524)	(0.00476)
State Ownership	0.00340	-0.000522	0.00707	-0.00108
	(0.00299)	(0.00247)	(0.00631)	(0.00541)
Domestic Ownership	0.00208	-0.000527	0.00413	-0.00115
	(0.00259)	(0.00205)	(0.00521)	(0.00454)
Firm Growth	0.0774***	0.0605***	0.147***	0.127***
	(0.0150)	(0.0135)	(0.0395)	(0.0389)
Age of firm (log)	0.0851*	0.0575	0.148	0.101
	(0.0443)	(0.0410)	(0.107)	(0.106)
Medium Size	0.00960	0.0357	0.0138	0.0819
	(0.0291)	(0.0266)	(0.0565)	(0.0690)
Large Size	-0.0690	-0.0313	-0.142**	-0.0738
	(0.0466)	(0.0441)	(0.0718)	(0.0874)
Export Status	0.0211	0.0164	0.0367	0.0366
	(0.0348)	(0.0296)	(0.0719)	(0.0708)
Economic Foundations	0.157***	0.156***	0.297***	0.338***
Sector	(0.0266)	(0.0236)	(0.0595)	(0.0691)
Year 2009	-1.065***	-1.210***	0.597***	0.796***
	(0.0907)	(0.0922)	(0.157)	(0.208)
Constant	-0.664**	-0.418*	-2.153***	-1.838***
	(0.296)	(0.244)	(0.655)	(0.590)
Observations	2,758	2,768	2,758	2,768
Pseudo-R^2	0.2012	0.2284	0.2824	0.0490

*Note. This table presents the system generalized method of moments (SGMM) and IV - Probit estimations of the impact of female board presence on process and product innovation. The instrumental variable is the industry average gender diversity. For brevity, the results of the first stage of 2SLS are not reported. Robust standard errors are in parentheses. All variables are defined in Table 1. *** p<0.01, ** p<0.05, * p<0.1*

Source: Author's calculations

Conclusion

This study contributes to the growing body of research on the impact of gender diversity on firm innovation by employing a bivariate probit model.

This approach enables simultaneous analysis of multiple innovation types, accounting for both observed and unobserved firm characteristics. The findings confirm that the appointment of female directors, particularly the first female director, significantly enhances firm innovation. This effect is likely driven by increased cognitive diversity, improved decision-making through diverse perspectives, a greater propensity for exploring innovation, and greater openness to risk-taking. However, the relationship between female ownership and innovation is more complex. While the initial presence of a female owner can foster inclusivity and spark novel ideas, higher proportions of female ownership may indicate resource constraints or a tendency towards risk aversion, which can hinder broader innovation strategies. Firm-level characteristics also play a critical role in innovation. Larger, high-growth firms and those in knowledge-intensive industries are more likely to engage in innovative activities. Foreign ownership and involvement in foundational economic sectors further enhance innovation capabilities. These findings suggest that innovation outcomes are shaped by a complex interplay of gender diversity, firm attributes, and industry context.

Based on the findings, it is recommended that companies actively pursue the inclusion of female directors on their boards to enhance diversity and innovation. Appointing the first female director is particularly impactful, and companies should prioritize identifying qualified female candidates to bring diverse perspectives. However, simply increasing female representation is not enough. Companies must foster an inclusive board culture through training, mentorship, and open communication. Additionally, firms with high female ownership should address potential resource constraints and risk aversion tendencies by leveraging strategic partnerships, securing funding, and encouraging calculated risk-taking. A well-balanced board composition is essential, ensuring that gender diversity is optimized in accordance with industry- and company-specific needs.

Policymakers can promote gender diversity on corporate boards by offering targeted incentives, such as tax benefits or subsidies, to companies that meet specific diversity targets. Mandatory disclosure requirements can further enhance transparency and accountability by requiring firms to report their board composition and gender diversity policies. While gender quotas can effectively increase female representation, they should be implemented cautiously to prevent unintended consequences, such as tokenism, ensuring that diversity efforts lead to meaningful inclusion and improved corporate

governance. This study is subject to certain limitations. It focuses solely on product and process innovation, neglecting other innovation dimensions, such as organizational and marketing innovation, thereby limiting a holistic understanding of the impact of gender diversity. The dataset's limited timeframe restricts the analysis of long-term trends. Future research should expand the dataset's temporal scope and size for greater robustness. Incorporating qualitative methods, such as case studies and interviews, could provide richer insights into the mechanisms linking gender diversity and innovation. Furthermore, cross-country and industry-specific analyses are recommended for a more comprehensive understanding of this complex relationship.

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ORIGINAL SCIENTIFIC PAPER

Scoping Review of the Impact of Financial Literacy Empowerment on the Growth of Female Entrepreneurship in Nigeria

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A B S T R A C T

The growth of female entrepreneurship is crucial to Nigeria's socio-economic development but is hindered by limited access to financial knowledge and resources. This study conducted a scoping review to examine the impact of financial literacy empowerment on the growth and success of female entrepreneurs in Nigeria. Using the Google Scholar database, a search spanning January 2019 to August 2024 identified 1,600,260 articles. After applying inclusion criteria, 97 articles were screened by abstract, and 17 were subjected to full-text review, with six ultimately selected for analysis. The review systematically identifies barriers to financial literacy among Nigerian women and evaluates the effectiveness of financial literacy programs. Findings indicate that enhanced financial literacy improves business management, facilitates access to financing, and drives business growth among female entrepreneurs. Tailored financial education programs addressing the specific needs of Nigerian women were identified as particularly effective. The study underscores the importance of policy interventions and support systems to create an enabling environment for female entrepreneurship through financial literacy initiatives. This review provides critical insights into the role of financial literacy in empowering female entrepreneurs. It highlights the need for future research and practical strategies to sustain entrepreneurial growth in Nigeria.

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Introduction

Financial literacy is critical for entrepreneurial success and sustainability. It involves understanding and applying financial skills like investing, budgeting, and financial management. For female entrepreneurs, financial literacy is essential, as it directly affects their ability to make informed financial decisions, secure funding, and manage business operations. However, studies show that women, particularly in developing countries, generally have lower levels of financial literacy than men, posing significant challenges to business growth (Alshebami & Al Marri, 2022; Erhomosele & Obi, 2022). Globally, female entrepreneurship is recognized as a key driver of economic growth, innovation, and social progress. Women entrepreneurs contribute to economic diversification, job creation, and poverty alleviation. These contradict the earlier belief that women's roles are confined to childbirth, child-rearing, and household duties (Odunaike & Ajiboye, 2020). Despite their contributions, female entrepreneurs face challenges such as limited access to finance, socio-cultural barriers, insufficient networks, and inadequate financial literacy (Aparicio et al., 2022). In regions like Africa, these challenges are more pronounced. African women often face restricted access to financial services and educational opportunities due to socio-cultural norms. Consequently, the lack of financial literacy exacerbates their inability to access and manage resources effectively (Onoshakpor et al., 2023; Ogbari et al., 2024).

In West Africa female entrepreneurs encounter significant barriers that hinder business growth and sustainability. Limited financial literacy is a critical issue, affecting their ability to make sound financial decisions, secure funding, and manage finances. Various initiatives in the region aim to empower women through financial education, which is increasingly recognized as essential for economic diversification, poverty reduction, and sustainable development (Mashapure et al., 2022; Adekunle, 2023). Nigeria, as West Africa's largest economy, reflects these trends (Iluno et al., 2021). Female entrepreneurs face with substantial obstacles, including socio-cultural constraints, inadequate networks, and poor financial literacy. These issues limit their ability to plan, manage, and grow businesses. Cultural norms and socio-economic factors further restrict access to financial education and resources. Many Nigerian women, particularly in rural areas, lack the financial skills needed for business development (Onoshakpor et al., 2023).

Stakeholders, including government agencies, NGOs, and international organizations, have launched initiatives to enhance financial literacy among Nigerian women. These programs aim to equip women with the skills needed to overcome entrepreneurial barriers. However, the effectiveness and impact of these programs on female entrepreneurship remain underexplored. This study evaluates the outcomes of such programs and their role in sustaining female-owned businesses in Nigeria, offering insights into fostering an inclusive entrepreneurial ecosystem (Bamidele & Pikirayi, 2022; Babalola et al., 2023; Mela et al., 2024; Dekolo et al., 2025).

Literature Review

Barriers to Financial Literacy and Female Entrepreneurship

Female entrepreneurs worldwide face significant barriers to financial literacy, which impact their business success. Global research highlights that women often struggle with financial management, access to credit, and investment decisions due to socio-cultural and systemic challenges (Sundarasen et al., 2023; Prabha, 2024). In Africa, financial literacy rates remain low, with only 38% of adults considered financially literate, and women are disproportionately affected by financial exclusion (Choudhary & Jain, 2023). Socio-economic constraints, restrictive cultural norms, and discriminatory lending practices further hinder their entrepreneurial potential, especially in West Africa, where women primarily operate in the informal sector with limited access to training and financial services (Ogundana et al., 2021; Onoshakpor et al., 2023). In Nigeria, these challenges are compounded by inadequate financial education, particularly in rural areas, and a lack of tailored literacy programs (Adaramola & Azeez, 2021).

Interventions Addressing Financial Literacy Gaps

Efforts to bridge the financial literacy gap have emerged at global, regional, and national levels. Internationally, organizations like the OECD/INFE, the World Bank, and GFLEC have launched financial literacy programs targeting women's financial empowerment (Menberu, 2024). The G20 Financial Inclusion Action Plan and the UN Sustainable Development Goals (SDGs) reinforce the role of financial literacy in achieving gender equality and economic sustainability, thereby empowering women through

education (Adekoya, 2015; Okunnu et al., 2017). In Africa, initiatives such as the African Women's Entrepreneurship Program (AWEP) and the Affirmative Finance Action for Women in Africa (AFAWA) focus on improving women's financial knowledge, business management skills, and access to funding (Adera & Abdisa, 2023). Digital finance solutions, including mobile banking and microfinance, play a growing role in expanding financial literacy, particularly in regions where traditional banking services are inaccessible (Baporikar & Akino, 2020). It is therefore essential that female entrepreneurs embrace and integrate new technology to enhance value and surpass customer expectations (Shamaki et al., 2022). In Nigeria, government-led strategies like the Central Bank's financial inclusion programs and private sector initiatives such as Women's World Banking aim to enhance financial literacy and business sustainability to increase women's financial inclusion (Antonijević et al, 2022; Babalola et al., 2023).

Outcomes and Impacts of Financial Literacy Initiatives

Empirical studies demonstrate a strong link between financial literacy and female entrepreneurship, with financially literate women more likely to secure funding, manage finances efficiently, and expand their businesses (Tanggamani et al., 2024; Adera & Abdisa, 2023). In Nigeria, women entrepreneurs play a crucial role in various sectors, including agriculture, retail, and technology, contributing to economic growth and innovation. However, limited financial knowledge often leads to poor budgeting, inadequate savings, and inefficient debt management, reducing business sustainability (Usama et al., 2018; Egbo et al., 2020; Amalare et al., 2020). Case studies from Ghana and Côte d'Ivoire reveal that financial literacy training significantly improves business performance, demonstrating the need for scalable and sustainable interventions in Nigeria and West Africa (Addai, 2017; World Bank, 2022).

Stakeholder Consultation

While stakeholder consultation is not mandatory in scoping reviews, it is often considered a valuable supplementary step (Arksey & O'Malley, 2005; Buus et al., 2022). Engaging key stakeholders, such as policymakers, financial institutions, non-governmental organizations (NGOs), and female entrepreneurs, can offer practical insights and validate findings, thereby

enhancing the study's relevance and applicability. In the context of financial literacy and female entrepreneurship in Nigeria, these stakeholders are well-positioned to:

Identify Practical Gaps: Policymakers and financial institutions can highlight real-world challenges and policy constraints that may not be fully captured in academic literature. Their input can help refine the scope of future research by pinpointing areas in which financial literacy programs need to be more robust or better tailored to the needs of Nigerian women entrepreneurs.

Validate Findings: Female entrepreneurs can provide firsthand experiences regarding the effectiveness of financial literacy interventions. Their perspectives can corroborate or challenge the findings from the reviewed studies, offering a richer understanding of how financial literacy translates into actual business practices and growth.

Co-Develop Recommendations: Collaboration with stakeholders enables the co-creation of targeted strategies and policies. Integrating academic insights with practitioner expertise, recommendations for financial literacy programs and policy interventions can be more actionable, context-specific, and sustainable.

Empirical Review

Several studies underscore the importance of financial literacy in female entrepreneurship but reveal significant gaps in understanding its specific impacts in Nigeria. Baporikar and Akino (2020) highlighted that women's entrepreneurship contributes to social development, economic growth, and poverty alleviation. Their qualitative study involving 23 women entrepreneurs revealed that financial literacy is critical for business success. They recommended group-based training programs but did not address the unique challenges Nigerian women face. Ehigie and Izedonmi (2020) explored the effects of government policies on women-led SMEs in Edo State, Nigeria. Analyzing data from 384 women entrepreneurs, they found that supportive policies positively influence the sustainability of women-led businesses. However, the study omitted the role of financial literacy, a crucial factor in empowering women to maximize such policy benefits.

Fowowe et al. (2022) examined microfinance's role in expanding women-led businesses in Akure. They identified barriers like high loan interest rates, lack of collateral, and business registration issues. Although

some women succeeded due to persistence and support systems, the study did not consider financial literacy's role in overcoming these obstacles. Empowering women through financial education could significantly enhance their ability to access and manage microfinance effectively. Smith-Hunter et al. (2023) emphasized the global impact of women entrepreneurs, who account for 25–33% of businesses and contribute substantially to economic progress. Despite recognizing their broad contributions, the study failed to explore how financial literacy enables women to sustain and grow their businesses, particularly in Nigeria.

Salami and Aghaunor (2024) highlighted the importance of SMEs to Nigeria's economy, noting that these enterprises create jobs, contribute to GDP, and alleviate poverty. However, Nigerian SMEs face challenges such as economic instability and poor infrastructure. Financial literacy, identified as a key factor for SME success, remains underexplored in the context of female-owned businesses. Adeola et al. (2024) investigated the growth of women-owned enterprises in Adamawa State, identifying societal norms, lack of support, and unfavorable attitudes as major barriers. While they recommended strategies to strengthen support systems, they overlooked financial literacy's potential to equip women with the skills to overcome socio-cultural and resource management challenges. Agu et al. (2024) explored the effects of the COVID-19 pandemic on Igbo women entrepreneurs in Nigeria, addressing a gap in academic literature using in-depth interviews and thematic analysis, findings revealed both positive (innovation, digital adoption) and negative (revenue loss, loan repayment struggles) impacts. Notably, nascent entrepreneurs benefited more than established ones. These studies collectively highlight gaps in addressing how financial literacy empowers Nigerian female entrepreneurs, emphasizing the need for focused research to bridge this critical gap.

Methodology

Study Design

This study employed the scoping review methodology outlined by Arksey and O'Malley (2005), which is widely recognized for mapping the breadth and scope of a particular research area. The framework includes five key stages: (1) identifying the resarch question, (2) identifying relevant studies, (3) selecting studies, (4) charting the data, and (5) collating,

summarizing, and reporting the results. This approach is particularly suitable for exploring the impact of financial literacy empowerment on the growth of female entrepreneurship in Nigeria, given the broad and multi-dimensional nature of the subject.

Search Strategy and Sources

The search strategy is comprehensive and systematic, identifying all relevant studies. The search will be conducted on Google Scholar only. Keywords and search terms include combinations of "financial literacy," "female entrepreneurship," "women entrepreneurs," "Nigeria," "empowerment," and "economic growth." Boolean operators (AND, OR) are used to refine the search. Only peer-reviewed journals and conference proceedings involved in financial literacy and entrepreneurship in Nigeria were selected. The reference lists of selected studies are also reviewed to identify additional relevant sources.

Eligibility Criteria and Study Selection

Inclusion and Exclusion Criteria: The inclusion criteria for this scoping review focus on studies that examine the relationship between financial literacy and female entrepreneurship in Nigeria. Only studies published in English, including peer-reviewed articles and conference papers, were considered. The timeframe for inclusion spans from January 1, 2019 to August 30, 2024. This period was selected based on citation impact considerations, as research evaluations often rely on a five-year citation window to assess the relevance and influence of scholarly work (Clermont *et al.*, 2021). The Hindex for a five-year citation period provides a reliable measure of research impact, ensuring that the review captures high-quality, recent studies that contribute meaningfully to the discourse on financial literacy and female entrepreneurship. Studies that focus on financial literacy without explicitly linking it to female entrepreneurship were excluded, as were non-peer-reviewed sources, opinion pieces, and reports lacking empirical evidence. These criteria ensure a focused and methodologically rigorous synthesis of existing research on the topic.

Data Extraction and Charting: They are based on populations outside Nigeria. They are not available in full text or are not accessible through institutional databases. Data extractio is conducted using a standardized form developed for this review. The form captures key information from

each study, including the author(s), year of publication, study location, objectives, methodology, key findings, and implications for financial literacy and female entrepreneurship. The charting process organizes the data thematically to facilitate comparison across studies. Special attention is given to the impact of financial literacy on business growth, sustainability, and the unique challenges faced by female entrepreneurs in Nigeria.

Analysis and Synthesis Methods

The analysis involves both quantitative and qualitative synthesis. Descriptive statistics are used to summarize the characteristics of the included studies, such as publication year, research design, and key outcomes. Thematic analysis is employed to identify common themes, patterns, and gaps in the literature regarding the impact of financial literacy on female entrepreneurship in Nigeria. The results are synthesized to provide a comprehensive overview of the current state of knowledge, highlighting areas where further research is needed. The synthesis also explores the implications of the findings for policy and practice, particularly in the context of empowering female entrepreneurs through financial literacy initiatives in Nigeria.

Results

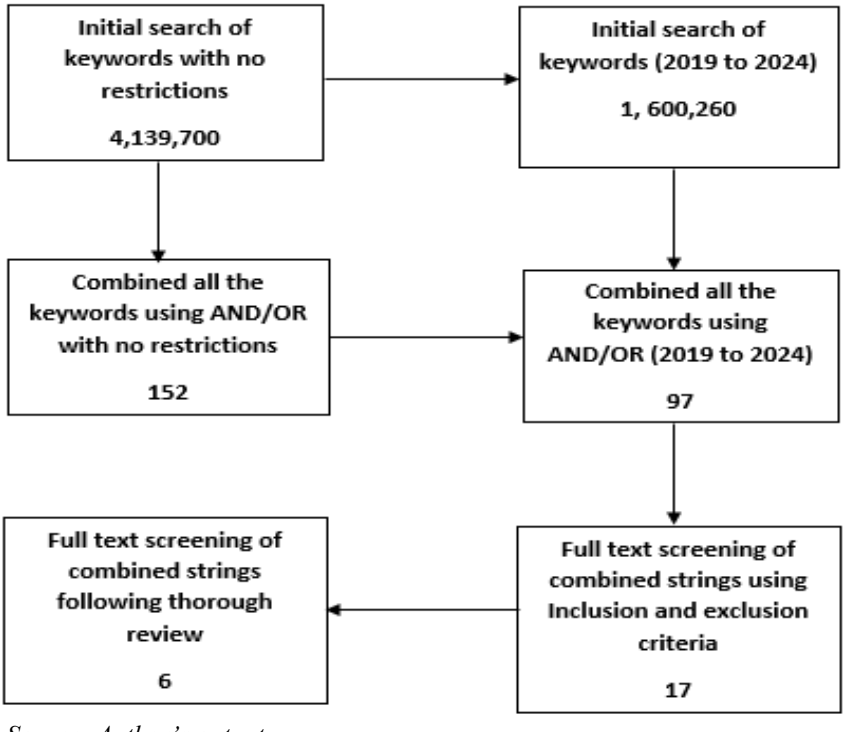
Screening Results

A search of the database using keywords relevant to "financial literacy empowerment and female entrepreneurship in Nigeria" with the study years (2019 to 2024) yielded a total of 1,600,260 articles. Title screening by combining all the strings narrowed this down to 97 articles, which proceeded to the abstract screening phase. The 97 articles were reviewed based on their abstracts. Of these, 80 were deemed unsuitable, leaving only 17 articles for full-text screening. Following a thorough review, six (6) articles were selected for data extraction, while eleven (11) were excluded. The results of this screening process are presented in a flow diagram in Figure 1.

