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FINANCIAL INCLUSION AND FINANCIAL SUSTAINABILITY OF WOMEN-OWNED SMALL AND MEDIUM ENTERPRISES IN MARSABIT COUNTY, KENYA

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Abstract:

Purpose of the Study: The study examined the effect of financial inclusion on the financial sustainability of women-owned small and medium enterprises in Marsabit County, Kenya. Specifically, it investigated the effects of availability of financial services, access to credit, financial literacy, and digital financial platforms on financial sustainability, as measured through operational self-sufficiency.

Methodology: The study adopted a positivist research philosophy and a descriptive-explanatory research design. The target population comprised 828 registered women-owned enterprises, from which 270 were selected through stratified random sampling. Data were collected using structured questionnaires and secondary data abstraction sheets and analysed using descriptive statistics, Pearson correlation and multiple regression.

Findings: The study achieved a response rate of 78.5%. Regression results revealed that availability of financial services ($B = 6.6738$, $p < 0.001$), access to credit ($B = 5.4423$, $p < 0.001$), financial literacy ($B = 8.4074$, $p < 0.001$), and digital financial platforms ($B = 8.9399$, $p < 0.001$) had positive and statistically significant effects on financial sustainability. The regression model explained 48.5% of the variation in financial sustainability. Digital financial platforms recorded the largest unstandardised regression coefficient, followed by financial literacy, availability of financial services, and access to credit. All four null hypotheses were rejected, demonstrating the statistical significance of financial inclusion.

Conclusion: The study concluded that financial inclusion significantly enhances the financial sustainability of women-owned enterprises in Marsabit County. It recommends expanding affordable financial services, improving credit accessibility, strengthening practical financial literacy programmes, and investing in digital financial infrastructure to promote operational self-sufficiency, enterprise resilience, sustainable business growth, and women's economic empowerment.

***Keywords**: Financial Inclusion, Financial Sustainability, Availability of Financial Services, Access to Credit, Financial Literacy, Digital Financial Platforms, Women-Owned SMEs.*

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1. INTRODUCTION

1.1 Background of the Study

Small and medium enterprises (SMEs) make up around 90 percent of all businesses and provide more than half of employment worldwide. In developing countries, they are central to economic diversification, productivity growth and poverty reduction (World Bank, 2025). Supporting women-owned enterprises is therefore closely tied to inclusive growth and to Sustainable Development Goals 1 (no poverty), 5 (gender equality) and 8 (decent work and economic growth) (United Nations, 2023). Yet the survival of women-owned SMEs remains fragile. Many struggle to earn enough to cover their running costs, to reinvest, and to build the savings that would help them withstand shocks. Access to appropriate financial services is widely regarded as one of the most important conditions for changing this picture.

1.1.1 Global Perspective

Financial inclusion has widened considerably in recent years. The Global Findex 2021 reported that 76 percent of adults worldwide held an account at a financial institution or with a mobile money provider, up from 51 percent in 2011. It also found that the gender gap in account ownership in developing economies had narrowed from 9 to 6 percentage points (Demirgüç-Kunt *et al.,* 2022). Owning an account is not the same as having the finance needed to run and sustain a business, however. The IFC–World Bank estimate for 119 emerging and developing economies puts the unmet financing need of micro, small and medium enterprises at about US$5.7 trillion. About US$1.9 trillion of this, or 34 percent, relates to women-owned enterprises (World Bank [WB], 2025). Earlier estimates placed the credit gap for women-owned and women-led SMEs at US$1.4–1.7 trillion, even though female borrowers tend to have lower default rates (International Finance Corporation [IFC], 2022). These figures show that the world has been more successful in connecting women to financial accounts than in connecting women's businesses to the credit, savings and payment services that make them sustainable.

1.1.2 Regional Perspective

Sub-Saharan Africa illustrates both the promise and the limits of this progress. In 2021, 55 percent of adults in the region had an account, including 33 percent who had a mobile money account, the largest share of any region and more than three times the global average (Demirgüç-Kunt *et al.,* 2022). Mobile money has been especially important for women. In Kenya, Suri and Jack (2016) found that access to the M-Pesa agent network raised household consumption and lifted about 2 percent of Kenyan households out of poverty, with the largest effects among female-headed households, partly because women moved into business and retail occupations.

More recent evidence shows that mobile money use reduces the performance disadvantage that women-owned firms face because of financial constraints (Lemma & Mlilo, 2025; Tamba & Murithi, 2024). Even so, usage barriers persist. The Global Findex found that about one-third of mobile money account holders in Sub-Saharan Africa could not use their accounts without help from a family member or an agent (Demirgüç-Kunt *et al.,* 2022). This points to the importance of financial literacy and confidence, and not only of access.