Table 1 captures keyword search trends on Google Scholar from January 1, 2019 to August 30, 2024. The focus keywords, Financial Literacy, Female Entrepreneurship, Economic Growth, Financial Empowerment, Business Performance and Nigeria are particularly relevant

to research on women entrepreneurs and their influence on economic development. The search interest in "Financial Literacy" has shown a steady increase from 2019 (14,700) to 2023 (26,800), reflecting growing attention to this crucial aspect, especially in the context of empowering women entrepreneurs. There is a slight dip in 2024 (19,600), which may suggest a shift in research focus or the emergence of new priorities in scholarly discussions. Searches for "Female Entrepreneurship" are much lower in volume than other terms, with a peak in 2023 (3,520). This indicates a rising interest in this area, albeit on a more modest scale compared to broader economic terms. The data suggests that research on female entrepreneurship is gaining traction but remains underrepresented. "Economic Growth" dominates the keyword searches, starting at 318,000 in 2019 and decreasing steadily to 85,300 in 2024. This trend might reflect a broader economic context, with earlier years focusing more on economic recovery, post-global financial crises and recently seeing a diversified focus in research topics.

Figure 1: Scoping review study selection



Source: Author's output

Although the absolute numbers are lower, there is consistent growth in searches for "Financial Empowerment," indicating increasing recognition of its importance in supporting marginalized groups, including women entrepreneurs. Category "Business Performance" sees a consistent search interest with a slight decline in 2024. This suggests sustained research in this area, critical for understanding how businesses, including those run by women, perform over time. "Nigeria" search increased from 468,000 in 2019 to 490,000 in 2020 but decreased steadily to 122,000 in 2024. This implies that research including Nigeria as a topic or keyword has been decreasing since 2020 till date. The "Combined String," likely representing a more niche or specific intersection of these topics, shows low search volumes, peaking at 24 in 2023. This might indicate emerging, yet still niche, research intersections that combine Financial Literacy, Female Entrepreneurship, Economic Growth, Financial Empowerment, Business Performance, and Nigeria. Given the increasing emphasis on financial literacy and its impact on business performance, it becomes clear that while

Table 1: Keywords Search on Google Scholar from 1st January 2019 to 30th August 2024

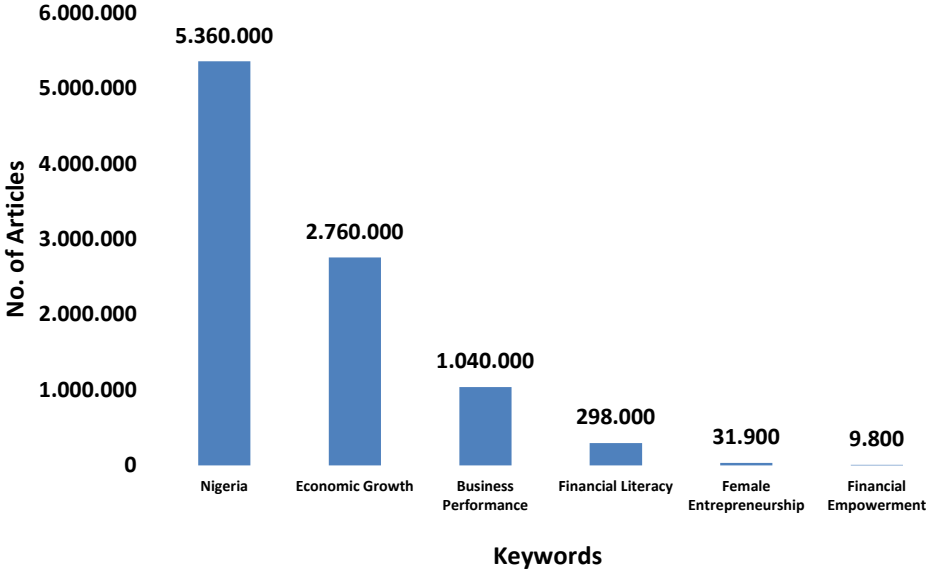
Google Scholar	**All years**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**Total**	**%**
Financial Literacy	298,000	14700	16,400	19,500	22,600	26,800	19,600	119,600	40.1
Female Entrepreneurship	31,900	2,200	2,370	2,760	2,920	3,520	2,170	15,940	50.0
Economic Growth	2,760,000	318,000	280,000	245,000	192,000	139,000	85,300	1,259,300	45.6
Financial Empowerment	9,800	634	760	854	847	1,160	965	5,220	53.3
Business Performance	1,040,000	29,900	32,000	35,400	37,900	36,800	28,200	200,200	19.3
Nigeria	5,360,000	468,000	490,000	397,000	347,000	221,000	122,000	2,045,000	38.2
Total	**9,499,700**	**833,434**	**821,530**	**700,514**	**603,267**	**428,280**	**258,235**	**3,645,260**	**38.4**
Combined string	152	11	13	11	20	24	18	97	63.8

Source: Author's output

female entrepreneurship is a growing field, there is still substantial room for more focused research. The gap lies in the lower relative interest in "Female Entrepreneurship" compared to broader economic terms, suggesting a need

for more targeted studies and policies that integrate financial literacy with female entrepreneurship to drive economic growth. The data also highlights the importance of financial empowerment as a foundational element for enhancing the performance of women-owned businesses.

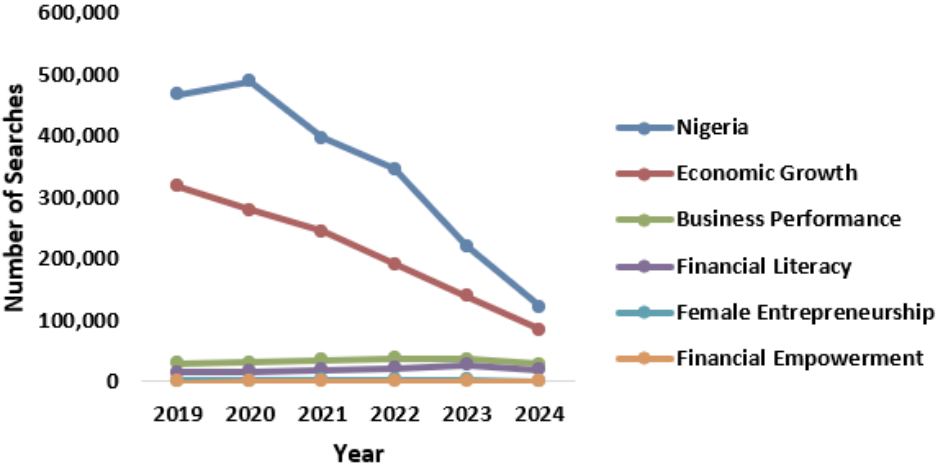
Figure 2: Keywords search with no restrictions



Source: Author's output

Figure 2 is a bar chart showing the total Google Scholar keyword searches without restriction. Each bar represents the total number of searches for each keyword. This visualization highlights the relative popularity of terms like "Nigeria", "Economic Growth," and "Business Performance", which show significantly higher search volumes compared to others such as "Financial Literacy", "Female Entrepreneurship" and "Financial Empowerment.

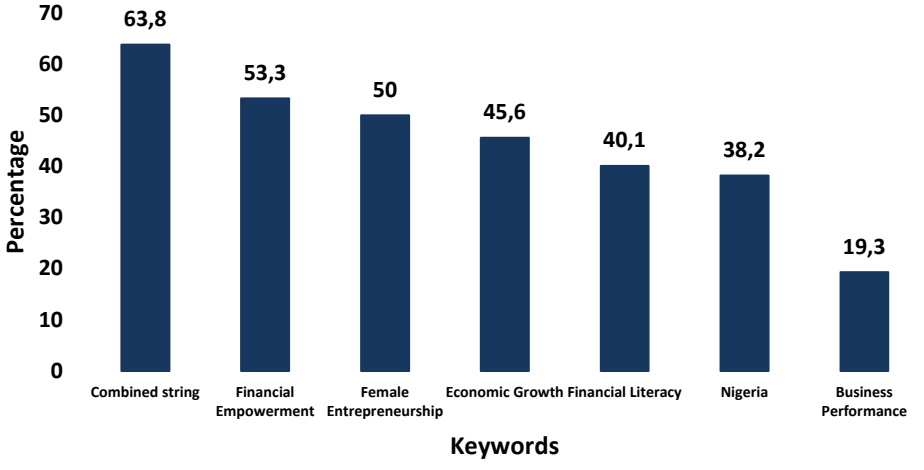
Figure 3: Keywords search from 1st January 2019 to 30th August 2024



Source: Author's output

Figure 3 is a line chart, which illustrates the trend in keyword searches on Google Scholar related to financial literacy, female entrepreneurship, economic growth, financial empowerment, business performance, and Nigeria from January 2019 to August 2024. Nigeria showed a slight increase between 2019 and 2020, but thereafter decreased steadily to 2024, showing a decrease in research focused on Nigeria. Financial literacy shows a steady increase, peaking in 2023, reflecting growing interest and recognition of its importance in various contexts, including female entrepreneurship. Female entrepreneurship also exhibits a gradual rise, aligning with global efforts to support women-led businesses, though the search volume is much lower than for other keywords, indicating a potential gap in research. Economic growth experiences a significant decline after 2019, possibly due to changing economic conditions or shifting research priorities. Financial empowerment shows moderate growth, highlighting the ongoing focus on empowering individuals, particularly women, through financial resources. Business performance maintains a consistent upward trend, reflecting its centrality in assessing the success of enterprises, including those led by women. These trends underline the increasing importance of financial literacy and empowerment in supporting female entrepreneurship and its contribution to economic growth.

Figure 4: Keyword search of a percentage of contemporary to total



Source: Author's output

Figure 4 shows the percentage of contemporary studies (2019–2024) for seven key terms: Combined String, Financial Empowerment, Female Entrepreneurship, Economic Growth, Financial Literacy, Nigeria and Business Performance. Combined String leads with 63.8%, reflecting a focus on emerging trends and new research areas. Financial Empowerment (53.3%) and Female Entrepreneurship (50.0%) also show strong contemporary representation, highlighting the growing emphasis on empowering women and supporting female-led businesses. Economic Growth (45.6%) and Financial Literacy (40.1%) indicate significant historical research, remaining relevant but spanning longer periods. Nigeria (38.2%) indicates research concerning Nigeria, while Business Performance has the lowest percentage (19.3%), suggesting established findings with less recent focus. Overall, the chart underscores a shift toward financial empowerment and female entrepreneurship in Nigeria, aligning with global goals of gender equality, financial inclusion, and economic development.

Included Studies Characteristics

Table 2: Characteristics of included contemporary studies

Sn	Authors	Title	Method	Gap	Publisher	Journal
1	Fowowe, A. S., Anifowose, O. L., Akindare, S., & Adedeji, O. A. (2022).	Impact of microfinance banks on business expansion capacity and performance of women food vendors in FUTA environment.	Descriptive and inferential survey design.	Does not address the role of financial literacy in overcoming female entrepreneurs' challenges in Nigeria (lack of collateral, high loan interest rates, and business registration)	KIJHUS	*KIU Interdisciplinary Journal of Humanities and Social Sciences*, *3*(1), 303-324.
2	Adeola, A. N., Gambiyo, S. P., Alhaji, S. S., & Baraya, N. B. (2024).	Examining the socio-cultural factors influencing female-owned enterprises in Yola North of Adamawa	Mixed methods approach survey design and analyze through	Does not consider the role of financial literacy empowerment in facilitating	Department of Management Science Nigeria Police Academy, Wudil-Kano	*POLAC Management Review*, *4*(2), 49-57

Sn	Authors	Title	Method	Gap	Publisher	Journal
		State.	Binary Logistic Regression.	entrepreneurial success		
3	Smith-Hunter, A., Robeson, D., Hunter, G. (2023).	Women Entrepreneurs in African Countries. In: Carter, S.D. (eds) COVID-19, Supply Chain, Climate Change, and Sustainable Development in Africa.	The study employs a cross-sectional research design and includes both descriptive and inferential statistics, and regression analysis. Including Nigeria	Does not delve into the specific factors that empower these women entrepreneurs, such as financial literacy	Springer	CBIAC 2022. Springer Proceedings in Business and Economics. 115-134. Springer, Cham.
4	Salami, A., & Aghaunor, C. T. (2024)	Women leadership, financial literacy and performance of small and medium scale enterprises in Nigeria.	Cross-sectional and survey research designs and used Structural	A notable gap in understanding how financial literacy specifically affects female-owned SMEs in	WJARR	World Journal of Advanced Research and Reviews, 22(02), 2239–2253.

Sn	Authors	Title	Method	Gap	Publisher	Journal
			Equation Model (SEM)	Nigeria.		
5	Baporikar, N., & Akino, S. (2020).	Financial literacy imperative for the success of women's entrepreneurship	Qualitative survey design approach with thematic coding analysis in Nigeria.	Does not specifically address the impact of financial literacy on female entrepreneurship in Nigeria	IJIDE	International Journal of Innovation in the Digital Economy (IJIDE), 11(3), 1-21.
6	Ehigie, M. E., & Izedonmi, F. I. O. (2020).	Women entrepreneurs in small and medium scale enterprises in Nigeria: Assessing the role of government.	Exploratory survey design and analysis using descriptive and multiple regression.	This does not address the critical role of financial literacy in empowering women entrepreneurs	LIJAD	Lapai International Journal of Administration (LIJAD), 3(3), 259-273.

Table 2 summarizes six studies (2019–2024) on female entrepreneurship and financial literacy in Nigeria, covering business performance, socio-cultural influences, policies, and leadership. Baporikar and Akino (2020) highlighted financial literacy's role in entrepreneurial success but lacked a Nigeria-specific focus. Ehigie and Izedonmi (2020) examined government policies supporting women-led SMEs but did not address financial literacy's role in leveraging these policies. Fowowe et al. (2022) studied microfinance's impact on women food vendors in Akure, identifying barriers like high interest rates and lack of collateral but overlooking financial literacy's role in overcoming these challenges. Addressing these gaps could provide deeper insights into Nigerian female entrepreneurs' needs.

Smith-Hunter et al. (2023) provided a broader perspective on African female entrepreneurs during crises like COVID-19, employing cross-sectional research (Arowolo & Ekum, 2016; Wang & Cheng, 2020). Although it explored women's contributions to economic resilience, it lacked a focus on financial literacy's role in sustaining female-owned businesses. Adeola et al. (2024) analyzed socio-cultural barriers affecting female-owned businesses in Adamawa State using a mixed-methods approach. Despite their insights into societal norms and support systems, they omitted financial literacy's potential to enhance women's ability to manage finances and make informed decisions. Salami and Aghaunor (2024) investigated the relationship between women's leadership, financial literacy, and SME performance in Nigeria. Using structural equation modeling, they identified financial literacy as a critical factor but did not delve into how it specifically affects female-owned SMEs, underscoring the need for targeted research.

Synthesis of Findings

The reviewed studies provide mixed evidence on the role of financial literacy in female entrepreneurship. While some research suggests that financial literacy contributes to business survival, profitability, and expansion by enhancing skills in budgeting, financial planning, credit management, and investment, the direct relationship between financial literacy and entrepreneurial success remains insufficiently explored in the selected studies. Although tailored financial literacy programs that address cultural and socio-economic barriers are often recommended in broader

financial inclusion literature, few of the reviewed studies explicitly examine their impact on female entrepreneurship in Nigeria.

Several gaps in the literature highlight the need for further research. Most studies adopt a cross-sectional design, providing only a snapshot of financial literacy's potential influence without tracking its long-term effects on business sustainability. Additionally, much of the existing research focuses on urban settings, leaving rural female entrepreneurs underrepresented despite their distinct financial and economic challenges. There is also a sectoral bias, with most studies concentrating on small-scale retail and service industries, while sectors such as agriculture and technology remain largely unexamined.

Another key limitation is the tendency to treat female entrepreneurs as a homogeneous group, overlooking important intersectional factors such as age, education level, and marital status, which could shape financial literacy's effectiveness. This oversight limits the applicability of existing findings to diverse groups of women entrepreneurs. Given these inconsistencies and gaps, future research should adopt longitudinal methodologies, extend coverage to rural and underserved regions, explore a broader range of economic sectors, and incorporate an intersectional lens. Addressing these limitations will provide a clearer understanding of financial literacy's role in female entrepreneurship and inform more targeted policy interventions.

Conclusion

This scoping review underscores the importance of financial literacy in empowering female entrepreneurs in Nigeria, yet it also reveals inconsistencies in the existing literature that require further exploration. While several studies highlight the role of financial literacy in enhancing business performance, improving access to finance, and fostering resilience against socio-cultural barriers, contradictions within the findings suggest that its impact is not consistently examined across all studies.

A key issue identified in this review is the contradiction in findings regarding financial literacy's role as an enabler of female entrepreneurship. For instance, Salami and Aghaunor (2024) argue that financial literacy significantly enhances SME performance by helping women manage financial resources, make informed decisions, and navigate financial challenges. Similarly, Fowowe *et al.* (2022) demonstrate its importance in

fostering business expansion for women in challenging environments such as Akure. However, Adeola *et al*. (2024) focus primarily on socio-cultural barriers, without explicitly addressing financial literacy's role in mitigating these challenges. This inconsistency raises concerns about whether financial literacy is universally acknowledged as a critical factor in female entrepreneurship or if its impact varies depending on other contextual elements.

In addition to contradictions in findings, the review also identifies methodological gaps that could affect the study's comprehensiveness. Notably, while the review states that "Nigeria" was included as a keyword in the search strategy, Table 1 does not reflect this inclusion. This omission raises concerns about the transparency and accuracy of the methodology, as it suggests that some relevant studies may have been overlooked. Furthermore, the timeframe of 2019–2024 for the selected studies is not explicitly justified, leaving readers uncertain about the rationale behind the scope of the review. Providing a clear explanation, such as linking this period to recent policy changes or economic trends affecting female entrepreneurship, would have strengthened the study's methodological rigor.

Another limitation of this review is the absence of stakeholder consultation. Although not a mandatory step in scoping reviews, consulting key stakeholders, such as policymakers, financial institutions, and female entrepreneurs, could have provided practical perspectives that validate the findings. Their insights would have been particularly valuable in understanding the real-world applicability of financial literacy programs and ensuring that the conclusions drawn from the literature align with the actual experiences of female entrepreneurs in Nigeria. Future research should incorporate stakeholder perspectives to enhance the relevance and impact of financial literacy interventions.

To address the identified gaps and contradictions, future studies should focus on several key areas. Longitudinal research would be beneficial in examining the long-term effects of financial literacy on female entrepreneurship, offering a deeper understanding of its sustained impact over time. Additionally, region-specific studies are needed to account for Nigeria's diverse socio-cultural contexts, as the challenges and benefits of financial literacy may differ across regions. Further research should also assess how financial literacy programs are integrated into national entrepreneurship policies, ensuring that they are effectively designed and

implemented. Financial institutions should develop tailored financial products that cater to the needs of financially literate female entrepreneurs, improving their access to credit and other financial resources.

Despite the methodological challenges and inconsistencies identified, this review reaffirms the significance of financial literacy in promoting female entrepreneurship in Nigeria. Addressing the contradictions in findings, refining research methodologies, and incorporating stakeholder perspectives, future research can provide more robust evidence to guide policy and intervention efforts. Ultimately, empowering women with financial knowledge is not just beneficial for their businesses but is also crucial for driving economic growth, fostering innovation, and enhancing Nigeria's overall entrepreneurial ecosystem.