1.1.3 The Kenyan Context

Kenya is among the leading countries in financial inclusion. The 2024 FinAccess Household Survey reported that 84.8 percent of adults were financially included, comprising 84.1 percent of women and 85.7 percent of men, a gender gap of only 1.6 percentage points (Central Bank of Kenya [CBK], Kenya National Bureau of Statistics [KNBS], & Financial Sector Deepening [FSD] Kenya, 2024). Micro, small and medium enterprises are a major part of the economy. The 2016 national MSME survey estimated that there were about 7.41 million such businesses, that they engaged about 14.9 million people, and that they contributed roughly a third of gross domestic product (KNBS, 2016). The same survey found that more than 70 percent of these businesses relied mainly on the owner's or family funds for capital (KNBS, 2016). This suggests that near-universal access to accounts has not yet translated into adequate finance for enterprise growth. Government and partner programmes, including the Women Enterprise Fund and the Uwezo Fund, were designed to ease this constraint, but the sustainability of many women-owned businesses remains in question.

1.1.4 Marsabit County

Marsabit County lies in northern Kenya, has a predominantly arid and semi-arid landscape, and had a population of 459,785 at the 2019 census (KNBS, 2019). Distances between settlements are long, and financial service points are few. A pilot by FSD Kenya in the county between 2016 and 2021 targeted extremely poor households, mainly women, with savings groups and links to markets and finance. Of its 1,200 beneficiaries, 83 percent were women. The pilot was motivated by the recognition that taking up a financial account was not enough to meet people's needs (FSD Kenya, 2022). Local reporting similarly indicates that more than half of the small businesses in the county are owned by women, but that many women hesitate to seek formal loans. Reasons given include collateral requirements, the need for a husband's consent, low financial literacy, and religious objections to interest-bearing credit. Mobile money has improved liquidity for many traders, but trust, confidence and the digital divide still limit effective use. These conditions make Marsabit a demanding test of whether financial inclusion supports enterprise sustainability.

1.1.5 Financial Inclusion and Financial Sustainability

Financial inclusion is the access to, and effective use of, affordable and reliable financial services such as payments, savings, credit and insurance by individuals and businesses. It concerns the meaningful use of financial systems to create opportunity and security, and not only the opening of an account (Demirgüç-Kunt et al., 2022). It is multidimensional. In remote, low-income areas, access to credit, financial knowledge and digital channels may matter as much as the number of institutions. This study therefore examined four dimensions: availability of financial services, access to credit, financial literacy and digital financial platforms. Each corresponds to a barrier reported for women entrepreneurs in arid areas, as described above.

Financial sustainability is the capacity of an enterprise to generate enough income to cover its costs and continue operating without external subsidy (Saidi et al., 2022). It is measured here as operational self-sufficiency, which is the ratio of operating revenue to operating expenses. A ratio above 1 shows that an enterprise earns more than it spends on operations.

1.2 Statement of the Problem

Financial inclusion is expected to help women-owned enterprises to survive and grow by giving them safe ways to save and pay, affordable credit, and the knowledge to manage money well. In Kenya, national indicators suggest that the access part of this expectation has largely been met, since the gender gap in financial inclusion is now only 1.6 percentage points (CBK et al., 2024). However, the financial position of women-owned enterprises has not improved to the same degree. Most MSMEs still depend mainly on own or family funds (KNBS, 2016), and globally the finance gap facing women-owned enterprises remains very large (International Finance Corporation, 2022; World Bank, 2025). The difficulty is greater in arid and semi-arid counties such as Marsabit, where long distances, limited collateral, low financial literacy, cultural and religious constraints, and uneven digital access combine to keep women from using formal finance (FSD Kenya, 2022).

The existing evidence does not resolve this problem. Studies in Kenya have examined credit and financial performance among women-owned enterprises in Kilifi and Eldoret (Kalama & Mutswenje, 2023; Nderitu, 2025), financial literacy among women's investment groups in Nairobi (Githaiga & Bula, 2023), and mobile money and the performance gap nationally (Lemma & Mlilo, 2025; Tamba & Murithi, 2024). These studies reached mixed conclusions. For instance, financial literacy was found to matter in Nairobi but not in Kilifi, which suggests that the effect depends on context. None of them examined women-owned SMEs in Marsabit County. None assessed availability of financial services, access to credit, financial literacy and digital financial platforms together in one model. Most also used broad measures of financial performance and

not operational self-sufficiency, which shows directly whether an enterprise can cover its operating costs from its own revenue.

Without evidence on which dimensions of financial inclusion matter most for sustainability in this setting, policymakers, financial institutions and development partners risk directing scarce resources to the wrong interventions. Women-owned enterprises in Marsabit would then continue to operate at the margin of viability. This study addresses that gap by analysing the effect of availability of financial services, access to credit, financial literacy and digital financial platforms on the financial sustainability of women-owned SMEs in Marsabit County.

1.3 Objectives of the Study

The overall objective of the study was to examine the effect of financial inclusion on the financial sustainability of women-owned SMEs in Marsabit County, Kenya. The specific objectives were to:

(i) Determine the effect of availability of financial services on the financial sustainability of women-owned SMEs in Marsabit County, Kenya.

(ii) Assess the effect of access to credit on the financial sustainability of women-owned SMEs in Marsabit County, Kenya.

(iii) Evaluate the effect of financial literacy on the financial sustainability of women-owned SMEs in Marsabit County, Kenya.