In this study, stakeholder consultation was initially considered, but not conducted due to time constraints and resource limitations. Recognizing the value of stakeholder engagement, future iterations of this research will incorporate a structured consultation process. This may involve focus group discussions with female entrepreneurs to validate the literature-based findings, interviews with policymakers to discuss policy implications, and collaboration with financial institutions to explore the practical feasibility of proposed interventions. Incorporating stakeholder consultation in subsequent research phases, the scoping review would not only map existing knowledge but also contextualize it within the lived realities of Nigerian female entrepreneurs.

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ORIGINAL SCIENTIFIC PAPER

Fostering Entrepreneurial Spirit: Impact of Incubation Activities on Female Students' Entrepreneurial Intention

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A B S T R A C T

Women around the world continue to inspire in various professions and careers. Women's entrepreneurship is one such sphere that is rapidly expanding around the globe. With women's entrepreneurial activity reaching levels comparable to men and showing higher engagement at an early age—the entrepreneurial intentions of female students are a crucial area of research. The objective of this study is to ascertain the impact of entrepreneurial incubation on the entrepreneurial intention of female students in selected higher education institutions. The well-being of female students is important not only to their personal development and success but also to the collective success and reputation of an educational institution. The study employs a descriptive research design and a stratified random sampling technique. The sample includes 250 female students from five NAAC and NIRF accredited colleges in the state of Tamil Nadu, and the data collected are analyzed statistically based on various tools like exploratory factor analysis, multiple correlation, regression analysis, and SEM. Results from the research recommends that entrepreneurial incubation activities need to be cultivated in every educational institution to nurture entrepreneurial intention among female students. This study attempts to establish the correspondence

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between various incubation activities and entrepreneurial intentions of female students in multiple institutions of higher education in Tamil Nadu.

KEYWORDS: *women entrepreneurship, incubation activities, entrepreneurial intention, higher education, gender-sensitive frameworks*

Introduction

Entrepreneurship has emerged as a powerful driver of economic development, innovation, and social inclusion, especially in developing countries like India. Entrepreneurship in India is experiencing significant growth every year. According to the Global Entrepreneurship Monitor report (GEM 2022-23), India's NECI ranking has improved dramatically, from 16th in 2021 to 4th in 2022 and then to 2nd in 2023. The report also confirms higher entrepreneurial engagement at an early stage (18-34) compared to other individuals. It is a platform for achieving self-employment, creating jobs, and realizing untapped potential. However, as much as it has the potential to bring about change, entrepreneurship is underutilized by women, even among college students. Women, who constitute about half of India's population, still suffer from systemic constraints such as limited access to resources, socio-cultural biases, and lack of mentorship that stifle their entrepreneurial spirit. They are also hampered by conventional teaching methods that do not meet the specific needs and challenges of women. Universities have also launched entrepreneurship education programs in recent years to improve students' innovation and business skills. However, these programs rely primarily on traditional pedagogies such as theory-driven classroom training and generic business plan competitions that do not provide the hands-on experience needed to instill confidence, risk-taking, and innovation in female students.

The lack of gender-specific incubation models, such as tailored mentors, networking spaces for female role models, and access to seed capital, also means that the gap between entrepreneurial intentions and actions persists. Incubation activities such as start-up boot camps, mentorship workshops, collaborative workshops, and exposure to industry networks can potentially bridge this gap by creating an enabling environment for women entrepreneurs. These activities not only equip them with skills and knowledge, but also with confidence and resilience that help them overcome institutional and societal constraints. However, the implementation of such activities at universities remains fragmented and

inconsistent. Most programs also work in isolation, are not geared towards intensive interaction, or do not provide psychosocial support to address gender-specific challenges such as social norms or fear of failure.

Furthermore, personal contact in the implementation of incubation activities discourages women from rural or economically marginalized regions from reaching out and participating. The lack of empirical data on how incubation activities specifically affect female students' entrepreneurial intentions, self-efficacy, and business creation poses an even greater challenge to the development of an effective intervention. This research gap necessitates conducting an in-depth study to investigate how systematic incubation activities affect female students' entrepreneurial intentions. By identifying gaps in existing practices and emphasizing the intersection of socio-cultural dynamics and institutional support, this study aims to provide experiential insights into building equitable, gender-sensitive entrepreneurial ecosystems. In this regard, the current study seeks to explore the contribution of incubation activities in influencing the entrepreneurial intentions of female students at specific higher education institutions. It aims to investigate how the experiences of mentorship, skill acquisition, peer network, and access to resources through incubation programs influence their entrepreneurial motivation, perceived competence, and engagement in entrepreneurial activities. By examining the antecedents of entrepreneurial intention, which include entrepreneurial ability, entrepreneurial attitude, pre-startup behavior, perceived feasibility, and entrepreneurial obstacles, this study aims to contribute to more knowledge about women's entrepreneurship.

Review of Literature

In their study, Xanthopoulou and Sahinidis (2024) investigated the determinants of university students' entrepreneurial intention using a mixture of bibliometric analysis and systematic literature review. A detailed analysis of 802 documents was conducted, which were reduced to 677 studies showing the growing focus on the topic over the last decade. In the study, determinants are systematically categorized into four broad groups: contextual factors, motivational factors, and personal background factors. By overlapping quantitative findings based on bibliometric analysis and qualitative content analysis of the literature review, the study provides a comprehensive picture of the current research landscape. The findings

summarize salient trends and gaps in literature and provide valuable insights for policymakers and educators seeking to promote entrepreneurial behavior in students. This integration not only contributes to scientific understanding but also offers pragmatic advice for promoting entrepreneurship through contextualized interventions that can be adapted to individual circumstances.

Padmaja and Madhooha (2023) in their study have discussed the promotion of entrepreneurship in Indian higher education and highlighted strategies, outcomes, challenges, and opportunities. It emphasizes the importance of entrepreneurship education, including the integration of entrepreneurial curricula, extracurricular activities, and industry engagement to equip students with the necessary skills and resources. The results of the study show that these interventions have a positive impact on graduate entrepreneurial intentions and behavior, with a focus on improved funding opportunities that facilitate student business creation. However, problems such as resource scarcity, lack of knowledge, and insufficient cooperation between the various stakeholders, such as universities, industry, and government, are also discussed. Her study concludes with suggestions for improving entrepreneurship education and fostering a conducive environment for potential entrepreneurs in Indian higher education.

Bhandari et al. (2024) demonstrated that psychological capital directly influences entrepreneurial spirit in women, suggesting that confidence-building measures are as vital as technical competencies. Bandura's (1986) Social Cognitive Theory highlights the role of self-efficacy, observational learning, and social reinforcement in shaping individual behaviors and intentions. In the context of entrepreneurial development, incubation activities serve as critical environments where female students can observe successful entrepreneurial models, receive mentorship, and build confidence in their capabilities. Manjaly et al. (2022) discuss how self-assessment tools can help female students recognize their entrepreneurial potential, aligning with the Theory of Planned Behavior's focus on perceived behavioral control.In their study, Imran Anwar et al. (2020) investigated the determinants of entrepreneurial intention (EI) in Indian female university students, using the Theory of Planned Behaviour (TPB) as a theoretical framework. The study examines the functions of cognitive factors such as attitude towards entrepreneurship (ATE), subjective norms (SN), and perceived behavioral control (PBC) and tests the moderator role of entrepreneurial education (EE). The results of data from 387 students from

three universities indicate that ATE, SN, and PBC have significant effects on EI and that EE supports these associations. The study confirms the substantial contribution of EE to entrepreneurial intentions and the need for specific educational interventions to empower female students in entrepreneurship. The findings of the study can help policymakers and educators interested in increasing women's participation in entrepreneurship and thereby promoting overall economic growth in India.

In their study, Wardana et al. (2020) investigated how entrepreneurial education affects students' entrepreneurial attitudes, with entrepreneurial self-efficacy and attitude playing a mediating role. The study applies structural equation modeling (SEM) and confirmatory factor analysis to examine data from 376 students from different universities in Malang, East Java, Indonesia. The result shows that entrepreneurial education has a positive impact on entrepreneurial self-efficacy and entrepreneurial attitude and ultimately on entrepreneurial mindset. In particular, the study confirms that although self-efficacy successfully mediates between education and attitude, it is not sufficient on its own to promote an entrepreneurial mindset. The findings add to the literature in that they clearly emphasize the role of a conducive learning environment in the development of students' entrepreneurial competence and thus in the development of curricula that enable innovative thinking and business creation. Fayolle and Gailly (2015) demonstrated that entrepreneurship education exerts a hysteresis effect, meaning that its influence on entrepreneurial attitudes and intentions persists over time. In the context of female students, incubation activities embedded within educational institutions can therefore have a lasting impact, strengthening entrepreneurial intention and fostering an entrepreneurial mindset even after the incubation program ends.

Wilson, Kickul, and Marlino (2007) demonstrated that entrepreneurial self-efficacy significantly mediates the relationship between gender and entrepreneurial career intentions, emphasizing the need for targeted educational interventions to enhance women's confidence in entrepreneurial capabilities. According to Maes et al. (2015) gender differences significantly influence entrepreneurial intentions among university students, with societal norms and self-efficacy playing crucial roles Gupta and Turban (2009) examine the influence of gender stereotypes on the entrepreneurial ecosystem, the barriers that women entrepreneurs face due to societal perceptions, structural biases, and limited access to resources are

highlighted in the study. It emphasizes the need for gender-equitable policies to promote an equitable entrepreneurial environment.

Marlow and McAdam (2015) examine business incubators as gendered spaces and their impact on women-led startups. The study argues that incubators, although designed to promote entrepreneurship, often reinforce gender biases and limit opportunities for women entrepreneurs. The findings highlight the need for gender-sensitive incubation models to promote inclusivity in entrepreneurial ecosystems.

Brush, Greene, and Welter (2009) emphasize that entrepreneurial ecosystems must be sensitive to gendered experiences to effectively support women entrepreneurs. Their gender-aware framework suggests that incubation programs should not only provide access to resources but also address societal and institutional barriers that women face. In the context of higher education, designing incubation activities that are aligned with these principles can significantly enhance the entrepreneurial intention of female students.

Shinnar, Giacomin, and Janssen (2012) emphasize that gender and cultural factors significantly shape entrepreneurial perceptions and intentions. Their findings highlight the need for incubation activities that consciously address cultural stereotypes and enhance self-efficacy among female students. By creating supportive and inclusive entrepreneurial environments, incubators can help mitigate gender-based barriers and foster stronger entrepreneurial intention among women.

Bøllingtoft and Ulhøi (2005) conceptualize business incubators as dynamic, networked environments that foster entrepreneurial agency through social capital, collaboration, and shared learning. For female students, incubators structured around such networked models can provide critical peer support, access to mentors, and real-world entrepreneurial ecosystems. The study by Musthaq and Jegadeeshwaran (2023) emphasizes the critical role of *knowledge management practices* in enhancing *job performance* within higher education institutions. Drawing parallels, effective knowledge-sharing environments, much like those studied in Coimbatore's educational institutions, are essential in entrepreneurial incubation settings as well.

Shabnaz and Islam (2021) in their study investigated the entrepreneurial intentions of university students in Bangladesh based on their entrepreneurial intentions and constraints. The data was collected through a coded questionnaire completed by 398 students majoring in

business. The study utilized statistical data analysis techniques such as exploratory factor analysis and regression analysis using SPSS software. The result of the present study shows that there are six main drivers of entrepreneurial intention and that independence and the motive of independence are the strongest drivers. Financial constraints and availability of supportive resources were also found to be important inhibiting factors for students' entrepreneurial intentions. The study highlights the need for practice-oriented entrepreneurship education and supportive policies to overcome perceived barriers and strengthen students' entrepreneurial intentions.

Rahman et al (2022) in their study identify factors influencing entrepreneurial intentions among female undergraduate students in Bangladesh, using structural equation modeling. They compare cross-cultural factors affecting female entrepreneurial intentions, highlighting similarities and differences between Indian and Bangladeshi contexts.

Paunovic and Musial (2024) explore gender differences in entrepreneurial intention, reasoning, self-efficacy, and education preferences, using the Entrepreneurial Event Theory framework as a complementary perspective to the Theory of Planned Behavior, focusing on perceived desirability and feasibility.

Statement of the Problem

Entrepreneurship as a catalyst for economic development and individual empowerment is a potential area for women in India, especially students aspiring to pursue higher education. Despite pro-women policies and external pressure to achieve gender equality, women are still disadvantaged by institutional constraints such as limited access to assets, socio-cultural biases, and a lack of mentorship that discourage them from becoming entrepreneurs. Even when schools have introduced entrepreneurship education programs, these are usually based on traditional pedagogical approaches that do not address the specific needs of women. Traditional pedagogies such as theoretical classroom lectures and generic business plan competitions do not provide the hands-on, experiential learning needed to foster confidence, risk-taking, and innovation in female students. The lack of gender-specific start-up models, including tailored mentors, female network role models, and access to seed capital, also plays a role in creating a gap between women's intentions and actions. This study

attempts to examine the impact of institutional start-up activities on the entrepreneurial intentions of female students at selected universities. It seeks to determine whether access to mentors, skill learning, a network of peers, and the provision of resources through incubation influences their motivation, self-efficacy, and commitment to pursuing entrepreneurial ventures. This study will develop an understanding of how to foster equitable, gender-sensitive entrepreneurial ecosystems by identifying gaps in current practice and illuminating the relationship between institutional support and sociocultural forces. The findings will advise policymakers and universities on how to re-conceptualize incubation models that enable female students to overcome barriers and contribute meaningfully to India's entrepreneurial ecosystem.

Objectives of the Study

1. To find out the impact of Incubation Activities on Female students' Entrepreneurial Intention in select colleges.
2. To suggest a model for Incubation activities for colleges.

Hypotheses of the Study

H_{01} There is no significant relationship between Incubation Activities on Female students' Entrepreneurial Intention

H_{02} There is no significant impact of Incubation Activities on the Entrepreneurial Intention of Female students.

Methodology of the Study

The present study is descriptive in nature. Both primary data and secondary data were used. The primary data was collected through structured questionnaires from female students at the respective selected colleges through the Internet, while the secondary data was collected from various research journals, college websites, project reports, books, and dissertations. A structured questionnaire was developed containing demographic items and 28 questions on a Likert scale to measure five key constructs. The questionnaire underwent rigorous validation, including expert review for content validity, a pilot test (Cronbach's α = 0.82-0.89),

and exploratory factor analysis (KMO = 0.87, Bartlett's test $p<0.001$) to confirm reliability and construct validity. Data collection was via online informed consent surveys, while analysis utilized SPSS for descriptive/correlational analyses and AMOS for SEM, with fit indices (CFI = 0.971, RMSEA = 0.032) meeting established thresholds. These methodological refinements strengthen the rigor and replicability of the study.

Five NAAC and NIRF-rated Arts and Science colleges in Coimbatore district were selected for the study. Stratified random sampling was used for data collection from the selected colleges. 50 students from five (5) colleges constitute the total sample of 250. Accordingly, the collected data were analyzed using various statistical methods such as multiple correlation, regression analysis, exploratory factor analysis, and structural equation modeling.

Data Analysis and Interpretation

A. Exploratory Factor Analysis

Table 1: Factors of Incubation Activities

Factor and Variance Explained	Components	Rotated Factor Loadings
Entrepreneurial Capacity	I am resourceful enough to be an entrepreneur	.832
	I have the capacity to become an entrepreneur	.730
	I have a part-time/internship experience	.736
	I have social and leadership skills required for entrepreneurship	.806
	Starting a firm and sustaining it would be easy for me	.636
	I have the knowledge to develop an entrepreneurial project	.873
Entrepreneurial Attitude	Trust in self to be an honest and reliable entrepreneur	.638
	High energy level that can be maintained over a long time	.540
	Good understanding of managing the business aspects	.809
	Adequate abilities and skills to be an entrepreneur	.769

Factor and Variance Explained	Components	Rotated Factor Loadings
	Great deal of pride when completing a project successfully	.551
Pre-incubation activities	Entrepreneurship course in the syllabus	.637
	Technology and research resources (library & internet) available in the institution	.720
	Journals regarding entrepreneurship available in the institution	.852
	Entrepreneurship seminars are conducted regularly	.743
	Workshop on entrepreneurship are conducted	.807
	Availability of Entrepreneurship Development Cell	.792
Perceived Feasibility	Entrepreneurship Seminar /counselling / workshops are conducted periodically	.750
	Fundraising suggestions are needed to fulfill an entrepreneurial dream	.522
	Local Incubator Support encourages understanding the entrepreneurship ecosystem	.722
	Moral support for Start-up by institutions is essential to start own firm	.445
	Redefined business model, as well as the idea, will enhance the confidence level	.598
	Incubation and acceleration program will give confidence to start own firm	.644
Entrepreneurial Barriers	Lack of in-depth knowledge in starting a firm	.700
	Unavailability of funds to start a firm	.703
	Not knowing the strategy to convert my innovative ideas into business process	.556
	Less support from the family to be an entrepreneur	.814
	Fear of failures	.596

Source: primary data

Table 1 shows the results of the factor extraction. Using principal component analysis, 28 statements were loaded to identify 5 factors. The factors were given names based on the agreement with the statements. The first factor identified is 'entrepreneurial capacity', the second factor is 'entrepreneurial attitude', the third factor is 'pre-startup activities', the fourth factor is 'perceived feasibility' and the fifth factor is 'entrepreneurial obstacles'.

B. Correlation Analysis

Relationship between Incubation Activities and Entrepreneurial Intention of the Female Students

H_{01} There is no significant relationship between Incubation activities on the Entrepreneurial Intention of Female students

Table 2: Coefficients of Correlation between Incubation Activities and Entrepreneurial Intention of the Female Students

S.No	Incubation Activities	Pearson Correlation	P Value
1	Entrepreneurial Capacity	0.856	0.007
2	Entrepreneurial Attitude	0.631	0.000
3	Pre Incubation Activities in Institutions	0.693	0.029
4	Perceived Feasibility	0.506	0.011
5	Entrepreneurial Barriers	0.750	0.014

Note: Significant at 5 % level

Source: Primary Data

The table above shows the relationship between the independent variable - Incubation activities and the dependent variable - Entrepreneurial intention of female students. The strongest relationship is between entrepreneurial capacity (0.856) perceived feasibility (0.506) and entrepreneurial intention of female students. The results are significant at a 5% level of significance. Therefore, the null hypothesis is rejected and there is a significant relationship between the factors of start-up activities and entrepreneurial intention.

C. Regression Analysis

Impact of Incubation Activities on Entrepreneurial Intention of the Female Students'

H_{01} There are no significant impact of Incubation Activities on Entrepreneurial Intention.

Table 3: Impact of Incubation Activities on Entrepreneurial Intention of the Female Students

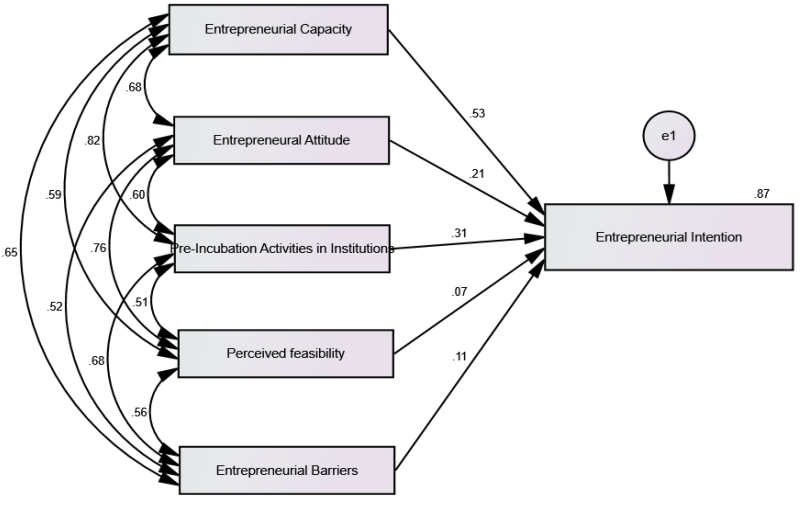
Model	R^2	Adjusted R^2	Sig.
Incubation Activities on the Female Students' Entrepreneurial Intention	.809	.803	.000[b]

Predictors: Entrepreneurial Capacity, Entrepreneurial Attitude, Perceived Feasibility, Entrepreneurial Barriers, Pre-Incubation Activities
Dependent variable: Entrepreneurial Intention
Source: Primary Data

Table 3 shows the result of the regression analysis. The entrepreneurial intention of female students is considered as the dependent variable and the start-up activities in some higher educational institutions are considered as predictors. The result shows that each change in the selected predictors leads to an 80.9% change in the dependent variable, i.e. the entrepreneurial intention of female students in some higher educational institutions. The significance level is 5%, which reflects the significance of the regression effect.