(iv) Examine the effect of digital financial platforms on the financial sustainability of women-owned SMEs in Marsabit County, Kenya.

1.4 Research Hypotheses

The study tested the following null hypotheses:

$H0_1$: Availability of financial services has no statistically significant effect on the financial sustainability of women-owned SMEs in Marsabit County.

$H0_2$: Access to credit has no statistically significant effect on the financial sustainability of women-owned SMEs in Marsabit County.

$H0_3$: Financial literacy has no statistically significant effect on the financial sustainability of women-owned SMEs in Marsabit County.

$H0_4$: Digital financial platforms have no statistically significant effect on the financial sustainability of women-owned SMEs in Marsabit County.

1.5 Significance of the Study

The study is significant for policy and practice. It provides evidence to guide the CBK, the Ministry of Gender, and county governments in designing financial inclusion interventions tailored to arid and semi-arid regions. It also offers practical insights for microfinance institutions and digital financial service providers seeking to support women entrepreneurs. For scholarship, the study extends the application of financial inclusion theories to a fragile and under-researched context.

1.6 Scope of the Study

The scope was limited to registered women-owned SMEs in Marsabit County, focusing on four financial inclusion dimensions and operational self-sufficiency as the measure of financial sustainability. The study was conducted between 2023 and 2025.

2. LITERATURE REVIEW AND HYPOTHESES

2.1 Theoretical Review

This study was anchored on five theories. Financial Intermediation Theory suggests that financial institutions reduce transaction costs and information asymmetry by channelling funds from savers to borrowers (Demirgüç-Kunt *et al.,* 2022). In the context of women-owned SMEs, financial intermediary's banks, microfinance institutions, and savings cooperatives mobilise savings and extend credit, thereby enabling enterprise investment and smoothing cash flows. The theory implies that the availability of financial intermediaries and the efficiency of their intermediation function are central to enterprise sustainability.

Pecking Order Theory suggests that firms prefer internal financing (retained earnings) first, followed by debt, and finally external equity (Amoa-Gyarteng & Dhliwayo, 2024). For women-owned SMEs in Marsabit, limited retained earnings and constrained access to external equity make debt particularly microcredit the most feasible external source of finance. The theory highlights the importance of access to credit and the cost of borrowing in shaping enterprise financial decisions and sustainability.

Human Capital Theory holds that knowledge, skills, and experience are productive assets that enhance individual and organisational performance (Kong & Kim, 2022). Financial literacy is a form of human capital that enables entrepreneurs to interpret loan terms, maintain records, manage budgets, and make informed financial decisions. The theory supports the inclusion of financial literacy as a determinant of financial sustainability.

The Technology Acceptance Model (TAM) explains how users come to accept and use new technologies based on perceived usefulness and perceived ease of use (Johnen *et al.,* 2023). In

the context of digital financial platforms, TAM suggests that women entrepreneurs will adopt mobile money and online banking when they perceive these tools as useful for their businesses and easy to use. The model justifies examining digital financial platforms as a dimension of financial inclusion.

Financial Sustainability Theory focuses on an enterprise's capacity to generate sufficient income to cover its costs and maintain operations without external subsidy (Saidi et al., 2022). The theory identifies financial planning, income diversification, sound financial administration, and own-income generation as pillars of sustainability. Operational self-sufficiency the ratio of operating revenue to operating expenses is a direct measure of this capacity. The theory provides the dependent variable framework for the study.

2.2 Empirical Review

Availability of financial service: The availability of financial services refers to the ease with which entrepreneurs can access and use formal banking channels, including the physical proximity of banks, microfinance outlets, and savings cooperatives, as well as the reliability of these services (Demirgüç-Kunt *et al.,* 2022). In Marsabit County, long distances between business centres and financial agents make access costly and time-consuming (CBK, 2023). Studies in Kenya have shown that branch density and the presence of financial agents are associated with higher financial inclusion and enterprise growth (FSD Kenya, 2023). However, availability alone does not guarantee use; affordability, trust, and product diversity also matter. The present study measured availability through neighbourhood presence, number of service outlets, access frequency, convenience, and product variety.

Access to credit: Access to credit is the capacity of women entrepreneurs to obtain loans and credit facilities fairly, timely, and affordably (OECD, 2023). Formal credit is limited in many parts of Marsabit, and available facilities often charge high interest rates or require collateral that women cannot provide (FSD Kenya, 2023). Kalama and Mutswenje (2023) found that access to credit had a statistically significant positive effect on the financial performance of small-scale women enterprises in Kilifi County, Kenya. Similarly, Nderitu (2025) reported that credit accessibility significantly influenced the financial performance of women-owned enterprises in Eldoret City. Access to credit was measured in this study through loan availability, interest rate affordability, repayment flexibility, adequacy and timeliness of disbursement, and satisfaction with the borrowing process.