D. Structural Equation Modeling

Effect of Incubation Activities on Female Students' Entrepreneurial Intention



Final SEM Model of Incubation Activities on Female Students' Entrepreneurial Intention

Table 4: Results of Goodness of Fit

Indices	X^2/df	P	GFI	AGFI	NFI	TLI	CFI	RMSEA	RMR
Fit Value	1.241	.411	.911	.914	.921	.954	.971	.032	.041
Recomm. Value	<3.0	>0.05	>0.90	>0.90	>0.90	>0.90	>0.95	<0.05	<0.05

Source: Primary Data

Table 4 shows the values for the goodness of fit indices. The X^2/df values are 1.241, the P-value is 0.411, the GFI is 0.911, the AGFI is 0.914, the NFI is 921, the TLI is 0.954, the CFI is 971, the RMSEA is 0.032 and the RMR is 0.041. All these values are well within the acceptable limits and thus prove that the results are acceptable for the validity of the specified model. This confirms that the data set adequately fits the proposed structural model of incubation activities on entrepreneurial intention.

Table 5: Regression Weights

DIM	INF	DIM	SE	UE	S.E.	C.R.	P
Entrepreneurial Intention	←	Entrepreneurial Capacity	.531	0.014	0.030	0.641	0.005
Entrepreneurial Intention	←	Entrepreneurial Attitude	.210	1.558	0.044	32.371	0.036
Entrepreneurial Intention	←	Pre Incubation Activities in Institutions	.311	0.032	0.031	1.013	***
Entrepreneurial Intention	←	Perceived Feasibility	.078	0.172	0.040	5.380	***
Entrepreneurial Intention	←	Entrepreneurial Barriers	.117	0.057	0.031	2.261	0.004

*** Significant at 0.05percent Level
UE – Unstandardized Estimate
SE – Standardized Estimate
S.E – Standard Error
C.R – Critical Ratio
P – Probability Value
DIM – Dimensions
INF – Influence

Source: Primary Data

Standardized estimation is used for regression weights to determine the influence of the independent variable on the dependent variable. In this context, all five variables were found to positively influence entrepreneurial intention. It is described as:

1. If entrepreneurial capacity increases by one percent in a positive direction, then entrepreneurial intention may also increase by 0.531.
2. If entrepreneurial attitude has increased by one percent in a positive direction, then entrepreneurial intention has increased by 0.210.
3. If pre-incubation activities in institutions increased by one percent in a positive direction, then entrepreneurial intention increased by 0.311.
4. If perceived feasibility has increased by one percent in the positive direction, then entrepreneurial intention has obviously increased by 0.078.
5. If the awareness on entrepreneurial barriers has increased by one percent in a positive direction, then the entrepreneurial intention has increased by 0.117.

Table 6: Squared Multiple Correlation

Dimensions	Estimate
Entrepreneurial Intention	0.871

Source: Primary Data

All the variables of Incubation Activities including entrepreneurial capacity, entrepreneurial attitude, perceived feasibility, entrepreneurial barriers, and Pre-incubation activities in institutions, account for an 87 percent variance in Entrepreneurial Intention.

Findings and Suggestions for the Study

The results of the study show that entrepreneurial capacity is the most significant predictor of entrepreneurial intention ($\beta = 0.531$), as Wardana et al. (2020) and Anwar et al. (2020), who discovered self-efficacy and perceived behavioral control as important factors in the Theory of Planned Behavior (TPB). Yet, this research builds on existing work by breaking

down ability into precise, concrete components such as leadership skills and resourcefulness that are even more applicable in gendered entrepreneurial environments (Brush et al., 2018). Similarly, the positive location of pre-incubation activities ($\beta = 0.311$) supports Padmaja and Madhooha's (2023) study on institutional support and differs from Shabnaz and Islam's (2021) case from Bangladesh, where issues of access dominated. This dichotomy underscores the influence of regional differences on entrepreneurial ecosystems. The low correlation of perceived feasibility ($r = 0.506$) compared to Ajzen's (1991) TPB model is perhaps indicative of systemic failures among Indian women, such as limited access to capital (Kelley et al., 2017) and further emphasizes the need for targeted interventions.

The focus of this research on experiential learning through internships and on-the-job training meets Nabi et al.'s (2017) objection to overly theoretical curricula on the head. While the geographical limitation to Coimbatore adds depth, it also echoes Xanthopoulou and Sahinidis' (2024) plea for a broader regional study. By placing these findings in the context of current debates, such as between individual capabilities (Liñán & Fayolle, 2015) and structural barriers (Marlow & McAdam, 2013), the study not only justifies its findings, but also makes a dual contribution to the literature: (1) measuring the extent to which start-up-specific variables bridge the gap between intention and action among women, and (2) calling for tailored mentoring models, a key gap highlighted by Henry et al. (2016).

Practical Implications

To put these findings into practice, the research sets out a multi-dimensional strategy for higher education institutions. First, they should emphasize entrepreneurial skills by developing problem-solving and leadership capacities through experiential learning - e.g. through start-up competitions and mini-incubators. Second, develop an entrepreneurial mindset by providing resilience workshops and exposure to female role models to overcome psychological barriers such as fear of failure. Third, reinforce pre-incubation activities by integrating entrepreneurship into core curricula and establishing Entrepreneurship Development Cells (EDCs) for continuous mentoring. Fourth, increase perceived feasibility through visible success stories (e.g. alumni networks) and pitch competitions with seed funding. Finally, overcome entrepreneurial barriers through financial literacy workshops, micro-loans and family support programs to dispel socio-cultural myths.

Together, these activities can create a space that supports women to move from intention to action, addressing systemic gaps and sparking economic and social innovation. Future longitudinal studies will assess the long-term impact of such interventions with continued refinement and measurable outcomes.

Conclusion

This study is based on the idea of promoting entrepreneurship; a study on how incubation activities influence female students' entrepreneurial intentions. The result of the study shows that entrepreneurial capacity, entrepreneurial attitude, pre-incubation activities, perceived feasibility, and entrepreneurial barriers strongly influence female students' entrepreneurial intentions. By removing barriers in the system and implementing start-up activities on campus, higher education institutions can create a climate that helps female students take entrepreneurial initiatives. Incorporating structured startup activities in conjunction with technological innovations and policies can bridge the gap between intention and action in entrepreneurship. This in turn will lead to economic growth, social empowerment, and gender balance in India's entrepreneurial ecosystem. Further, the study concludes that it is important to emphasize the need for collaboration between educational institutions, policymakers, and business stakeholders. Through the entrepreneurial spirit of female students, India can leverage a huge untapped potential that can drive innovation and sustainable growth in the future.

Limitations of the Study and the Scope for Future Research

The study on the impact of incubation efforts on female students' entrepreneurship spirit has its own limitations and leaves room for further research. It is limited to only five arts and science colleges in the Coimbatore district and hence may not be representative of the entire diverse educational landscape of India. Future research can also expand the geographical scope to include institutions from other regions and types, such as technical and professional colleges, to achieve broader coverage. The study also relies on self-reporting through structured questionnaires, which may lead to response bias. Future research could use qualitative methods such as interviews or case studies to confirm the findings. The study also

focuses mainly on institutional factors and encourages for further research on socio-cultural and family factors that determine women's entrepreneurship.

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ORIGINAL SCIENTIFIC PAPER

Women's Economic Empowerment in Kazakhstan: Institutional Trust, Economic Participation, and Sociocultural Barriers

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A B S T R A C T

The paper explores institutional trust, women's participation in the economy and politics in both urban and rural areas of Kazakhstan, considering regional differences between these areas. The research is quantitative in its approach that combines both Latent Class Analysis (LCA), which explains latent attitudinal categories, with Change-Point Analysis to determine key turning points in Gender Inequality Index (GII) over a 16-year time series from 2008 to 2023. The study finds a high level of gender perspective disparity between urban and rural areas in Kazakhstan, in addition to essential changes in gender inequality levels. The results show that institutional trust plays a vital role in shaping women's participation in the economic sphere, with a lower level of trust correlated with a decrease in labor force involvement and career growth. In addition, two key

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turning points in gender development have also been identified in 2019 and 2022, which are linked with government reform as well as socioeconomic alterations.

KEYWORDS: *gender, women's empowerment, social attitudes, labor market, economic participation*

Introduction

Women's economic empowerment is essential for sustainable economic growth and social justice. Although there is formal recognition of gender equality, women still face serious institutional and socio-cultural barriers that limit their access to entrepreneurship, leadership positions, and high-paying jobs. Feminist economic theory emphasizes that the economic marginalization of women is caused by market conditions and institutional and cultural factors (Inglehart & Norris, 2003; Barker, 2005). In parallel, institutional trust theory posits that trust in public institutions significantly shapes individuals' economic engagement, including their likelihood to pursue entrepreneurial activities and career advancement (Weil & Putnam, 1994; Deininger & Goyal, 2024).

Empirical studies have shown that low trust in institutions significantly hinders women's access to financial resources and entrepreneurial networks, limiting their economic activity, particularly in developing economies. (Mengesha et al., 2017; Tangut, 2024). In Kazakhstan, like many other countries, this issue is exacerbated by a lack of transparency in government programs, limited access to career development opportunities for women, and a lack of sustainable mechanisms to promote women to managerial positions. (Kuzhabekova & Almukhambetova, 2019; Yousafzai et al., 2024). Additionally, traditional gender roles and patriarchal attitudes, particularly prevalent in rural areas of Kazakhstan, significantly restrict women's ability to develop entrepreneurship and increase their participation in the economy (Kireyeva et al., 2024).

The scientific novelty of this study lies in its integrated approach to analyzing gender inequality in Kazakhstan. Unlike most other studies, which focus on either the micro-level (sociocultural attitudes) or the macro-level (structural indicators), this paper combines both levels of analysis for the first time. In this paper, an assessment is carried out to identify hidden patterns concerning gender norms and women's involvement in economic activity using the latent class analysis (LCA) method. Based on the study of

the collected panel data for 2008-2023, the dynamics of gender equality are investigated, and the most significant periods of transformation are identified.

This work provides essential empirical data and a theoretical rationale for developing targeted measures to support women's entrepreneurship and increase women's economic participation in Kazakhstan. The study addresses two key issues: (1) how does the level of institutional trust affect women's economic and political participation in Kazakhstan? (2) What differences exist in the perception of women's gender roles and economic opportunities between urban and rural regions of the country? LCA and point-of-change analysis are used to answer these questions. The LCA method allows the grouping of respondents according to their views on gender roles, the level of institutional trust, and economic activity. Analyzing points of change helps identify structural shifts that affect women's entrepreneurial initiatives.

This paper is outlined as follows: the literature review synthesizes research on gender roles, institutional trust, and women's economic participation. The methodology outlines the use of Latent Class Analysis, change-point analysis, and data sources. The results section presents key findings on regional differences and temporal trends. Finally, the conclusion highlights the study's contributions and limitations, offering actionable policy recommendations to support women's economic empowerment.

Literature Review

Women's economic empowerment, including developing women's entrepreneurship, is vital in transforming traditional gender roles and increasing economic participation. However, the transformation of gender roles occurs unevenly in different countries, and the degree of women's involvement in the economy varies significantly depending on cultural traditions, legal norms, and public perception. For example, Nair (2023) found that women are more active in entrepreneurial activities in highly digitalized countries. Sugiyanto et al. (2024) emphasized that developing innovative behavior can expand women's access to economic opportunities.

In developed countries, women are increasingly taking leadership positions and starting businesses. In developing countries, patriarchal norms are more pronounced, making it more difficult for women to enter the formal labor market and engage in entrepreneurial activities (Iqbal et al.,

2023; Setyorini et al., 2024). Social attitudes significantly impact employment in countries with high levels of religiosity and tradition (Khoudja & Fleischman, 2015; Gjylbegaj & Radwan, 2025).

In Kazakhstan, traditional social attitudes often emphasize male authority within the household and community decision-making, hindering women's progression into leadership and high-status positions (Kenzheali et al., 2024). A prevalent belief is that a woman's primary duty lies in the family sphere, particularly in caregiving and homemaking roles, which leads to skepticism regarding women's suitability for political or executive positions (Davletbayeva & Semidotskikh, 2024). Stereotypes such as "men are natural leaders" and "women are emotionally less stable for management roles" persist in workplace and educational environments, influencing hiring decisions and access to promotions (Lawson et al., 2022). Moreover, retraditionalization and patriarchal narratives, emphasizing the roles of "woman-mother" and "keeper of traditions", continue to hinder women's equal participation in economic and political life. Despite their high educational potential, traditional norms and institutions in rural areas prevent women's equal access to education, employment and entrepreneurship (Meenakshi, et al., 2024). These attitudes contribute to occupational segregation and reinforce the gender gap in income and career advancement.

Structural barriers further compound these limitations. In rural areas, women are more likely to be employed in the informal sector, which undermines financial independence and restricts access to social protection, credit systems, and long-term career advancement (Mensah & Derera, 2023; Yoganandham & Vishnuram, 2024; Koehler, 2025). In 2022, Kazakhstani women earned approximately 74.8% of what men earned, down from 78.3% in 2021, reflecting a backslide in gender pay equity (Bureau of National Statistics, 2023). Although women in urban areas have better access to education and high-income jobs, gender-based income disparities persist nationwide (Lekha & Kumar, 2024; Mohammed et al., 2025).

While female entrepreneurship has expanded in Kazakhstan, as women comprise 64.6% of individual entrepreneurs, barriers to accessing profitable and high-growth sectors remain (Bureau of National Statistics, 2023). These include discriminatory hiring practices, limited access to professional networks, and insufficient institutional support (Agrawal, 2018; Yousafzai et al., 2024). Gender norms continue to shape decisions about resource allocation and leadership, and without sufficient institutional trust, even

highly qualified women may remain excluded from the formal labor market (Weil & Putnam, 1994; Rowley et al., 2010; Kuzhabekova & Almukhambetova, 2019). Moreover, it can be concluded that without sufficient institutional trust, even qualified women may continue to be excluded from the formal labor market.

International research shows that low institutional trust limits women's economic participation, career growth, and entrepreneurial activity (Oboro-Offerie & Busia, 2022; Karhina et al., 2019; Bhandari et al., 2024). This is often reinforced by cultural traditions and weak institutional frameworks (Badamas & Idris-Iyekolo, 2025). For example, Mengesha et al. (2017) found that migrant women in Australia face reduced access to economic resources when trust in institutions is low. Similarly, Liani et al. (2021) observed that weak trust in institutions in African countries decreases women's access to finance and reduces their economic activity.

In contrast, high trust in government and labor institutions encourages greater female participation in public life (Deininger & Goyal, 2024). Di Ruggiero (2025) shows that policies promoting women's inclusion can help strengthen institutional trust. Likewise, Świecka et al. (2025) found that social trust and awareness positively influence women's engagement in economic initiatives.

In Kazakhstan, institutional trust among women remains low and uneven. Despite the formal promotion of gender equality, women's representation in leadership and political roles is limited. A lack of transparency in government programs and weak support for female entrepreneurship reinforce inequality. These trends echo Tangut's (2024) findings that low trust in institutions discourages women from engaging in entrepreneurial activities. As of May 2025, women held only 28 out of 148 seats (18.9%) in the lower house of Parliament, the Mäjilis (Central Communications Service under the President of the Republic of Kazakhstan, 2025). This underrepresentation underscores the imperative of strengthening institutional processes to support women's leadership. However, recent data suggests a potential opportunity for institutional engagement. According to a 2024 survey conducted by the Kazakhstan Institute for Strategic Studies, women's trust in the President stood at 78.1%, compared to 74.5% among men (KazISS, 2025). This relatively high level of trust presents an opportunity to translate institutional confidence into enhanced economic participation.

In various countries, the increased women's participation in the economy has played a pivotal role in transforming traditional gender norms. In Turkey, the rise of female entrepreneurship has contributed to shifting perceptions about women's social functions (Kurtege Sefer, 2020). In India, policy initiatives that ensured women's access to financing and resources have helped alter gender expectations, particularly in rural regions (Chopra, 2024). These cases highlight how economic empowerment, when supported by institutional reforms, can drive deeper sociocultural change. Kazakhstan presents a similar yet distinct context, shaped by its own policy landscape and regional dynamics.

Women's economic participation empowers them and plays a critical role in challenging traditional gender roles. Research confirms that increasing the number of women in leadership positions reduces discrimination and fosters more inclusive institutions (Chinedu-Eze et al., 2024). The growth of women's entrepreneurship likewise challenges prevailing societal expectations and expands women's perceived economic roles (Đuričin & Beraha, 2024; Yousafzai et al., 2024).

These initiatives have yielded mixed outcomes. Women now comprise nearly 65% of sole proprietors and 46.9% of SME employees, indicating significant progress in entrepreneurship and formal employment (Bureau of National Statistics, 2023b). However, women remain underrepresented in high-income, male-dominated sectors, and the gender wage gap persists (Bureau of National Statistics, 2023a). Sociocultural norms, particularly in rural areas, continue to reinforce traditional roles. According to a 2023 UNDP survey, 67.9% of men and 53.6% of women still believe that a woman's primary role is to care for the family, while only around one-third of respondents are familiar with terms such as "gender equality" or "feminism" (UNDP, 2023).

Urban–rural disparities further shape this dynamic. In cities like Astana and Almaty, women's labor force participation exceeds 68%, supported by better access to education and professional networks. In contrast, rural regions such as Turkistan and Kyzylorda show rates closer to 58%, with many women engaged in informal or unpaid labor (Bureau of National Statistics, 2023c). Women in urban areas are more likely to assume leadership roles, while rural women remain largely excluded from business and political networks (Kireyeva et al., 2024).

A review of scientific papers reveals a strong link between gender norms, institutional trust, and women's economic activity. In countries with

high levels of institutional trust, women participate more actively in economic activities, while there are more significant barriers in traditional societies. In the case of Kazakhstan, however, many studies overlook regional differences and the role of institutional trust in shaping women's economic behavior. This creates a gap in understanding how gender norms evolve across urban and rural contexts, and how institutional settings may accelerate or hinder women's empowerment.

Research Methods

This study uses a quantitative method, emphasising LCA to identify hidden groups of respondents with common gender attitudes. The study covers residents of Kazakhstan's urban and rural areas and aims to identify barriers to women's access to quality employment. The prime rationale for conducting a complete examination is to produce thoughtful observations that can be efficiently utilised to formulate key strategies that will effectively broaden opportunities and improve accessibility towards quality employment for women in Kazakhstan.

The research is based on official statistical data from the Bureau of National Statistics of the Republic of Kazakhstan for 2008-2023, reflecting objective gender equality indicators. Using these data makes it possible to track the dynamics of structural changes in gender equality over the past 15 years. Data from the World Values Survey (WVS), which evaluates public attitudes on gender norms, social engagement, and trust in institutions, are analyzed. This dataset provides essential information about the perception of gender roles and the participation of women in various spheres of life at the time of the survey. This dual-source approach enables a comprehensive examination of gender inequality at structural (economic and political indicators) and attitudinal (individual beliefs) levels. However, due to the WVS's data collection timeline, some recent changes such as policy reforms and growing female leadership are not fully captured, limiting the data's applicability for current trend analysis.