Financial literacy: Financial literacy refers to entrepreneurs' awareness, knowledge, and practical skills regarding money and business decisions (IMF, 2021). It includes reading financial statements, understanding interest rates, and managing budgets (OECD, 2023). Githaiga and Bula (2023) found that financial literacy had a strong positive influence on the entrepreneurial

sustainability of women investment groups in Nairobi. However, Kalama and Mutswenje (2023) found that financial literacy training had no statistically significant effect on financial performance in Kilifi, suggesting that context and the quality of training matter. Financial literacy was measured in this study through interpretation of loan terms, record-keeping, understanding of savings and insurance products, budget management, and confidence in using digital financial tools.

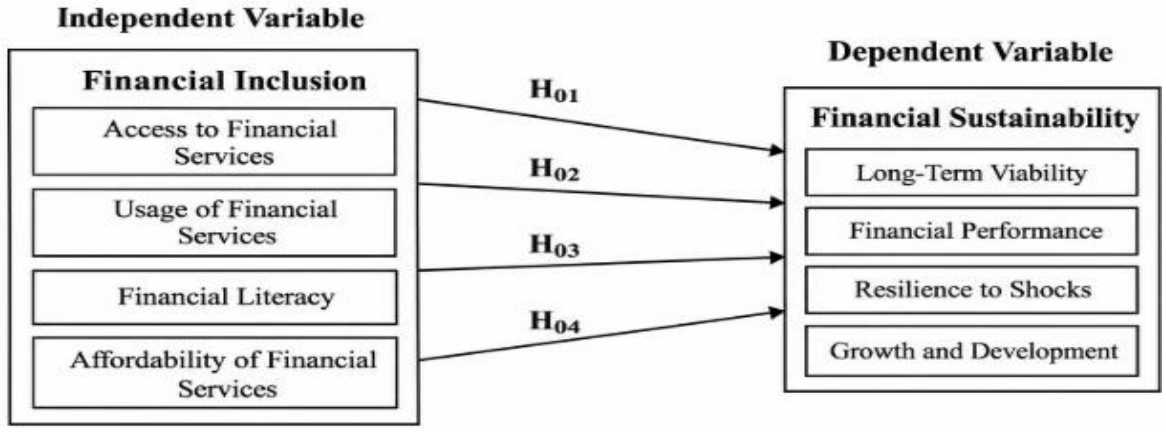
Digital financial platforms: Digital financial platforms refer to the use of mobile and online platforms to conduct financial transactions, including mobile money, mobile banking, and digital savings and credit products (Tamba & Murithi, 2024). Lemma and Mlilo (2025) demonstrated that more extensive use of mobile money reduced the gendered performance gap for women-owned businesses in Kenya by about 42.5%. Tamba and Murithi (2024) similarly found that mobile money use reduced the performance disadvantage of female-owned firms arising from financial constraints. Digital financial platforms were measured in this study through regularity of mobile transactions, savings deposits, loan usage, digital payments, and remittances.

2.3 Conceptual Framework

The conceptual framework posits that financial inclusion, represented by four dimensions availability of financial services, access to credit, financial literacy, and digital financial platforms affects financial sustainability, measured by operational self-sufficiency. The framework assumes that greater availability, easier access, higher literacy, and more extensive use of digital platforms enhance an enterprise's ability to cover operating costs from operating revenue. The relationship is expected to be positive and statistically significant for each dimension.

Figure 1

Conceptual Framework



3. METHODOLOGY

The study adopted a positivist philosophy and a descriptive-explanatory research design. The descriptive approach characterised respondents, their businesses and financial inclusion conditions, while the explanatory approach examined relationships between financial inclusion and the financial sustainability of women-owned SMEs in Marsabit County, Kenya. The target population comprised 828 registered women-owned SMEs. A sample of 270 enterprises was determined using Yamane's formula at a 5% margin of error. Stratified random sampling ensured representation across sub-counties and business sectors, including retail, trade, food processing and services, with proportional allocation.

Primary data were collected using structured questionnaires with closed-ended items measured on a five-point Likert scale. The questionnaire covered business characteristics, availability of financial services, access to credit, financial literacy, digital financial platforms and financial sustainability. Secondary data were collected using an abstraction sheet to calculate operational self-sufficiency where records were available. The instruments were pretested among 27 enterprises in a neighbouring sub-county. Content validity was assessed through expert review, while construct validity was examined using the KMO measure and Bartlett's test. Cronbach's alpha assessed reliability, with 0.70 as the minimum acceptable threshold. Normality, multicollinearity, heteroskedasticity and model specification were tested before regression.

Data were analysed in Stata 14 using descriptive statistics, Pearson correlation and multiple linear regression. Hypotheses were tested at the 5% significance level. The study observed informed consent, voluntary participation, confidentiality and anonymity. Ethical clearance was obtained from Kenyatta University Ethics Review Committee, and a NACOSTI research permit was formally secured.

4. RESULTS AND DISCUSSION

4.1 Response Rate

A total of 270 questionnaires were distributed, and 212 were returned and found usable. This represented a response rate of 78.5% (Table 4.3). This rate exceeded the 50% threshold considered adequate for social science research (Taherdoost, 2021), and it was therefore deemed sufficient for analysis.