The dataset comprises responses from 1,276 individuals, with 755 from urban and 521 from rural areas, collected during a survey from the WVS. The primary focus is identifying latent classes based on agreement levels with various statements about gender norms, access to education, employment equity, and organisational participation. Attitudes on gender roles (Q29, Q30, Q31, Q35), trust in women's organisations (Q80),

participation in women's groups (Q104), and perceptions of gender equality in politics (Q233) are analysed. These indicators help reveal latent attitudinal patterns influencing women's employment opportunities. Responses are measured using ordinal scales, such as Likert scales (ranging from 'Strongly disagree' to 'Strongly agree') or categorical scales (e.g., 'Not at all often' to 'Very often'), serving as key indicators in assessing attitudinal structures that shape access to quality employment for women.

The LCA framework assumes that a finite number of unobserved latent classes, k, generate the observed response patterns. The probability of observing a response pattern Yi for individual i, given latent class k, can be expressed as shown in formula (1):

$$\boldsymbol{P(Y_i) = \sum_{k=1}^{K} P(C_i = k) \prod_{j=1}^{J} P\left(Y_{ij} \mid C_i = k\right)} \qquad (1)$$

where:
K – the total number of latent classes
J – the number of observed variables
$\boldsymbol{C_i}$ – the latent class membership for individual *i*
$\boldsymbol{P\left(Y_{ij} \mid C_i = k\right)}$ – the conditional response probabilities given class membership.

Table 1 shows the distribution of respondents by region.

Table 1: Distribution of respondents by region

Region	Number of cases	Total %	Cumulative %
KZ-ALA Almaty city	135	10.6	10.6
KZ-AST Astana city	70	5.5	16.1
KZ-ALM Almaty	137	10.7	26.8
KZ-AKM Akmola	57	4.5	31.3
KZ-AKT Aktobe	59	4.6	35.9
KZ-ZAP West Kazakhstan	43	3.4	42.9
KZ-MAN Mangystau	44	3.4	46.3
KZ-YUZ Turkestan	114	8.9	54.9
KZ-PAV Pavlodar	62	4.9	59.8
KZ-KAR Karagandy	102	8.0	67.8
KZ-KUS Kostanay	68	5.3	73.1
KZ-KZY Kyzylorda	58	4.5	77.6

Region	Number of cases	Total %	Cumulative %
KZ-VOS East Kazakhstan	65	5.1	82.7
KZ-SHV Shymkent city	62	4.9	87.6
KZ-SEV North Kazakhstan	55	4.3	91.9
KZ-ZHA Zhambyl	74	5.8	100.0

Source: Authors' elaboration.

For this analysis, two latent classes were specified to capture divergent attitudinal groups:

1. Class 1 ("Moderates"): respondents exhibiting neutral or moderate agreement patterns, reflecting evolving or mixed views on traditional gender roles.
2. Class 2 ("Traditionalists"): respondents with conservative views who support traditional gender norms.

To assess the role of urban or rural residence, the grouping variable $URBRURAL$ was incorporated to examine its influence on latent class membership. This relationship was modelled using a multinomial logit model, as shown in formula (2):

$$\log\left(\frac{P(C_i=2)}{P(C_i=1)}\right) = \alpha + \gamma \cdot URBRURAL \qquad (2)$$

where α is the intercept and γ quantifies the effect of urban or rural residence on the likelihood of latent class membership. The models were estimated separately for urban and rural respondents using the generalized structural equation modelling (GSEM) framework in STATA. GSEM was selected over alternatives such as multinomial logit regression or hierarchical linear models because it can address latent classes of different types of responses (i.e., ordinal, categorical) and estimate associations between observed covariates and latent classes with consideration for measurement error. The choice ensures efficient capturing of interactions among gender norms, institutional trust, and regional differences, which is the research's main analysis point.

Residual variances ($\text{var}(\epsilon_{Qj})$) were evaluated to identify differences in attitudes between latent classes. Urban respondents from Class 1 showed less variability in Q30 (views on educational equality) than rural respondents, indicating more sustainable urban change. This methodology allows us to identify strategic directions for women's empowerment.

Moderators (Class 1) have progressive views, especially in cities where equality trends in education and leadership are increasing. Politicians should use this to increase women's participation in quality employment. “Traditionalists” (Class 2) adhere to traditional gender roles, especially in rural areas. Measures to reduce prejudice and support women's organizations are vital for them.

Table 2: Indicators for women's participation in various sectors

Indicator	**Period**
The gender inequality index	2008-2023
Seats in the mazhilis of the parliament, the ratio of women	2008-2023
The proportion of the economically active female population of working age	2008-2023
Share of women-police, in percentage	2008-2023
Share of women judges, in percentage	2008-2023
Share of women occupying leading positions in percent	2008-2023
The proportion of women in political posts, in percent	2008-2023
Number of women holding leadership positions in the government	2008-2023

Source: Authors' elaboration.

The methodology is in a sequence that is as follows:

(1) *Collection of data*. The study makes use of a longitudinal database that comprises the Gender Inequality Index (GII) as well as corresponding indicators that are relevant in terms of women in different sectors, as seen in Table 2.

The dataset ranges from 2008 through 2023, giving a complete picture of gender inequality over a 16-year timeframe.

2) *Change-Point Detection*. A change point is identified whenever a shift in signs in the slope is observed, hence a shift from decline towards stagnation or advancement. The approach focuses on magnitude changes to measure improvement and stagnation and on shift timings to associate these with corresponding socio-political and economic developments.

3) *Visualisation and Interpretation.* To explore potential correlations, these points are cross-referenced with macro-level trends in women's participation across political, economic, and security sectors. Specifically,

we examine the relationship between increased female representation in leadership (e.g., parliament, police, judiciary) and observed changes in the role of socio-political reforms and policy interventions in influencing these trends.

4) *Contextual Analysis*. The identified change points are analysed within Kazakhstan's broader policy and socio-economic context. This involves correlating the years of significant shifts (e.g., 2019 and 2022) with the introduction of gender-sensitive policies and reforms, Changes in leadership initiatives promoting women's participation, and Regional or sectoral advancements in female representation.

This methodology presents a balanced strategy for analysing drivers and obstacles that affect gender inequality trends in Kazakhstan by blending quantitative examination with context interpretation. The outcomes form a platform for developing evidence-based solutions to consolidate progress and address structural issues linked with gender inequality.

Results

The results obtained from LCA give a more refined interpretation of gender roles, women's faith in women's organisations, and gender activity participation in urban and rural areas, specifically about socio-cultural beliefs and perceptions about institutions. The obtained findings have essential relevance in guiding strategies towards enhancing women's accessibility to quality job opportunities across the entire nation, alongside the overall objectives of gender equality as well as socio-economic development.

The analysis identified two distinct latent classes across urban and rural respondents, representing divergent attitudinal profiles. Class 1 ("Moderates") includes individuals with more neutral or evolving views on traditional gender roles and moderate levels of institutional trust. In contrast, Class 2 ("Traditionalists") comprises respondents who strongly endorse conventional gender norms and highly trust women-specific institutions.

The complete list of survey questions and response options is available in Appendix Table 3.

Results indicate clear attitudinal divides between urban and rural respondents (Table 4). "Moderates" (Class 1) show weaker adherence to traditional gender roles, with lower β-values for statements on male political leadership (Q29: $\beta = 1.019$, $p<0.001$) and male priority in education (Q30: β

= 0.274, p = 0.005). Conversely, "Traditionalists" (Class 2) strongly support conventional norms, with β-values exceeding 2.4 (p<0.001) across key indicators (Q29, Q30, Q35). This polarization suggests the need for differentiated policy interventions targeting urban progressives and rural conservatives (see Table 4 for full results).

Table 4: Results of LCA

Variable	Urban Class 1 (β)	Urban Class 2 (β)	Rural Class 1 (β)	Rural Class 2 (β)
Q29	1.019 (p<0.001)	2.417 (p<0.001)	1.020 (p<0.001)	2.417 (p<0.001)
Q30	0.274 (p=0.005)	2.900 (p<0.001)	0.274 (p=0.005)	2.900 (p<0.001)
Q35	2.366 (p<0.001)	2.982 (p<0.001)	2.366 (p<0.001)	2.982 (p<0.001)
Q80	1.795 (p<0.001)	1.894 (p<0.001)	1.335 (p<0.001)	1.894 (p<0.001)
Q104	0.033 (p=0.387)	-0.022 (p=0.053)	0.033 (p=0.387)	-0.022 (p=0.053)
Q233	1.461 (p<0.001)	2.158 (p<0.001)	1.461 (p<0.001)	2.158 (p<0.001)

Source: Authors' elaboration.

In contrast, urban respondents in Class 2 have a high level of consensus regarding all variables with mean scores above β = 2.4 (p<0.001) on Q29, Q30, and Q35. The implication is that urban respondents in Class 2 reflect a high level of conformity with traditional views, which can hinder gender progress in urban areas. In addition, urban respondents in Class 2 have high confidence in women's organisations (Q80), with a score of β = 1.894 (p<0.001), which reflects that these women's organisations are seen in a good light by those with traditional gender roles.

In rural areas, Class 1 shows similar attitudinal patterns to their urban counterparts, with moderate agreement on Q29 (β = 1.020) and minimal agreement on Q30 (β = 0.274), indicating a gradual shift toward gender parity in leadership and education. Meanwhile, rural "Traditionalists" maintain strong support for conventional norms (β > 2.9 on Q30 and Q35), reinforcing the persistence of patriarchal attitudes across regions.

"Traditionalists" display consistently high β-values across all indicators, particularly in leadership and education contexts (e.g., Q30: $\beta > 2.9$, $p < 0.001$), reflecting strong adherence to traditional gender roles. In contrast, "Moderates" show minimal agreement with such norms, primarily on educational equity (Q30: $\beta = 0.274$, $p = 0.005$), which indicates growing support for gender parity, particularly in urban areas.

These divergent views underscore the need for targeted educational initiatives and awareness campaigns in rural regions, where patriarchal beliefs remain deeply embedded. Traditional views on family income roles also remain strong (Q35: $\beta = 2.366$, $p < 0.001$), suggesting that even where progressive attitudes toward leadership and education are emerging, household economic norms tend to remain conservative. Furthermore, trust in women's organizations (Q80) is noticeably lower among rural Moderates ($\beta = 1.335$) than their urban counterparts. This finding reflects a limited level of institutional confidence, which may hinder broader participation in gender-based initiatives.

Rural respondents in Class 2 exhibit patterns consistent with their urban counterparts, demonstrating strong agreement with traditional gender norms across all key indicators (e.g., Q29–Q35, $\beta > 2.4$, $p < 0.001$). Confidence in women's organizations (Q80: $\beta = 1.894$) remains moderately high even among Traditionalists, although participation in such groups **(Q104)** is consistently low across all groups ($\beta \approx 0.033$), limiting their potential impact.

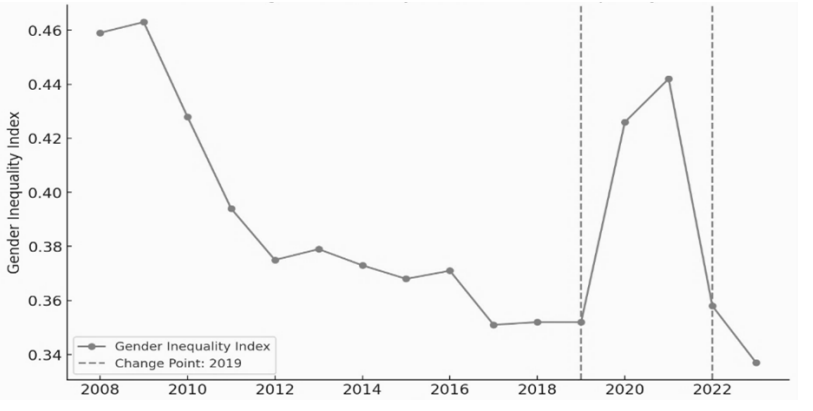
Perceptions of gender equality in political opportunities (Q233) reveal further disparities. Urban respondents in Class 1 perceive moderate levels of equality ($\beta=1.461$, $p<0.001$), whereas those in Class 2 demonstrate significantly stronger alignment ($\beta=2.158$, $p<0.001$). Rural respondents exhibit similar trends, although with slightly lower responses in Class 1, suggesting entrenched biases in rural areas. These disparities underline the importance of targeted policy measures to address regional and class-specific barriers to women's political participation and representation.

The findings emphasise the need for nuanced policy measures to address regional and class-specific barriers to women's access to quality employment. Urban Class 1 respondents represent a demographic ripe for progressive interventions, such as gender-equal education campaigns and leadership development programs. In contrast, rural Class 2 respondents require targeted strategies to challenge deeply entrenched traditional norms and improve institutional trust. Efforts to enhance participation in women's

groups and confidence in women's organisations are crucial to fostering a supportive environment for women's empowerment across all classes and regions. By addressing these disparities, Kazakhstan can make significant strides toward achieving its strategic goal of expanding opportunities and access for women in the labour market.

Gender inequality trends in Kazakhstan show two key turning points: a temporary setback in 2019 and a significant improvement in 2022 (Figure 1).

Figure 1: Change-point analysis of the GII in Kazakhstan for 2008–2023



Source: Authors' elaboration.

The change-point estimation in Kazakhstan from 2008 until 2023 reflects two points at which a break in trend is discernible: 2019 and 2022. 2019 and 2022 are turning points in gender inequality trajectories that align with women participating in sectors. In 2019, the GII saw a reversal 2019, rising from 0.352 in 2018 to 0.426 in 2019. The stagnation can be seen as proof of setbacks in gender policy implementation or a slower rate of closing structural gaps. During these two years, women in the police increased incrementally from 12.5% in 2018 to 14.6% in 2019, whereas women in leadership roles and political positions saw little shift. The stagnation is proof that social as well as structural obstacles still hold sway despite incremental advancement in women in professions across fields, especially in rural as well as traditionally conservative areas. The shift that followed in 2022 proves that gender inequality has reduced considerably, as seen in a drastic fall in the GII from 0.442 in 2021 to 0.358 in 2022. The fall

is in line with enhanced trends in women's participation, as women in the police increased to 15.6%, and women in leadership positions increased to 40.8%. The increment in institutional reform and women rising into leadership roles in political and economic spaces can be seen as a cause.

The findings are that structural developments in women's participation concerning security (police), leadership, and political involvement are key drivers in reducing gender inequality. The 2019 regression, as much as its transitory state, highlights that ongoing policy application and assessment are crucial, especially in tackling root gender roles in rural contexts. The correlation with social participation data, that is, latent class trends, clearly reflects those targeted strategies, development in terms of institutional confidence, and women attaining leadership positions, which are critical drivers in gender inequality advancements. The research recommends longitudinal tracking of gender inequality trends and considering the correlation between macro-level developments in policy and attitudinal developments at a more local level. Policymakers are critical in operationalising these insights into devising evidence-based strategies that promote equal participation of women in all sectors of society, that is, in the economy.

Discussions

The quantitative approach utilized, which is grounded in LCA, recognizes latent heterogeneity concerning gender roles, leadership, educational opportunities, and employment equity regarding gender inequality trends. The study also develops a correlation between attitudinal trends in 2018 and subsequent changes in the GII, providing insights into factors influencing women's employment opportunities in Kazakhstan.

The divide between "Moderates" (Class 1) and "Traditionalists" (Class 2) is consistent across urban and rural populations. Urban Moderates generally express more egalitarian views, as reflected in lower β-values related to male leadership and educational preference. In contrast, Traditionalists, particularly in rural areas, strongly adhere to conservative gender norms that limit women's economic roles.

High β-values on Q35 among "Traditionalists" reflect persistent stereotypes that hinder women's participation in high-income sectors and limit both formal and domestic economic contributions. These cultural attitudes pose challenges for implementing national gender equality

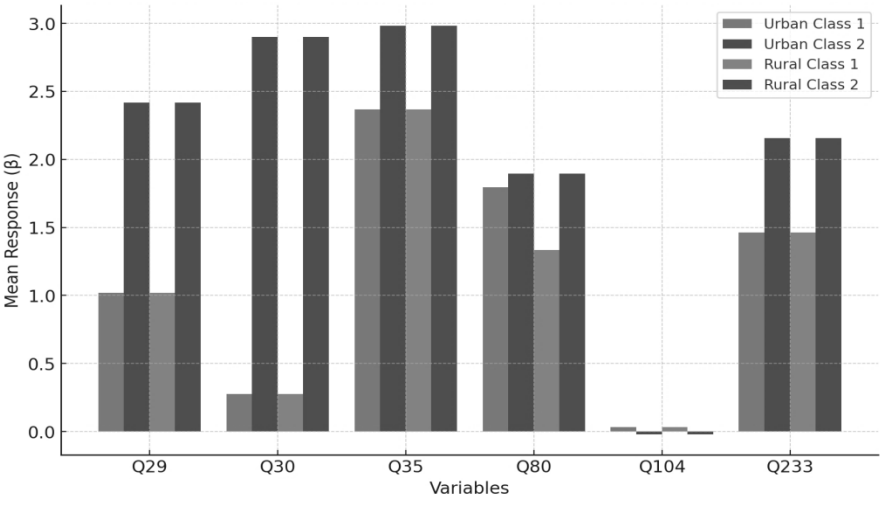
strategies. Overcoming them requires coordinated efforts, including awareness campaigns and private-sector incentives to promote women's advancement, ultimately contributing to broader socio-economic development.

These attitudinal divisions correspond with national-level trends. The GII improved from 0.459 in 2008 to 0.351 in 2017, but a reversal occurred in 2019 (0.426), indicating structural stagnation. Although trust in women's organizations increased in 2018 (Q80: $\beta = 1.894$, $p < .01$), this did not lead to greater participation or institutional reform. By 2022, the GII declined again to 0.358, reflecting the positive impact of gender-responsive policymaking and increased female representation in politics (40.8%) and law enforcement (15.6%).

Figure 2 illustrates the attitudinal divide, showing significant β-value differences across urban and rural respondents in Q29, Q30, Q35, Q80, Q104, and Q233.

The integration with the WVS data makes critical intersections between attested outcomes and underlying social attitudes evident. For example, areas with high proportions of "Traditionalists" (Class 2) have consistently low female labour participation rates and little gender reform progress. In rural areas with high proportions of traditional beliefs, the ratio of economically active women is stagnant compared to urban areas, but a consistent trend has been seen. The difference highlights mediation by sociocultural norms in determining the impact of measures. The pattern is also seen in educational attainment, reflecting the underlying attitudinal divide; poor female enrollments at universities are seen in rural areas despite national progress. The overlap between latent classes and regional trends in GII highlights that geographically targeted strategies are a necessary countermeasure to counteract prevailing traditional beliefs and promote development towards more supportive institutions.

Figure 2: Change-point analysis of the GII in Kazakhstan for 2008-2023



Source: Authors' elaboration.

These results concur with previous contributions by Kuzhabekova and Almukhambetova (2019), who state that structural institutional obstacles—particularly at the levels of public administration and academia—hindered women's advancement despite official promises of gender equality. One of the confirmations of the results is that rural interviewees are less receptive to efforts at change from the top-down level, and community-centered, non-state decentralization programs, like those implemented by the Zhas Project in collaboration with UNDP's local mainstreaming efforts, have a more significant, sustainable impact in such environments.

"Traditionalists" (Class 2) exhibit strong confidence in women's organizations ($\beta = 1.894$, $p<0.001$), yet participation remains low ($\beta\approx0.033$, not significant), highlighting a gap between perceived importance and actual engagement. The difference reflects that though confidence in these kinds of organizations is high, participation is not evident. Therefore, developing women's organization capacities and coverage, especially in rural areas, is necessary to translate confidence into effective participation and empower women. Kazakhstan has implemented several measures to encourage women's engagement in civic activity, such as the National Commission on Women's Affairs and Family-Demographic Policy and the targeted funding offered through the Damu Entrepreneurship Fund. While such measures have succeeded at the urban level, our survey indicates partial success at the

rural level, where underlying traditional attitudes prevail. This mismatch suggests the need for policy adaptation at the regional level and greater monitoring mechanisms for converting country-level initiatives to local-level outcomes.