Table 1
Response Rate of the Study

Category	Frequency	Percentage
Distributed questionnaires	270	100.0
Returned and usable	212	78.5
Not returned	58	21.5

4.2 Reliability and Validity Tests

Reliability was assessed using Cronbach's alpha. All constructs exceeded the 0.70 threshold, indicating good internal consistency (Table 1). Validity was assessed using the Kaiser–Meyer–Olkin measure and Bartlett's test of sphericity. The KMO value was 0.812, and Bartlett's test was significant ($p < 0.001$), confirming that the data were suitable for factor analysis (Table 1).

4.3 Descriptive Statistics

The descriptive statistics indicate that digital financial platforms had the highest mean score (M = 3.6550, SD = 0.7254), suggesting that respondents generally perceived digital financial platforms as relatively accessible and useful to their businesses. Financial literacy recorded a mean of 3.5775 (SD = 0.7476), indicating a moderately positive assessment of financial knowledge and skills among the respondents. Availability of financial services had a mean of 3.5817 (SD = 0.7414), suggesting that women-owned SMEs had a moderately positive perception of the availability of financial services in Marsabit County.

Access to credit recorded the lowest mean score (M = 3.5058, SD = 0.7795). Although the score was above the midpoint of the five-point Likert scale, it suggests that access to credit was relatively less favourable compared to the other financial inclusion dimensions. This indicates that some women-owned SMEs continued to experience challenges in accessing credit facilities.

Financial sustainability, measured using operational self-sufficiency (OSS), recorded a mean of 106.3851 (SD = 13.9128), with a minimum of 72.35 and a maximum of 138.54. Assuming the OSS figures are expressed as percentages, the mean value indicates that enterprises generated approximately 106.39% of the revenue required to cover their operating costs. This suggests that, on average, the enterprises were operationally self-sufficient, although the variation in scores indicates differences in their sustainability levels.

Table 2
Descriptive Statistics

Variable	N	Mean	Std. Dev.	Min	Max
Availability of Financial Services (AFS)	240	3.5817	0.7414	1.40	5.00
Access to Credit (AC)	240	3.5058	0.7795	1.20	5.00
Financial Literacy (FL)	240	3.5775	0.7476	1.40	5.00
Digital Financial Platforms (DFP)	240	3.6550	0.7254	1.60	5.00
Financial Sustainability (OSS)	240	106.3851	13.9128	72.35	138.54

Note. N = number of observations; M = mean; SD = standard deviation; Min = minimum; Max = maximum; OSS = operational self-sufficiency

4.4 Diagnostic Tests

Diagnostic tests were conducted before estimating the multiple linear regression model to establish whether the data satisfied the assumptions of linear regression. The tests covered normality, multicollinearity, heteroskedasticity and model specification. The findings are presented in the following subsections.

4.4.1 Normality Test

The Shapiro–Wilk test was used to establish whether the regression residuals were normally distributed. The results are presented in Table 3.

Table 3
Shapiro–Wilk Test for Normality

Variable	W	df	p-value
Regression residuals	0.987	212	0.184

Note. W = Shapiro–Wilk test statistic.

As presented in Table 3 the Shapiro–Wilk test produced a statistic of 0.987 and a p-value of 0.184. Since the p-value was greater than the 0.05 significance level, the null hypothesis of normality was not rejected. This indicates that there was no statistically significant evidence of departure from normality in the regression residuals. The result therefore supported the normality assumption required for the regression analysis.

4.4.2 Multicollinearity Test

The Variance Inflation Factor (VIF) and tolerance values were examined to determine whether the independent variables were highly correlated with one another. The results are presented in Table 4.11.

Table 4.

Variance Inflation Factor and Tolerance Results

Independent variable	VIF	Tolerance
Availability of financial services	1.84	0.543
Access to credit	2.12	0.472
Financial literacy	1.96	0.510
Digital financial platforms	2.34	0.427

Note. VIF = Variance Inflation Factor.

The findings in Table 4, indicate that the VIF values ranged from 1.84 to 2.34, while tolerance values ranged from 0.427 to 0.543. All VIF values were below the commonly applied threshold of 10, while all tolerance values exceeded 0.10. Digital financial platforms recorded the highest VIF of 2.34, whereas availability of financial services had the lowest VIF of 1.84. These findings indicate that the independent variables did not exhibit problematic multicollinearity. Therefore, all four financial inclusion dimensions could be retained in the multiple regression model without substantial concern about excessive correlations among the predictors.

4.4.3 Heteroskedasticity Test

The Breusch–Pagan/Cook–Weisberg test was conducted to determine whether the variance of the regression residuals was constant across observations. The results are presented in Table 4.12.

Table 5

Breusch–Pagan/Cook–Weisberg Test for Heteroskedasticity

Test statistic	Value
Chi-square (χ^2)	1.23
Degrees of freedom	4
p-value	0.267

The results in Table 5, show that the Breusch–Pagan/Cook–Weisberg test produced a chi-square statistic of 1.23 with four degrees of freedom and a p-value of 0.267. Since the p-value exceeded the 0.05 significance level, the null hypothesis of constant error variance was not rejected. This suggests that there was no statistically significant evidence of heteroskedasticity in the regression model. Consequently, the assumption of homoscedasticity was considered satisfied, supporting the use of ordinary least squares regression for examining the relationship between financial inclusion and financial sustainability.