The change-point analysis on GII also provides additional context in interpreting these trends. The stagnation in 2019 is in tandem with a slowdown in policymaking and resistance towards change, as seen from a high incidence rate in Traditionalist views. The dramatic shift in 2022 is linked with broad-based reform at a macro level, encompassing women's advancement into leadership roles and increased participation in political and economic spaces. These structural level reforms are consistent with the Kazakhstan 2030 Strategy and Concept of Family and Gender Policy to 2030, both of which have in their program the reduction of gender inequality and the expansion of women's participation at the economic and leadership level. To some extent, the 2022 positive change can be attributed to institutional reform along these strategy documents. However, the analysis finds that while there has been a change in country-level policy, rural areas remain behind in changing attitudes, demonstrating the necessity for directed policy implementation.

Tailored interventions should address the specific needs and characteristics of each group. Urban respondents identified as “Moderates” (Class 1) demonstrate a shift toward gender equality. Effective policies for this group may include professional training programs that empower women in high-income sectors, enhance leadership and negotiation skills, and strengthen female networking and mentoring systems. Emphasis should be placed on promoting women’s participation in information technology and STEM fields and addressing residual gender biases (Agrawal, 2018; Bhandari et al., 2024).

In contrast, “Traditionalists” (Class 2), especially in rural areas, are more strongly influenced by cultural norms discouraging women’s economic engagement. Successful strategies for these communities may include awareness campaigns that frame women’s economic participation as a driver of community development. Involving local leaders and promoting household-based economic activities can further support women's roles and improve overall well-being.

Integrating attitudinal data with longitudinal gender inequality indicators offers a strong basis for understanding and addressing gender disparities in Kazakhstan. This study underscores the need for evidence-

based, geographically sensitive policymaking that links individual beliefs with broader structural outcomes. Policymakers should prioritize ongoing monitoring of attitudinal trends and statistical indicators to inform adaptive strategies that promote inclusive participation across all sectors. Such approaches align with Kazakhstan's national development goals and contribute to global gender equality and women's empowerment agendas.

Conclusion

This study comprehensively analyses gender inequity in Kazakhstan, combining micro-level attitudinal models with macro-structural trends over sixteen years. Using LCA and Change-Point Analysis, the research identifies key inflexion points and the sociocultural attitudes shaping them. The findings highlight several key insights.

First, the analysis of political representation shows that women occupy only 18–27% of parliamentary seats, falling short of the government's 30% target outlined in the Concept of Family and Gender Policy to 2030. Despite advances in female education and literacy, structural barriers limit women's full participation in decision-making processes.

Second, the results of the LCA indicate the existence of two attitudinal cohorts within the sample. The "Moderates" group is defined by a significant, gradual decline of traditional gender beliefs among urban residents. In contrast, the "Traditionalists" are highly represented within the sample's rural components with a strong allegiance to entrenched patriarchal beliefs, supported by the strong β-values of key attitudinal measures. The existence of the attitudinal patterns is also endorsed by change-point analysis of the GII, with the latter showing significant patterns of change across time with a notable decline between 2008 and 2017 (0.459 to 0.351), followed by a trend inversion to 0.426 by 2019 (indicating a deceleration of the downward trend), followed by a continuation of the decline to 0.358 by 2022.

The empirical evidence of this research underscores the strong linkage between institutionally oriented trust, gender-oriented economic engagement, and culture. Notwithstanding Kazakhstan's considerable gains toward the development of human capital, reflected by a high literacy rate and a significant female presence at institutions of higher learning, the persistent existence of significant challenges within the economic and political domains necessitates a rethink of policy strategies. In urban areas

where gender norm change is widely accepted at a macro scale, increased support to develop a strong leadership base, complemented by specific interventions to root out remaining biases, can have positive results. In rural areas where traditional gender roles remain deeply entrenched, culturally sensitive advocacy, community-level engagement, and long-term behavioral change strategies are urgently needed to challenge persistent beliefs.

Limitations of the current study lie in the temporal lag of specific attitudinal data (i.e., WVS) and the absence of qualitative understanding that could enable better appreciation of regional dynamics and sociocultural complexity. Future research could address these limitations using ethnographic approaches or case study methodologies. Policy recommendations derived from this study are: (1) launching community-level awareness raising campaigns to counter entrenched gender norms; (2) increasing women's organizations' reach and budget levels for marginalized communities; (3) synchronizing education reform with women's labor market integration into STEM fields; and (4) implementing trust-building mechanisms via transparent monitoring of gender-oriented government programs.

Future research efforts should include qualitative approaches that complement the strong quantitative techniques applied to this research to provide a thorough understanding of the intricacies of gender role change and the regulative principles of institutions. In conclusion, the current study is a significant scholarly work on the gender inequality debate in Kazakhstan that provides a comprehensive analysis that combines micro-perceptual knowledge with macro-dynamism structures. The implications drawn out of this research call for a rethinking of existing gender policies that stress the need for a two-pronged approach that simultaneously reinforces legal frameworks while promoting sociocultural change. The conclusions made of this research call for the need to have persistent, location-sensitive interventions that are the best way to overcome entrenched gender parity disparities.

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ORIGINAL SCIENTIFIC PAPER

Gender Perspectives on SME International Trade and Revenue in the Digital Era: Evidence from Serbia

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A B S T R A C T

International trade drives expansion and development, significantly contributing to national productivity and job creation. The aim of this research is to investigate four groups of factors that act as independent variables and their impact on the export performance of SMEs as the dependent variable. This study examines critical elements shaping the global trade success of small businesses and medium-sized enterprises, with export revenue as the dependent variable. A sample of 342 Serbian enterprises, primarily exporters, was surveyed through an online questionnaire conducted at the end of 2024, in collaboration with the

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Serbian Association of Employers. The survey targeted business owners and managers, who provided their assessments using a Likert scale on 12 statements related to four predefined research variables, focusing on factors influencing SME export propensity, with a particular emphasis on gender. The findings, with contingency table analysis, indicate that internal factors, such as the implementation of new technologies and organizational adaptability, exert the greatest influence on export performance, along with all external factors examined. Additionally, company size was found to have a significant impact on export revenue. Regarding gender, the study assessed the role of female-owned SMEs and found that they are less likely to engage in export activities. The results align with existing academic literature, suggesting that female-owned SMEs face systemic disadvantages due to smaller firm size, limited managerial capacity, resource constraints, and insufficient market knowledge. Consequently, gender was not identified as a significant direct determinant of SME export performance and revenue. These research findings contribute to the literature on SME internationalization, digitalization, organizational change, gender issues, and women's entrepreneurship. Furthermore, they offer valuable insights for feminist economic studies and policy discussions aimed at supporting female entrepreneurs.

KEYWORDS: *international trade, digitalization, female entrepreneurship, SME, internationalization*

Introduction

Women-led SMEs are increasingly contributing to international trade, but they often face unique challenges such as limited access to financing, networks and market information (Antonijević et al., 2024; Domazet et al., 2024). Addressing these barriers can unlock significant economic potential (Akter et al., 2019; Marjanović et al., 2022). In this context, gender-inclusive trade policies and governance frameworks are crucial for ensuring equitable participation in digital trade (Paunović et al., 2025). Initiatives that promote gender equality in trade can help close the gender gap and enhance the competitiveness of women-led SMEs (Thystrup, 2023; Lazić et al., 2023; Reina Marin et al., 2024).

The research examines the export performance and revenue of SMEs, considering various influencing factors, including a gender-based approach (Popović & Jevtić, 2020; Mitić et al., 2020; Srebro et al., 2023; Radović-Marković et al., 2025).

Literature on international trade has emphasized the key role of firms in shaping imports and exports since the mid-1990s. Exporting firms are

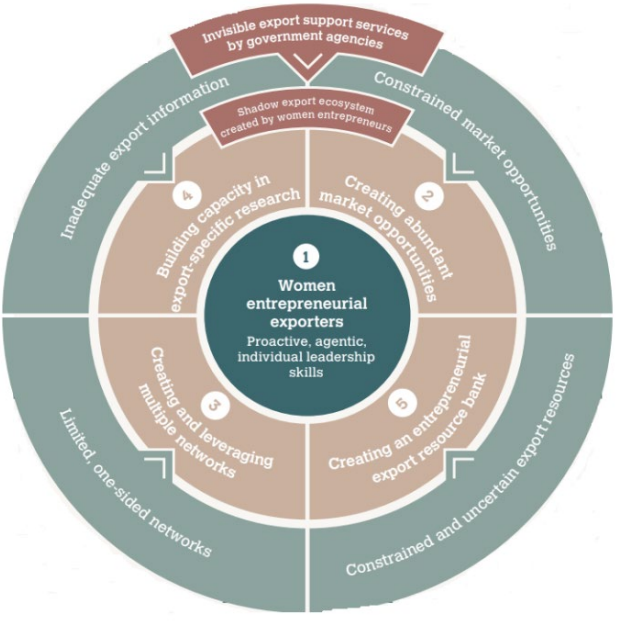
generally more productive than those operating solely in domestic markets. The global economy has demonstrated the importance of resilience (Radović-Marković, 2018; Vapa, B., & Vapa, J., 2022), experiencing consistent yearly growth at a stable rate of 3.2% (OECD Economic Outlook, 2025). However, recent indicators suggest that momentum may be slowing. Business and consumer confidence have softened in certain regions, while inflationary pressures persist across multiple economies. Additionally, policy uncertainty remains elevated, with significant risks on the horizon. A major concern is the potential for further economic fragmentation. If inflation exceeds expectations, central banks may adopt stricter monetary policies, potentially triggering volatility in financial markets. Based on the literature (Radović-Marković, Kočović, Grozdanić, 2013; Radović-Marković, Grozdanić, R., & Jevtić, B., 2017; Jevtić, Vučeković, Tasić, 2023), the authors defined the further research question (RQ) for this study: *How do gender perspectives influence SME international trade and revenue in the digital era*?

The structure of the paper includes the introduction, theoretical framework, materials and methods, main findings, conclusions, and references.

Theoretical Framework

A comprehensive framework for entrepreneurial ecosystems comprises ten components that collectively influence entrepreneurial outcomes (Muhammad et al., 2024; Stam & Van de Ven, 2021; Jacobides et al., 2018; Marjanović et al., 2023). These elements serve as practical constructs within the broader theoretical frameworks of institutions and resources embedded in the ecosystem. The primary output of this ecosystem is productive entrepreneurship, defined as the creation of new value. The model identifies two core elements: formal institutions, which encompass legal frameworks, regulations, property rights, and financial policies such as bank lending criteria, and informal institutions, which refer to the intangible norms, values, and cultural factors that shape the entrepreneurial milieu within a society.

Figure 1: Entrepreneurial export ecosystem



Source: Authors according to WTO, 2022

This research aims to define four groups of factors, each comprising 12 claims, as independent variables to analyze their impact on the export performance of SMEs, which serves as the dependent variable.

Independent variable A. Enterprise Ownership – Gender-based (female and male). This variable includes several unique contributions that female and male entrepreneurs can make to the export performance of SMEs, helping them navigate global markets with a distinctive approach. Their **leadership and decision-making style**, such as collaborative decision-making, fosters stronger team dynamics and adaptability in foreign markets. Their ability to make inclusive and diverse decisions enhances innovation, which is crucial for competing internationally. In terms of **risk management and strategic vision**, a cautious yet strategic approach to risk can lead to more effective long-term planning for export activities, improving the sustainability of SMEs in international markets. Strong **networking and relationship-building** skills translate into better customer retention and market penetration abroad.

Additionally, entrepreneurs may gain **access to funding and resources** through specific grants, loans, or programs promoting gender equality in

trade and entrepreneurship. A strong **focus on social responsibility and sustainability** enhances brand reputation in international markets, where ethical business practices are highly valued. Their **adaptability to market needs**, driven by greater empathy and flexibility, enables better product customization for global customers, boosting competitiveness abroad. Lastly, the **promotion of inclusive business practices** aligns SMEs with global market trends and fosters stronger relationships with international stakeholders who prioritize ethical and inclusive businesses. *Defined Claims for variable A*:

A.1. Male entrepreneurs are often noted for their careful approach to risk, which can lead to more strategic, long-term planning for export activities.

A.2. Female entrepreneurs are often noted for their careful approach to risk, which can lead to more strategic, long-term planning for export activities.

Independent variable B. Global and domestic trade environment. The variable includes determinants of SME export success in the digital era, focusing on external and global market conditions like, foreign market demand and consumer trends influence export potential, as shifting preferences, emerging industries, and seasonal trends shape demand for goods and services. International economic conditions and trade regulations impact market access, with geopolitical factors, tariffs, customs procedures, and import/export restrictions determining the ease of entering foreign markets. Compliance with international trade agreements and standards is essential for competitiveness. Technological infrastructure plays a crucial role, as access to digital tools, logistics systems, and communication networks enhances SME operations, while poor infrastructure can hinder efficiency and growth. Additionally, national trade and logistics support affects market expansion, where efficient shipping, warehousing, and distribution systems improve delivery reliability, whereas high logistics costs can reduce profitability. *Defined Claims for variable B:*

B1. Foreign market demand and consumer trends influence SMEs' export potential.

B2. International economic conditions, geopolitical factors, trade regulations, and the competitive landscape are vital for SMEs' market access.

B3. National-ready digital infrastructure and cross-border e-commerce facilitation are crucial for enabling global expansion.

B4. National trade and logistics support shapes demand for SMEs that comply with regulations.

Independent variable C. Digital transformation and management flexibility. This variable highlights how internal influences, beyond an SME's direct control, shape export success and necessitate adaptive strategies. Namely, in the digital age, organizations should carry out their strategies and plans as quickly as possible to adjust themselves to a dynamic, uncertain, and unpredictable environment (Lukić-Nikolić, 2024; Domazet & Marjanović, 2025). Effective management of these challenges requires SMEs to develop key capabilities, resources, and strategies. Digital capabilities and technological integration play a crucial role, involving the adoption of digital tools. A strong digital marketing and online presence enables businesses to reach global customers through online marketing, social media, and digital advertising. Data analytics and market insights help optimize export strategies by providing valuable research, customer behavior analysis, and performance tracking.

Additionally, organizational resources and capabilities determine an SME's ability to compete internationally. Financial resources influence investments in digital tools, international expansion, and operational costs, while human capital, particularly a skilled workforce in digital technologies, international trade, and marketing, strengthens global competitiveness (Domazet, Marjanović, Subić, 2024). Management expertise is also critical, as strong leadership drives digital transformation, internationalization strategies, and adaptability to global market demands. Furthermore, product and market adaptation through customization, innovation, and R&D enables SMEs to meet the diverse needs of international consumers. Compliance with quality standards and certifications enhances competitiveness by ensuring that products meet international requirements. Lastly, strategic and operational management in export activities, including supply chain management, customer support, and after-sales services, ensures efficiency and long-term success in global markets. *Defined claims for independent variable C:*

C1. SMEs' digital capabilities and technology optimize export strategies through market research, customer analysis, and performance tracking.

C2. SMEs' organizational and management resources drive internationalization and adaptability to global market demands.

C3. Product customization, innovation, and quality certifications enhance SMEs' competitiveness in global markets.

C4. A strong export strategy, supported by an efficient supply chain and operational management, drives SMEs toward long-term internationalization success.

Independent variable D: Enterprise size. This variable addresses the advantages of SME and large company size on export performance. SMEs gain a competitive edge through their flexibility and agility, allowing them to focus on niche markets and tailor products to specific demands. Their ability to build closer relationships with customers fosters trust and loyalty in international markets. Additionally, SMEs benefit from cost efficiency in specialized operations, faster implementation of digital tools, and leaner supply chains. Their smaller size enables quick decision-making and the ability to adapt strategies rapidly in response to new export opportunities. Large companies have several advantages in terms of export performance, including economies of scale, greater financial resources for expansion, established brand recognition, extensive distribution networks, and the ability to leverage global partnerships. These factors enable them to access larger markets, reduce per-unit costs, and maintain a strong competitive position internationally. *Defined claims for independent variable D*:

D1. SMEs, with their flexibility, innovation, and customer relationships, often outperform large companies in niche and emerging markets.

D2. Large companies benefit from economies of scale, greater financial resources, established brand recognition, and extensive distribution networks, which enhance their export performance.

Dependent variable E: SMEs' export performance and revenue. Important characteristics of export performance, revenue, and SMEs' internationalization in the digital era include:

- Digital Savviness – The ability to effectively utilize digital tools and technologies to streamline operations and enhance global market reach.

- Adaptability – The capacity to quickly respond to changes in market conditions, consumer preferences, and technological advancements.
- Innovative Mindset – A focus on innovation and the ability to develop unique products or services tailored to international markets.
- Global Perspective – A broad understanding of international markets, cultures, and consumer behavior that drives international expansion strategies.
- Lean and Agile Operations – The ability to implement efficient processes and make quick decisions, which are crucial for competing in dynamic global markets.
- Collaboration and Networking – A focus on building strong partnerships to support global operations.
- Technological Integration – The seamless integration of advanced technologies, such as e-commerce platforms, data analytics, and supply chain management systems, to support international business processes.

Methods and Materials

This research is part of a broader study conducted by the authors across Serbia, examining the key drivers of female entrepreneurship, the entrepreneurial ecosystem, and female internationalization. To address the research question, a data-driven examination was carried out in Serbia in 2024 on a sample of 342 Serbian enterprises, primarily exporters, surveyed through an online questionnaire in collaboration with the Serbian Association of Employers. The survey targeted business owners and managers, who provided their assessments using a Likert scale on 12 statements related to four predefined research variables, focusing on factors influencing SME export propensity, with a particular emphasis on gender. The findings, derived from contingency table analysis, highlight the impact of external and internal factors, firm size, and gender on SME export performance. In the following table, descriptive statistics of the respondents across the selected variables are presented (Table 1).

Table 1: Descriptive statistics

	N	Column%
A. Gender		
A1. Mail	207	60.53
A.2 Female	135	39.47
B. Global and domestic trade environment		
B1.	76	22.22
B2.	98	28.65
B3	93	27.19
B4.	75	21.93
C. Digital transformation and management flexibility		
C1.	68	19.88
C2.	91	26.68
C3.	101	29.53
C4.	82	23.98
D. Enterprise size		
D1.	159	46.49
D2.	183	53.51
Total	342	100.00

Source: Author's research

Analyzing the descriptive characteristics of groups A, B, C, and D (Table 1) reveals significant differences among categories. **Group A** is dominated by **A1**, which accounts for over 60% of the total 342 respondents, highlighting its prevalence within this category. In **Group B**, the distribution is relatively balanced across the four categories, though **B2** emerges as the most prominent, comprising **28.65%**, suggesting varied preferences or characteristics within the group. **Group C** follows a similar pattern, with **C3** representing the largest share at **29.53%** of the 342 respondents. Lastly, in **Group D**, **D2** holds the majority position, albeit with a slightly smaller proportion of **53.51%** of the total respondents.

The hypotheses in this research are:

H_{01}: No notable variation is observed in category A regarding SMEEP.
H_{a1}: A clear distinction is observed in category A regarding SMEEP.

H_{02}: No notable variation is observed in category B regarding SMEEP.
H_{a2}: A clear distinction is observed in category B regarding SMEEP.

H_{03}: No notable variation is observed in category C regarding SMEEP

H_{a3}: A clear distinction is observed in category C regarding SMEEP.

H_{04}: No notable variation is observed in category D regarding SMEEP.
H_{a4}: A clear distinction is observed in category D regarding SMEEP.

Based on the evaluation of the findings presented in Table 2, it is evident that the largest share of respondents in group A1 is satisfied, while the share of dissatisfied is higher in A2. A1 shows better results in all satisfaction categories, especially with a high percentage of satisfied (48.31%) compared to A2 (33.33%).