4.4.4 Model Specification Test

The Ramsey Regression Equation Specification Error Test (RESET) was conducted to assess whether the regression model was appropriately specified. The test examined whether omitted

nonlinear combinations of the fitted values could indicate model misspecification. The findings are presented in Table 6.

Table 6

Ramsey RESET Test for Model Specification

Test statistic	Value
F-statistic	0.98
Degrees of freedom	3, 204
p-value	0.412

As shown in Table 6, the Ramsey RESET test produced an F-statistic of 0.98 and a p-value of 0.412. Since the p-value was greater than 0.05, the null hypothesis of no specification error was not rejected. This suggests that there was no statistically significant evidence of functional form misspecification in the estimated regression model. The findings therefore supported the use of the specified model in examining the effects of availability of financial services, access to credit, financial literacy and digital financial platforms on the financial sustainability of women-owned SMEs in Marsabit County.

Overall, the diagnostic tests indicated that the regression residuals did not significantly depart from normality, the independent variables did not exhibit problematic multicollinearity, the error variance was not significantly heteroskedastic, and the model showed no statistically significant specification error. These results provided support for proceeding with the multiple linear regression analysis.

4.5 Correlation Analysis

Pearson's product-moment correlation analysis was conducted to establish the direction and strength of the relationships between the four financial inclusion dimensions and the financial sustainability of women-owned SMEs in Marsabit County. The analysis examined the relationships between availability of financial services, access to credit, financial literacy, digital financial platforms and financial sustainability. The results are presented in Table 7.

Table 7

Pearson Correlation Matrix for Financial Inclusion and Financial Sustainability

Variable	1	2	3	4	5
1. Financial sustainability	1.00				
2. Availability of financial services	0.42**	1.00			
3. Access to credit	0.38**	0.31**	1.00		
4. Financial literacy	0.51**	0.29**	0.27**	1.00	
5. Digital financial platforms	0.47**	0.33**	0.30**	0.35**	1.00

Note. **p** < .01 (two-tailed).

The findings in Table 7 indicate that all four dimensions of financial inclusion had positive and statistically significant relationships with financial sustainability at the 1% significance level.

Availability of financial services had a positive and moderate correlation with financial sustainability ($r = 0.42$, $p < 0.01$). This suggests that women-owned SMEs reporting greater availability of financial services also tended to report higher levels of financial sustainability. The finding implies that the availability of banking services, savings facilities and other formal financial services may support enterprises in managing their financial resources and meeting operational obligations.

Access to credit also had a positive and statistically significant relationship with financial sustainability ($r = 0.38$, $p < 0.01$). The correlation indicates that enterprises with better access to credit tended to demonstrate higher financial sustainability. This suggests that credit facilities may help women-owned SMEs finance business activities, manage cash flow requirements and invest in business operations.

Financial literacy recorded the strongest correlation with financial sustainability ($r = 0.51$, $p < 0.01$). This indicates a positive and moderate relationship between financial knowledge and the ability of women-owned SMEs to maintain their financial operations. The finding suggests that financial literacy may enable business owners to make informed financial decisions, prepare budgets, manage expenditure and monitor business performance.

Digital financial platforms also demonstrated a positive and statistically significant correlation with financial sustainability ($r = 0.47$, $p < 0.01$). This suggests that greater use of digital financial platforms was associated with higher financial sustainability. Digital platforms may support efficient financial transactions, improve access to financial services and facilitate business payment processes.

The correlations among the independent variables ranged from 0.27 to 0.35, indicating relatively low to moderate relationships. These findings are consistent with the VIF results presented in Table 4.11, which showed no evidence of problematic multicollinearity.

4.6 Regression Analysis

Multiple linear regression analysis was conducted to establish the individual effects of availability of financial services, access to credit, financial literacy and digital financial platforms on the financial sustainability of women-owned SMEs in Marsabit County. Financial sustainability was measured using operational self-sufficiency (OSS). The analysis also established the overall explanatory power and statistical significance of the regression model.

The regression model was specified as follows:

$OSS = \beta_0 + \beta_1 AFS + \beta_2 AC + \beta_3 FL + \beta_4 DFP + \varepsilon$

Where:

- OSS = Operational self-sufficiency.
- β_0 = Regression constant.
- AFS = Availability of financial services.
- AC = Access to credit.
- FL = Financial literacy.
- DFP = Digital financial platforms.
- β_1–β_4 = Regression coefficients.
- ε = Error term.

The regression results are presented in Table 8.

Table 8

Multiple Linear Regression Results for Financial Sustainability

Variable	B	SE	t	p-value
Constant	12.4060	2.115	5.87	< .001
Availability of financial services	6.6738	1.214	5.50	< .001
Access to credit	5.4423	1.087	5.01	< .001
Financial literacy	8.4074	1.342	6.26	< .001
Digital financial platforms	8.9399	1.418	6.30	< .001

Model summary: $R^2 = 0.485$; Adjusted $R^2 = 0.475$; $F(4, 207) = 48.72$; $p < .001$.