Table 2: Contingency Table - A & Claim

Count **Total %** **Col %** **Row %**	**Not satisfied**	**Partially satisfied**	**Satisfied**	**Total**
A1	48 14.04 53.93 23.19	100 29.24 67.11 48.31	59 17.25 56.73 28.50	207 60.53
A2	41 11.99 46.07 30.37	49 14.33 32.89 36.30	45 13.16 43.27 33.33	135 39.47
Total	89 26.02	149 43.57	104 30.41	342

Source: Author's research

The overall results indicate that 26.02% of respondents are dissatisfied, 43.57% are partially satisfied, and 30.41% are completely satisfied. The significance level is set at 0.05, with two levels of freedom and the threshold value for χ^2 is 5.991. A calculated χ^2 value of 4.953 was obtained and it is smaller than the tabular $\chi 2=5.991$, and the obtained significance of 0.0840 is greater than the threshold of 0.05, According to the findings, H_{01}—stating that no notable variation is observed in category A regarding SMEEP—is supported, while H_{a1}, which indicates a clear distinction in category A regarding SMEEP, the alternative hypotheses is not confirmed.

From the analysis of the results (Table 3) of the Contingency Table, it can be seen that group B1-B2 has a significant number of dissatisfied respondents (71.11%) and partially satisfied respondents (49.31%). In

contrast, the proportion of satisfied respondents is lower (36.11%). On the other hand, group B3-B4 has a lower percentage of dissatisfied respondents (28.89%), but still has a good number of partially satisfied respondents (50.69%) and satisfied respondents (63.89%), which suggests that respondents in this group are generally more positive.

In total, 26.32% of respondents are dissatisfied, 42.11% are partially satisfied, and 31.58% are completely satisfied. The significance level is set at 0.05, with two levels of freedom and the threshold value for χ^2 is 5.991. A calculated χ^2 value of 17.086 exceeds the critical χ^2 value of 5.991, while the observed p-value of 0.0001 falls below the significance level of 0.05. According to the findings, H_{02}: No notable variation is observed in category B regarding SMEEP, which is not supported, while H_{a2}: A clear distinction is observed in category B regarding SMEEP, which can be confirmed.

Table 3: Contingency Table - B & CLAIM

Count **Total %** **Col %** **Row %**	**Not satisfied**	**Partially satisfied**	**Satisfied**	**Total**
B1-B2	64 18.71 71.11 36.78	71 20.76 49.31 40.80	39 11.40 36.11 22.41	174 50.88
B3-B4	26 7.60 28.89 15.48	73 21.35 50.69 43.45	69 20.18 63.89 41.07	168 49.12
Total	90 26.32	144 42.11	108 31.58	342

Source: Author's research

From the results analysis (Table 4) of the Contingency Table, it can be observed that the C1-C2 group has a higher percentage of dissatisfied respondents (65.52%) and a lower percentage of satisfied respondents (41.56%) compared to the C3-C4 group. Group C1-C2 also has a significant number of partially satisfied (39.33%). On the other hand, the C3-C4 group shows better results in terms of satisfaction, with 60.67% of participants being partially satisfied and 58.44% being satisfied. In total, 25.44% of

respondents are dissatisfied, 52.05% are partially satisfied, and 22.51% are completely satisfied.

Table 4: Contingency Table - C & CLAIM

Count **Total %** **Col %** **Row %**	**Not satisfied**	**Partially satisfied**	**Satisfied**	**Total**
C1-C2	57 16.67 65.52 35.85	70 20.47 39.33 44.03	32 9.36 41.56 20.13	159 46.49
C3-C4	30 8.77 34.48 16.39	108 31.58 60.67 59.02	45 13.16 58.44 24.59	183 53.51
Total	87 25.44	178 52.05	77 22.51	342

Source: Author's research

The significance level is set at 0.05, with two levels of freedom and the threshold value for χ^2 is 5.991. A calculated χ^2 value of 17.086 exceeds the critical χ^2 value of 5.991, while the observed p-value of 0.0001 falls below the significance level of 0.05. According to the findings, H_{03}, which states that no notable variation is observed in category C regarding SMEEP, is not supported, while H_{a3}, indicating a clear distinction in category C regarding SMEEP, can be confirmed.

From the analysis of the results (Table 5) of the Contingency Table, it can be noted that group D1 has a higher percentage of dissatisfied (64.49%) and a lower percentage of satisfied (33.33%), compared to group D2. Group D1 also shows a high percentage of partially satisfied respondents (41.73%), which suggests room for improvement. On the other hand, group D2 shows a better distribution of satisfaction, with a lower percentage of dissatisfied (35.51%) and a higher percentage of satisfied respondents (66.67%). This suggests that respondents in group D2 are more positive about their experiences. In total, 31.29% of respondents are dissatisfied, 40.64% are partially satisfied, and 28.07% are completely satisfied.

Table 5: Contingency Table - D & CLAIM

Count **Total %** **Col %** **Row %**	**Not satisfied**	**Partially satisfied**	**Satisfied**	**Total**
D1	69 20.18 64.49 43.40	58 16.96 41.73 36.48	32 9.36 33.33 20.13	159 46.49
D2	38 11.11 35.51 20.77	81 23.68 58.27 44.26	64 18.71 66.67 34.97	183 53.51
Total	107 31.29	139 40.64	96 28.07	342

Source: Author's research

The significance level is set at 0.05, with two levels of freedom and the threshold value for χ^2 is 5.991. A calculated χ^2 value of 21.877 exceeds the critical χ^2 value of 5.991, while the observed p-value of 0.0001 falls below the significance level of 0.05. According to the findings, H_{04}, which states that no notable variation is observed in category D regarding SMEEP, is not supported, while H_{a4}, indicating a clear distinction in category D regarding SMEEP, can be confirmed.

The findings, with the above contingency table analysis, indicate that internal factors, such as the implementation of new technologies (Jevtić & Srebro, 2024; Vrbanac et al., 2023; Domazet & Marjanović, 2024), organizational adaptability, exert the most significant influence on export performance, along with all examined external factors on the national and global level. Additionally, company size was found to have a significant impact on export revenue.

Regarding gender, the study assessed the role of female-owned SMEs and found that they are less likely to engage in export activities (Vučeković et al., 2021; Shamaki et al., 2022). The results align with existing academic literature, suggesting that female-owned SMEs face systemic disadvantages due to smaller firm size, limited managerial capacity, resource constraints, and insufficient market knowledge. Consequently, gender was not identified as a significant direct determinant of SME export performance and revenue (Jevtić et al., 2024; Miškić et al., 2025; Srebro et al., 2023).

Conclusion

This article contributes to the literature on SME internationalization by offering valuable insights into the interplay between digital transformation, leadership, and firm capabilities in global market adoption among women entrepreneurs (Viana Feranita et al., 2024; Etemad, 2004). A key contribution of this study lies in its novel framework, which explains how digital technologies enhance internal organizational capabilities to drive SME export performance. By analyzing the dynamic relationships between these variables, the research provides a comprehensive examination of the critical factors influencing digitization, female enterprise ownership, managerial competencies, entrepreneurial ecosystems, and enterprise size in the internationalization process of SMEs. Economic uncertainty remains a fundamental challenge for international trade, as businesses navigate supply chain due diligence requirements and geopolitically influenced export control regulations (Huo, 2014). These external pressures necessitate resilient and adaptable organizational capabilities, which are increasingly shaped by digitalization and strategic leadership. Effective leadership (Sui et al., 2022) is particularly crucial for the success of SMEs in global markets, enabling firms to manage uncertainty, optimize digital tools, and implement strategic decision-making processes that enhance competitiveness.

This study also responds to calls for further research into gender dynamics within entrepreneurship (Bertrand, 2021), as well as the intersection of leadership, digital technology, and female entrepreneurship. The findings contribute to the dynamic capabilities literature by demonstrating how both individual leadership attributes and organizational factors influence the ability of SMEs to adapt to digital transformation and navigate international markets. In this context, managerial competencies play a pivotal role in shaping strategic orientations and ensuring organizational agility. Female-led SMEs, in particular, benefit from leadership strategies that emphasize inclusivity, innovation, and digital adaptation, all of which are crucial for fostering sustainable international growth.

Furthermore, the study highlights the intricate relationship between digital capabilities and internationalization, emphasizing the need for SMEs to integrate technological advancements into their operational and strategic frameworks. Beyond technical proficiency, transformational leadership—characterized by the ability to inspire employees, foster collaboration, and

drive digital innovation—is instrumental in leveraging digital tools for global expansion (Dedjanski et al., 2024). This perspective highlights the importance of aligning IT strategies with leadership efforts to enhance export performance (Molodia, 2023; Grozdanić et al., 2013).

Finally, this research extends the analysis of internal organizational capabilities, particularly within female-led enterprises, by conceptualizing digital capabilities as a mediator between firm structure, strategic adaptability, and internationalization success (Jevtić et al., 2020). Using dynamic capability theory as a theoretical framework, the study challenges the notion that gender alone determines SME success, arguing instead that a comprehensive ecosystem, including resources, digital infrastructure, and strategic leadership, drives global competitiveness. The findings indicate that digital transformation fundamentally reshapes SMEs' value creation processes and business models, presenting both unprecedented opportunities and operational challenges. This shift places significant pressure on organizations to upskill employees, restructure workflows, and embrace emerging technologies. Empirical evidence supports previous research (Pergelova et al., 2019) demonstrating that digital transformation is a disruptive force, compelling SMEs to reevaluate leadership strategies and operational frameworks. According to dynamic capability theory, firms must develop adaptive business models that integrate digital transformation leadership with internationalization strategies to enhance global competitiveness (Zhou & Tong, 2022). In the evolving international trade landscape, SMEs that successfully navigate this digital shift will be better positioned to thrive in the "new normal" of global markets (Audretsch & Belitski, 2021).

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ORIGINAL SCIENTIFIC PAPER

Technological innovation versus Gender Equality: Perspectives in the Dairy Sector

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A B S T R A C T

Women remain significantly underrepresented in the leadership of agricultural organizations. Simultaneously, increasing environmental pressures and global efforts to achieve the Sustainable Development Goals (SDGs) create new opportunities to restructure agribusiness operations and promote women's leadership. This study analyzes data from over five hundred dairy enterprises in the Visegrad Group countries (Czech Republic, Hungary, Poland, and Slovakia, sourced through ORBIS) to identify management features that foster female leadership within this European context. Principal Component Analysis revealed that a higher number of female directors and shareholders is associated with enhanced women's leadership. These features are most common in medium-sized enterprises. In contrast to these findings, current EU initiatives promoting gender equality in European agriculture target start-ups and small businesses. However, statistical analysis indicates that leadership in small enterprises is less strongly influenced by gender dynamics. Meanwhile, emerging innovations in dairy production could further strengthen larger companies, potentially diminishing the

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role of women-led smaller enterprises. To counterbalance this shift, future policies should actively promote gender diversity in corporate boards to ensure equitable leadership opportunities across all business sizes while simultaneously strengthening support for small businesses, regardless of gender.

KEYWORDS: *entrepreneurship, gender, innovation, technology, agriculture*

Introduction

Leadership serves as a critical driver of organizational success and societal progress, shaping decision-making, innovation, and economic development (Arici & Uysal, 2022). The intersection of leadership, gender equality, and technological innovation has become increasingly relevant as businesses and policymakers strive to create inclusive and sustainable economies (Al-Qahtani et al., 2022). Women's leadership has been shown to enhance organizational resilience, innovation capacity, and alignment with the Sustainable Development Goals (SDGs) (Kapse et al., 2024; Karali et al., 2024). However, persistent gender disparities, particularly in male-dominated industries such as agriculture, continue to limit women's access to leadership roles and decision-making power (Farhall & Rickards, 2021).

Transformational leadership theory suggests that women leaders, by emphasizing collaboration, ethical decision-making, and innovation, can drive significant organizational change (Popovic-Pantic et al., 2023). In the agricultural sector, where traditional leadership models often reinforce male dominance, transformational leadership could offer a framework for more inclusive governance structures (Greimel et al., 2023). Similarly, feminist economics highlights the structural barriers - such as land ownership and unequal access to resources - that hinder women's participation in agribusiness leadership (Omolekan & Alli, 2020; Vercillo, 2022). Institutional theory further explains how deeply ingrained societal norms and regulatory frameworks perpetuate gender disparities, particularly in male-dominated industries like dairy farming (Midamba & Ouko, 2024). Studies in Cambodia and the Philippines have found that women hold leadership positions in cooperatives, but these roles often come with limitations. Cambodian women leaders struggle to balance farm work with leadership responsibilities, while Filipina leaders are stereotyped into specific roles.

A broader study across Africa shows a similar pattern. While women participate in agricultural organizations, they are underrepresented in

leadership, especially at higher levels. This underrepresentation can be attributed to factors such as lack of land ownership or the organizations themselves not addressing women's specific needs. The study highlights an extreme example in Zimbabwe where women make up three-quarters of the members but only hold five percent of leadership positions (Huot et al., 2023). Disparities exist in Europe as well (Fanelli, 2022), where the transmission of farmland from father to son remains a significant barrier for women (Balezentis et al., 2021). Regenerative agriculture could offer small-scale, environmentally friendly opportunities (for newcomer women), would be beneficial for farmers as well (O'Donoghue et al., 2022). However, among others, the demand for large-scale sustainable production to eliminate poverty (SDG 1), and hunger (SDG 2) and support responsible consumption (SDG 12), the mitigation of greenhouse gas emissions to support climate action (SDG 13), the controlled environment to foster the sustainable water management (SDG 6) suggests a global-scale change in the agriculture, rather than a local one (Zurek et al., 2022). Since the dairy sector is considered one of the most polluting within the agriculture (Cellone et al., 2020), the upcoming (inter)governmentally supported shift is likely to favor innovative technological solutions, which would affect the number and composition of the current market players. Technological transformation within the dairy sector is particularly critical, as it can either exacerbate existing gender disparities or provide opportunities for women-led enterprises (Khan et al., 2021; Islam et al., 2023).

In light of these dynamics, this study is guided by the following research questions:

- How does company size influence the likelihood of female leadership in the dairy sector?
- What is the relationship between company ownership structure and the gender of company directors?
- How might emerging technological and market trends reshape gender dynamics in leadership within the dairy industry?

By addressing these questions, the study aims to explore how structural, organizational, and technological factors intersect to shape gender representation in leadership roles within the dairy industry and put the latest EU project in context through the study of the Central European dairy sector.

The theoretical background is followed by the presentation of the research design and methodology, which describes the analyzed variables of

dairy businesses in the Visegrad Group (V4) countries (Czech Republic, Hungary, Poland, and Slovakia) and outlines the methodologies used for the statistical tests. In the results and discussion section the identified gender differences are highlighted, reflecting the dissimilarities between the businesses of these closely related countries. Company-related variables that are likely to influence women's leadership opportunities in the dairy sector are also examined. The article concludes with a brief description of emerging technological developments and their potential effects on the dairy industry.

Theoretical Background

Understanding gender disparities in leadership within the agricultural sector requires a multidimensional theoretical approach. This study draws upon insights from various theories to frame the investigation of women's roles in the dairy industry amid environmental and market transitions. Feminist economics provides a foundational lens by emphasizing that gender inequalities in economic participation are not merely outcomes of individual choices but are embedded in broader structural and historical contexts (M. Kim, 2023). In agriculture, persistent disparities in land ownership, resource access, and financial capital have systematically limited women's opportunities for leadership and entrepreneurship (Masuku et al., 2023).These structural constraints, although often less visible in formal company data, manifest themselves in the composition of corporate boards, ownership structures, and entrepreneurial activity—dimensions this study seeks to explore through company-level analysis. Simultaneously, institutional theory highlights the role of cultural norms, formal regulations, and organizational practices in reinforcing or challenging gendered structures (Kulkarni et al., 2020). In the context of the V4 countries, where historical legacies and socio-political transitions have shaped gender roles similarly, institutional factors could be particularly salient. Emerging pressures from European Union policies, including ESG disclosure requirements and sustainability initiatives, represent potential institutional shifts that could create more favorable environments for women's leadership. Leadership styles themselves are also important. Transformational leadership theory suggests that leaders who emphasize collaboration, vision, and ethical stewardship are particularly well-suited to drive organizations through periods of transition (Zhu & Huang, 2023).

Research indicates that women leaders often exhibit transformational qualities, which could be especially valuable in the dairy industry's current phase of environmental and market adaptation (Saleem et al., 2024). This theoretical perspective underscores the importance of examining not only the presence of women in leadership roles but also the organizational contexts—such as company size and governance structure—that may enable or constrain transformational leadership practices. Bringing these theoretical strands together, the present study positions the gendered patterns observed in the V4 dairy sector as products of intersecting structural and institutional dynamics. Rather than treating female underrepresentation as a standalone phenomenon, the analysis situates it within broader systems of economic opportunity, cultural expectations, and leadership adaptation.

Research Design and Methodology

This section outlines the research design and methodology employed to investigate gender dynamics in leadership within the dairy industry across the V4 countries. It provides a detailed description of the data sources, the data collection process, and the analytical methods applied.

Contextual Background

The study by Gawel et al., (2024) found a correlation between green transition and female entrepreneurship in agriculture across twenty-three EU member states. The research also highlighted variations among countries. To further explore these differences, this study focuses on the dairy industry of the V4 countries. The member states partly share their history and even cultural background, but lately regarding the Gender Equality Index (EIGE, 2023) they have present different approaches. The current dataset can also be used to verify the differences between the V4 countries highlighted by the study of Gawel et al., (2024). Since, the dairy sector is a significant contributor to agricultural GDP and is heavily influenced by government policies, making it a suitable representative for studying trends in general agriculture (Dhungana et al., 2024). Additionally, the industry faces challenges due to its environmental impact, leading to a transition that could present opportunities for female entrepreneurs (van Selm et al., 2021). This is further supported by the growing focus on gender equality within Environmental, Social, and Governance (ESG) disclosure (Khemakhem et al., 2023).

Data

ORBIS (Orbis Europe, 2024) has proven to be the most suitable database for the comparative analysis of dairy companies in the V4 region. Its advanced industry filtering capabilities and extensive coverage of EU countries make it a valuable resource. ORBIS provides detailed corporate structures and comprehensive information on company leaders, including their names and positions, while also covering solo entrepreneurs. In contrast, other databases, such as Bloomberg Terminal, primarily focus on publicly traded companies and financial markets. Although ORBIS is a high-quality data source, some instances of missing data were identified. While various imputation methods could be used to address these gaps, they risk distorting results and failing to ensure accurate representation. Consequently, excluding companies with insufficient data was deemed the most appropriate approach to maintain data reliability, even though this may influence the study's conclusions. As mostly small businesses were affected, they are less represented in the research, and the conclusions regarding them may therefore be less accurate. It is important to note that the current sample cannot be considered representative. The data was collected between 13 February 2024. and 6 March 2024, and it contains the latest available financial (2022) and management-related information connected to the studied variables (presented in Table 1). In total, five hundred and eighty-two companies were analyzed: seventy Czech, one hundred and twenty-nine Hungarian, two hundred and ninety-three Polish, and ninety Slovakian.