Note. Dependent variable: Operational self-sufficiency (OSS). B = Unstandardised regression coefficient; SE = Standard error.

The results in Table 8 indicate that the regression model was statistically significant, $F(4, 207) = 48.72$, $p < .001$. This demonstrates that the four financial inclusion dimensions jointly had a statistically significant relationship with the financial sustainability of women-owned SMEs. The coefficient of determination (R^2) was 0.485, indicating that availability of financial services, access to credit, financial literacy and digital financial platforms jointly explained 48.5% of the variation in financial sustainability. The adjusted R^2 of 0.475 indicated that the model explained approximately 47.5% of the variation after adjusting for the number of predictors. The remaining

51.5% of the variation was attributable to other factors not included in the model and random error.

Regarding individual predictors, availability of financial services had a positive and statistically significant effect on financial sustainability (B = 6.6738, t = 5.50, p < .001). This indicates that a one-unit increase in the availability of financial services score was associated with an increase of approximately 6.67 units in operational self-sufficiency, holding the other financial inclusion dimensions constant. The finding suggests that the availability of banking, savings and other formal financial services contributes to the ability of women-owned SMEs to sustain their operations.

Access to credit also had a positive and statistically significant effect on financial sustainability (B = 5.4423, t = 5.01, p < .001). The coefficient indicates that a one-unit increase in the access to credit score was associated with an increase of approximately 5.44 units in operational self-sufficiency, holding the other variables constant. This suggests that access to credit enables women-owned SMEs to obtain additional financial resources for business operations, investment and working capital requirements. The finding highlights the importance of accessible credit facilities in supporting the financial sustainability of women-owned enterprises.

Financial literacy demonstrated a positive and statistically significant effect on financial sustainability (B = 8.4074, t = 6.26, p < .001). The coefficient indicates that a one-unit increase in financial literacy was associated with an increase of approximately 8.41 units in operational self-sufficiency, holding the other predictors constant. This finding suggests that financial knowledge and skills support better financial planning, budgeting, expenditure management and financial decision-making among women entrepreneurs. Financial literacy therefore plays an important role in strengthening the ability of women-owned SMEs to manage their resources and sustain their operations.

Digital financial platforms had the largest positive regression coefficient (B = 8.9399, t = 6.30, p < .001). This indicates that a one-unit increase in the digital financial platforms score was associated with an increase of approximately 8.94 units in operational self-sufficiency, holding the other variables constant. The finding suggests that the use of digital financial platforms supports efficient financial transactions, payment processing and access to financial services. These capabilities may improve business financial management and contribute to operational sustainability.

Comparatively, digital financial platforms recorded the largest unstandardised coefficient, followed by financial literacy, availability of financial services and access to credit. However, because the coefficients are unstandardised, their magnitudes should be interpreted cautiously when comparing the relative importance of predictors.

Overall, the regression findings demonstrate that all four financial inclusion dimensions had positive and statistically significant effects on the financial sustainability of women-owned SMEs in Marsabit County. The findings provide empirical support for the importance of financial service availability, credit access, financial literacy and digital financial platforms in strengthening enterprise sustainability.

4.7 Hypothesis Testing

Hypothesis testing was conducted using the multiple linear regression results to determine whether the four financial inclusion dimensions had statistically significant effects on the financial sustainability of women-owned SMEs in Marsabit County. The decisions were based on the regression coefficients and their corresponding p-values at a 5% significance level.

Hypothesis One: Availability of Financial Services

H_{01}: Availability of financial services has no statistically significant effect on the financial sustainability of women-owned SMEs in Marsabit County, Kenya.

The regression results showed that availability of financial services had a positive and statistically significant effect on financial sustainability ($B = 6.6738$, $t = 5.50$, $p < .001$). Since the p-value was below the 0.05 significance level, the null hypothesis was rejected. The study therefore established that availability of financial services significantly influenced the financial sustainability of women-owned SMEs in Marsabit County.

Hypothesis Two: Access to Credit

H_{02}: Access to credit has no statistically significant effect on the financial sustainability of women-owned SMEs in Marsabit County, Kenya.

The findings indicated that access to credit had a positive and statistically significant effect on financial sustainability ($B = 5.4423$, $t = 5.01$, $p < .001$). Since the p-value was below 0.05, the null hypothesis was rejected. The study therefore established that access to credit significantly influenced the financial sustainability of women-owned SMEs in Marsabit County.

Hypothesis Three: Financial Literacy

H_{03}: Financial literacy has no statistically significant effect on the financial sustainability of women-owned SMEs in Marsabit County, Kenya.

The regression results revealed that financial literacy had a positive and statistically significant effect on financial sustainability ($B = 8.4074$, $t = 6.26$, $p < .001$). Since the p-value was below the 0.05 significance level, the null hypothesis was rejected. The study therefore established that

financial literacy significantly influenced the financial sustainability of women-owned SMEs in Marsabit County.

Hypothesis Four: Digital Financial Platforms

H_{04}: Digital financial platforms have no statistically significant effect on the financial sustainability of women-owned SMEs in Marsabit County, Kenya. The findings demonstrated that digital financial platforms had a positive and statistically significant effect on financial sustainability ($B = 8.9399$, $t = 6.30$, $p < .001$). Since the p-value was below 0.05, the null hypothesis was rejected. The study therefore established that digital financial platforms significantly influenced the financial sustainability of women-owned SMEs in Marsabit County. In summary, all four null hypotheses were rejected. The findings established that availability of financial services, access to credit, financial literacy and digital financial platforms had positive and statistically significant effects on the financial sustainability of women-owned SMEs in Marsabit County, Kenya.

4.9 Discussion

The finding that availability of financial services enhances financial sustainability is consistent with Financial Intermediation Theory and with evidence that branch density and agent presence facilitate enterprise investment and cash-flow smoothing (Demirgüç-Kunt et al., 2022; FSD Kenya, 2023). In Marsabit, where distances to financial outlets are long, improving the physical and digital reach of financial services is likely to yield substantial sustainability gains.

The positive effect of access to credit corroborates the Pecking Order Theory proposition that debt is a critical external financing source for capital-constrained SMEs (Amoa-Gyarteng & Dhliwayo, 2024). It also aligns with empirical findings that credit access significantly improves the performance of women-owned enterprises in Kenya (Kalama & Mutswenje, 2023; Nderitu, 2025). Affordable interest rates, flexible repayment, and timely disbursement appear to be particularly important for women entrepreneurs who lack collateral.

The strong effect of financial literacy supports Human Capital Theory and the evidence that financial knowledge enables entrepreneurs to make sound financial decisions and sustain their enterprises (Githaiga & Bula, 2023; Kong & Kim, 2022). Although Kalama and Mutswenje (2023) found no significant effect of financial literacy training in Kilifi, the present study's measure captured applied literacy—record-keeping, budget management, and confidence in using digital tools—which may explain the difference. Financial literacy programmes that are practical and tailored to the local context are likely to be more effective than generic training.

The finding that digital financial platforms have the largest effect is consistent with the Technology Acceptance Model and with recent evidence that mobile money narrows the gendered performance gap for women-owned businesses in Kenya (Johnen et al., 2023; Lemma & Mlilo, 2025; Tamba & Murithi, 2024). Digital platforms reduce transaction costs, improve liquidity, and enable remote access to financial services, which is particularly valuable in arid and semi-arid areas. However, the digital divide and low trust remain barriers that must be addressed to realise the full potential of digital finance.

5. CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The study examined the effect of financial inclusion on the financial sustainability of women-owned SMEs in Marsabit County, Kenya. Using a sample of 270 enterprises and a response rate of 78.5%, the study found that availability of financial services, access to credit, financial literacy, and digital financial platforms each had a positive and statistically significant effect on operational self-sufficiency. The model explained 48.5% of the variance in financial sustainability. Digital financial platforms had the largest effect, followed by financial literacy, availability of financial services, and access to credit.

5.2 Conclusions

The study concludes that financial inclusion has a positive and statistically significant effect on the financial sustainability of women-owned SMEs in Marsabit County, Kenya. The findings demonstrate that availability of financial services, access to credit, financial literacy and digital financial platforms are important determinants of enterprise sustainability. Specifically, the availability of financial services enables women entrepreneurs to access formal financial products conveniently, while access to credit provides financial resources for business expansion, working capital and cash-flow management.

The study further concludes that financial literacy strengthens the ability of women entrepreneurs to make informed financial decisions, prepare budgets, manage business finances and utilise available financial products effectively. Digital financial platforms also contribute to financial sustainability by facilitating faster transactions, reducing the time and costs associated with financial services, and improving access to financial products.

5.3 Recommendations

Policy recommendations. The CBK and the Ministry of Gender should expand the physical and digital reach of financial services in Marsabit County through agent banking, mobile money, and

branchless banking. The county government should work with financial institutions to establish affordable credit facilities tailored to women-owned SMEs, with flexible collateral requirements and transparent interest rates. Financial literacy should be integrated into national and county enterprise support programmes, with a focus on practical skills such as record-keeping, budgeting, and digital financial management. The government should also invest in digital infrastructure and digital literacy to bridge the digital divide.

Practice recommendations. Microfinance institutions and digital financial service providers should design products that meet the specific needs of women entrepreneurs in arid areas, including small-ticket loans, savings products, and micro-insurance. They should also invest in trust-building and customer education to increase adoption and effective use of digital platforms. Business development service providers should offer mentoring and advisory support to complement financial access.

5.4 Suggestions for Further Research

Future research could examine the moderating role of social norms, intra-household decision-making, and county-level institutional quality on the relationship between financial inclusion and financial sustainability. Longitudinal studies could track enterprises over time to establish causality more robustly. Comparative studies across arid and non-arid counties would help identify context-specific mechanisms. Finally, research could explore the differential effects of specific digital financial products—such as mobile savings, digital credit, and micro-insurance—on enterprise sustainability.

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