Table 1: The studied variables

Company	**Leadership**
Country	Number of board members
Founded	Number of females within board members
Profit after tax	Number of males within board members
Number of employees	Number of shareholders
Number of subsidiaries	Chairman of the board
	Working days

Source: Authors' elaboration, 2025

Statistical Methods

Prior to statistical analysis, the normality of the data was evaluated using the Shapiro-Wilk and Kolmogorov-Smirnov tests. This step ensured the selection of appropriate statistical methods for subsequent analyses. The Kolmogorov-Smirnov test is a statistical tool used to compare the distributions of two groups, regardless of whether they follow a specific pattern (Berger & Zhou, 2014). The Shapiro-Wilk test is a nonparametric method to analyze the variables' distribution, which doesn't require any specific assumptions about the data's distribution (Hanusz et al., 2016). Since both of the tests indicated that the data was not normally distributed, the requirements for using one-way ANOVA test were not met (T. K. Kim, 2017). The Mann-Whitney U test was used to compare the distributions of two independent groups, regardless of whether they follow a specific pattern, based on the ranks assigned to the data points within the combined groups (MacFarland & Yates, 2016). Principal Component Analysis (PCA) was used to transform the related variables in the dataset. This multivariate statistical procedure reduces the number of dimensions in the data by "compressing" it into fewer variables than the original, while the fewer factors contain nearly the same amount of data (Kherif & Latypova, 2020). Before running it, some conditions had to be checked. One of them is the correlation matrix, which shows the correlation between variables in the database. The other is the anti-image matrix which decomposes the variables into explained and unexplained squares of variance. The elements outside the diagonal represent the fraction of variance that is not dependent on the other variables, therefore, they should have low values in these positions (Shlens, 2014). The run of Bartlett's test is also important. It tests whether the deviation of values outside the main diagonal from zero is random (Aslam, 2020). The Kaiser-Meyer-Olkin (KMO) criterion should be used too, to measure the suitability of variables for factor analysis (Rojas-Valverde et al., 2020).

Results and Discussion

To reveal the hypothetical dissimilarities between the clusters one-way ANOVA or the Student's t-test was planned to be used. However, as the Kolmogorov-Smirnov and the Shapiro-Wilk tests showed a lack of normal distribution in the dataset, alternative methods were necessary. The Mann-Whitney U test and the Kruskal-Wallis test could be considered as ideal

nonparametric alternatives to the one-way ANOVA since they are not sensitive to violations of normality. The suitability of the dataset was first assessed to determine whether it met the assumptions of the test. The variables met the assumptions required for the Mann-Whitney U Test. The independence of observations was ensured, as group members' values were not dependent on each other. While Q-Q plots indicated some outliers, these were considered valid data points rather than errors resulting from data collection. To address potential distortions caused by differences in sample sizes, the analysis was conducted within countries rather than across countries.

First, the share of women-led companies was identified within the dairy sector of the V4 countries. The results showed that the highest number of women directors was found in Hungary, and the lowest in the Czech Republic. The analysis of business-related variables revealed that, in most cases, there was no significant difference between the age of the company and whether it was run by a man or a woman, except in the Czech Republic, where older companies tended to be run by men.

Table 2: The age of the company and the gender of the Chairman

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
Slovakia	The distribution of old company (years) is the same across categories of Chairman of the Board.	Independent-Samples Mann-Whitney U Test	0.958	Retain the null hypothesis.
Hungary			0.55	Retain the null hypothesis.
Czech Republic			0.010	Reject the null hypothesis.
Poland			0.098	Retain the null hypothesis.

Source: Authors' elaboration, 2025

In relation to the number of employees, companies with more employees were more likely to be managed by men in Hungary and Poland. At the same time, no significant difference related to this variable was found in businesses located in Slovakia and the Czech Republic.

Table 3: The number of employees and the gender of the Chairman

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
Slovakia	The distribution of Number of employees is the same across categories of Chairman of the Board.	Independent-Samples Mann-Whitney U Test	0.872	Retain the null hypothesis.
Hungary			0.025	Reject the null hypothesis.
Czech Republic			0.183	Retain the null hypothesis.
Poland			0.045	Reject the null hypothesis.

Source: Authors' elaboration, 2025

Profit after tax did not show any statistically significant differences among dairy enterprises in any of the V4 member countries.

Table 4: Profit after tax and the gender of the Chairman

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
Slovakia	The distribution of profit after tax is the same across categories of Chairman of the Board.	Independent-Samples Mann-Whitney U Test	0.545	Retain the null hypothesis.
Hungary			0.717	Retain the null hypothesis.
Czech Republic			0.286	Retain the null hypothesis.
Poland			0.436	Retain the null hypothesis.

Source: Authors' elaboration, 2025

A higher number of directors is less favorable for women in Slovakian dairy companies, which supports male leadership. However, in the other three countries, it does not appear to be connected with the gender of the manager.

Table 5: Number of board members and the gender of the Chairman

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
Slovakia	The distribution of Number of board members is the same across categories of Chairman of the Board.	Independent-Samples Mann-Whitney U Test	0.011	Reject the null hypothesis.
Hungary			0.51	Retain the null hypothesis.
Czech Republic			0.226	Retain the null hypothesis.
Poland			0.506	Retain the null hypothesis.

Source: Authors' elaboration, 2025

In each case, except in Slovakia, when the number of female board members was high, the business was more likely to be directed by women. Conversely, when the number of male board members was high, the company was more likely to be managed by men.

Table 6: Number of shareholders and the gender of the Chairman

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
Slovakia	The distribution of number of shareholders is the same across categories of Chairman of the Board.	Independent-Samples Mann-Whitney U Test	0.947	Retain the null hypothesis.
Hungary			0.078	Retain the null hypothesis.
Czech Republic			0.726	Retain the null hypothesis.
Poland			0.046	Reject the null hypothesis.

Source: Authors' elaboration, 2025

A higher number of shareholders seems to be advantageous for women. In Poland, more women-directed companies were found in cases where there were more shareholders. However, in Slovakia, Hungary, and the Czech Republic, this variable did not differ significantly between companies run by men and those run by women.

Table 7: Number of subsidiary and the gender of the Chairman

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
Slovakia	The distribution of number of subsidiary is the same across categories of Chairman of the Board.	Independent-Samples Mann-Whitney U Test	0.366	Retain the null hypothesis.
Hungary			0.387	Retain the null hypothesis.
Czech Republic			0.975	Retain the null hypothesis.
Poland			0.049	Reject the null hypothesis.

Source: Authors' elaboration, 2025

In general, the number of subsidiaries did not differ significantly within the dairy businesses led by women or men. Although the more subsidiaries a company had, the more likely it was to be directed by men in Poland.

Table 8: Number of working days and the gender of the Chairman

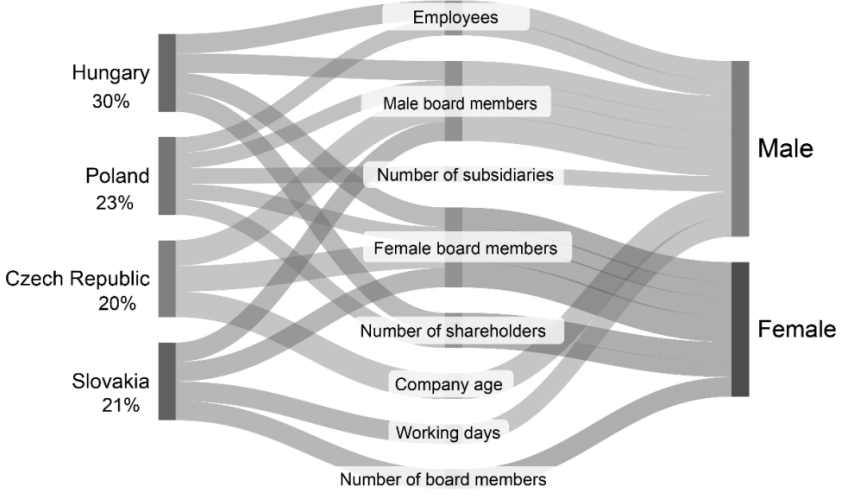
Hypothesis Test Summary				
	Null Hypothesis	Test	Sig.	Decision
Slovakia	The distribution of days as leader is the same across categories of Chairman of the Board.	Independent-Samples Mann-Whitney U Test	0.012	Reject the null hypothesis.
Hungary			0.904	Retain the null hypothesis.
Czech Republic			0.529	Retain the null hypothesis.
Poland			0.978	Retain the null hypothesis.

Source: Authors' elaboration, 2025

According to the companies analyzed, male directors in Slovakia enjoy the trust of owners for a longer period than female directors. In the other countries, no statistically significant difference was found related to this variable. A summary of these findings is presented in Figure 1.

The highest share of women leaders within the V4 countries could be found in Hungary, which aligns with the study of Gawel et al., (2024), where Hungary was associated with a higher share of female entrepreneurship. Poland belonged to the same cluster, but its supportive environment was far from that of Hungary. In contrast, the Czech Republic had the lowest share, which matches the findings of (Gawel et al., 2024), where a lower number of women leaders was suggested. The work of (Gawel et al., 2024) did not analyze Slovakia, however, the given case suggests, just like in the Czech Republic the number of female entrepreneurs is low.

Figure 1: Share of woman leaders and the business-related variables that could be significantly connected to gender differences



Source: Authors' elaboration, 2025

Note: The higher the value of the variable, the higher the probability of the indicated gender leadership

Through the run of Principal Component Analysis, various business sizes could be outlined, which probably influence the gender of the director. The run of the Kaiser-Meyer-Olkin Measure of Sampling Adequacy and the Bartlett test, in addition to the creation of correlation and anti-image matrixes, showed that the sample could be used for PCA. To identify the ideal component number, the Kaiser's rule was used. The eigenvalues showed (Table 9), that three factors should be defined to appropriately

characterize well the analyzed businesses since their eigenvalues are greater than one. With these, over sixty-five percent of the variance could be explained.

Table 9: Principal component analysis of business-related variables

	Initial Eigenvalues		
Component	**Total**	**% of Variance**	**Cumulative %**
1	3.092	38.653	38.653
2	1.165	14.562	53.215
3	1.011	12.641	65.856
4	0.942	11.775	
5	0.679	8.486	
6	0.609	7.611	
7	0.502	6.272	
8	1.892E-15	2.365E-14	

Source: Authors' elaboration, 2025

The factor loads of the agricultural enterprises' variables highlighted the markedly different approach to the gender of the director according to the possible characteristics of the company (Table 10).

Table 10: The new components and the factor load of the company-related variables

	Small Business	**Medium Business**	**Large Business**
Company's age	0.192	-0.196	0.688
Number of employees	-0.013	-0.154	0.667
Number of directors	-0.076	0.087	0.917
Number of female directors	0.082	0.755	0.307
Number of male directors	-0.127	-0.291	0.863
Number of shareholders	0.185	0.626	0.145
Number of subsidiaries	0.462	0.024	0.604
Working days	0.835	-0.220	-0.329

Source: Authors' elaboration, 2025

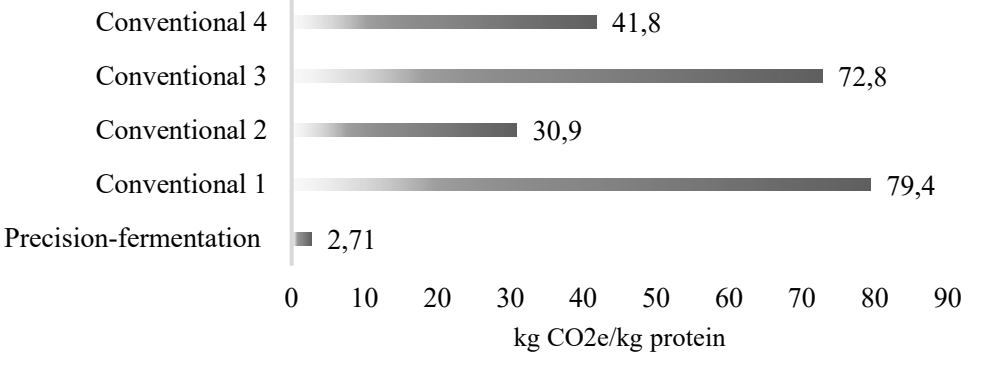
Businesses with a longer history (age), a high number of employees, directors, and subsidiaries are typically large nationwide or even internationally operating companies that are run by male-dominated boards, a trend widely documented in corporate governance research (Li & Chen, 2018). These enterprises are more likely to be directed by men due to entrenched gender norms and access to leadership networks (Díez-Martín et al., 2024). In contrast, medium-sized enterprises seem to have more shareholders (Beck & Demirguc-Kunt, 2006) which could increase the opportunities for female leadership. This may facilitate women's chance of securing positions not as board members but also as directors (Rastad & Dobson, 2022). However, the relationship between ownership structure and leadership gender composition remains underexplored and may be influenced by additional firm-specific factors (Alshareef, 2024). Small enterprises which are often founded and directed by one person do not face the same leadership competition. Consequently, the founder's access to capital, industry experience, and personal networks likely play a more decisive role in leadership than gender alone (Dessein & Prat, 2022). Yet, gender dynamics in small businesses are not entirely neutral, as access to financing and institutional support can still pose challenges for women entrepreneurs (Radhakrishnan & Ping Ho, 2025).

The study of Han et al., (2019) shows similar findings, where the female CEOs' share was the lowest among those companies that have one hundred eighty-two or more employees. The same work highlighted the lowest share of women by businesses older than twelve years. Plenty of studies revealed that the bigger the company, the higher the probability of being led by a man (Bureau for Employers' Activities, 2019). Numerous international studies revealed the gender composition of the board has an effect on the CEO's gender (Dah et al., 2020). In Germany, for instance, women hold only about five percent of board seats in the top 200 companies, reinforcing the trend of male dominance in larger firms (Holst & Kirsch, 2014). Since these large companies often have subsidiaries and extensive market experience, they are also more likely to be led by men (Audretsch & Guenther, 2023). However, further research is needed to understand the role of ownership and governance structures in shaping gender representation in different business sizes. The number of shareholders' potential influence on the gender composition of company boards has not been extensively studied (Rastad & Dobson, 2022). Still, given that founders play a crucial role in decision-making and business growth in micro and small enterprises, their influence could shape gender

representation differently in these firms compared to larger ones (Meressa, 2020).

The underrepresentation of women in leadership has been recognized by the EU, which has launched the "Promoting Gender Equality in European Agriculture" project (European Commission, 2024). This initiative seeks to address intersecting forms of discrimination that disadvantage women in agriculture. However, its primary focus is on fostering gender-inclusive policies for start-ups and smaller businesses rather than addressing structural inequalities in larger firms. At the same time, the latest technological developments in the dairy industry are likely to reshape the current relations. Even though GMOs (genetically modified organisms) are prohibited within the EU, future regulatory changes could alter this stance, potentially introducing efficiency gains and cost reductions on a larger scale (Kavhiza et al., 2022). Other innovations, such as precision fermentation (Chai et al., 2022) and cellular agriculture (Yart et al., 2023) offer alternative dairy production methods that reduce environmental impact (Figure 2). The application of new raw materials, like fungi, legumes, nuts, or seeds, could further transform the industry (Kamath et al., 2022).

Figure 2: Greenhouse gas emissions of protein made by precision-fermentation and conventional method (from milk)



Source: Authors' elaboration, based on Perfect Day (2021), 2025

Note: The various conventional values were measured by other studies

Precision fermentation-derived proteins enable the production of animal-free dairy products with significantly lower greenhouse gas emissions, contributing to sustainability goals (Hilgendorf et al., 2024).

Consumers are increasingly supportive of sustainable alternatives, which could accelerate market shifts (Banovic & Grunert, 2023). Currently, start-ups and smaller firms are pioneering many of these micro-level solutions. These firms can scale through direct market entry, partnerships with established companies, or acquisitions, the latter of which may reshape the industry's competitive landscape. While these innovations may create opportunities for women-led businesses, they could also reinforce existing inequalities if market consolidation favors larger firms. As novel food technologies gain traction, larger enterprises with greater capital and infrastructure may benefit disproportionately, potentially limiting the role of smaller businesses, including those led by women. Thus, while gender diversity in leadership may improve among smaller enterprises, the overall female representation in dairy leadership could decline if market concentration intensifies. Future policy interventions should consider both technological transformation and gender inclusivity to ensure equitable opportunities across different business sizes (Del Baldo, 2022; Wahab, et al., 2022).

Conclusion

Gender equality and environmental sustainability are crucial SDGs that significantly impact the agricultural sector. The dairy industry, a key contributor to agricultural GDP, faces mounting challenges from shifting consumer preferences, the rise of milk substitutes, and increasing scrutiny of traditional dairy production methods. Addressing these challenges presents an opportunity to enhance gender diversity in a historically male-dominated field. Despite the shared historical and cultural background of the V4 countries, their approaches to women's leadership in the dairy sector vary considerably. The findings confirm that Hungary and Poland exhibit a relatively higher share of female directors, while the Czech Republic and Slovakia have fewer women in leadership roles. However, the determinants of gender representation differ across countries. In Hungary, a greater share of women-led businesses exists despite notable structural biases. In contrast, Czech dairy enterprises, which display fewer explicit barriers, still have the lowest proportion of female directors, suggesting the influence of deeper cultural or systemic factors being at play. Company size emerged as a significant determinant of gender representation. Larger, well-established companies with extensive subsidiaries and male-dominated boards are more

likely to be led by men, reinforcing trends observed in corporate governance research. Medium-sized enterprises, characterized by a higher number of shareholders and a more balanced board composition, provide greater opportunities for women in leadership. Small and micro-enterprises, often led by their founders, are less influenced by gender but remain shaped by access to capital and resources. These findings align with broader global research, highlighting persistent gender disparities at the upper levels of corporate hierarchies.

To address these structural imbalances more effectively, the use of softer policy tools could be more successful than rigid quotas. For instance, introducing voluntary gender diversity targets within agricultural business programs could encourage dairy companies to gradually promote female leadership without compromising perceptions of merit-based advancement. Voluntary targets would respect corporate autonomy while setting clear expectations for progress, thus fostering cultural change from within rather than through external enforcement.

Additionally, fostering women's leadership may be better supported through industry-driven initiatives rather than government mandates. Encouraging dairy cooperatives and sectoral organizations to create mentorship and networking opportunities for women entrepreneurs could offer more organic pathways to leadership. By strengthening professional connections and peer support systems, these initiatives can reduce the isolation that many women leaders face, particularly in traditional industries like agriculture. Over time, such community-based efforts could significantly lower informal barriers to women's advancement.

While ESG disclosure requirements offer another avenue for promoting gender diversity, achieving meaningful progress will likely depend on a combination of cultural change, political support, and innovative business practices that prioritize inclusiveness and sustainability.

Naturally, the present study is not without limitations. The sample, though substantial, is not representative. Methodological constraints, such as reliance on cross-sectional data and non-parametric tests, also limit the causal interpretations that can be drawn. Future research could expand the dataset longitudinally to capture trends over time and explore qualitative approaches to better understand the cultural and organizational dynamics behind gender disparities. Broader comparative studies, incorporating additional EU countries or examining different agricultural sectors, could

further enrich the understanding of gender dynamics in the green transition of European agriculture.

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Appendix - Characteristics of the sample

Variable	Subcategory/Range	Count (N)	Percentage (%)
Country	Czech Republic	70	12,0%
	Hungary	129	22,2%
	Poland	293	50,3%
	Slovakia	90	15,5%
Company: Founded (year)	1900-1950	30	5,2%
	1951-2000	195	33,5%
	2001-Present	357	61,3%
Company: Profit After Tax (EUR)	<0	200	34,4%
	0-1M	8	1,4%
	1M-10M	79	13,6%
	10M+	295	50,7%
Company: Number of Employees	1-50	327	56,2%
	51-250	212	36,4%
	251+	43	7,4%
Company: Number of Subsidiaries	0	523	89,9%
	1-5	53	9,1%
	6+	6	1,0%
Leadership: Board Members	1-3	447	76,8%
	4-6	47	8,1%
	7+	88	15,1%
Leadership: Female Board Members	0	313	53,8%
	1	171	29,4%
	2+	98	16,8%
Leadership: Male Board Members	0	93	16,0%
	1	247	42,4%
	2+	242	41,6%
Leadership: Number of Shareholders	1	212	36,4%
	1-5	308	52,9%
	6+	62	10,7%

Variable	**Subcategory/Range**	**Count (N)**	**Percentage (%)**
Leadership: Chairman of Board	Female	107	18,4%
	Male	475	81,6%
Leadership: Working Days	<365	311	53,4%
	365-1095	39	6,7%
	1095+	232	39,9%

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