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DIGITAL CONNECTIVITY, INSTITUTIONS, AND WOMEN'S FINANCIAL INCLUSION

Abstract

Purpose: This study examines the cross-country association between women's internet use and financial account ownership and assesses whether entrepreneurship-related legal frameworks, supportive frameworks, and enforcement perceptions are independently associated with account ownership. Methodology: Economy-level data for 2024 from the Global Findex Database 2025 are merged with the entrepreneurship topic of Women, Business and the Law 2026. The matched sample includes 140 economies, reduced to 128 when enforcement-perception data are required. Ordinary least squares regressions are estimated with HC3 heteroskedasticity-robust standard errors; alternative financial-use indicators and an interaction specification are used as sensitivity checks. Findings: Women's internet use is positively associated with account ownership in all principal specifications. Entrepreneurship legal-framework scores and enforcement-perception scores are also positively associated with account ownership when entered separately alongside internet use, whereas supportive-framework scores are not statistically significant in the corresponding specification. The interaction between internet use and enforcement perceptions is positive but does not reach the 5% significance level. Originality: The article brings together recent, gender-disaggregated financial-access indicators and the three-pillar institutional structure of Women, Business and the Law 2026 in a cross-economy analysis. Practical implications: The findings support policies that combine digital connectivity with effective legal protections and implementation. Limitations: The analysis is cross-

sectional and associational, lacks a GDP-per-capita control in this version, and uses entrepreneurship-topic scores as proxies for the broader institutional context.

Keywords: gender equality; Global Findex; legal frameworks; entrepreneurship law; institutional enforcement; cross-country evidence

1. Introduction

Financial inclusion is an important component of inclusive economic development because access to formal accounts can support payments, saving, receipt of wages and public transfers, and the management of financial shocks. However, account ownership is not distributed evenly across populations. Women may face overlapping constraints associated with income, education, employment, access to identification, digital connectivity, legal rights, and the practical implementation of those rights. A useful empirical account of women's financial inclusion therefore needs to consider both the resources that enable access and the institutional conditions under which financial services can be used.

The Global Findex Database has become a central source for internationally comparable evidence on financial access and use. Its 2025 edition reports nationally representative survey data collected in 2024 from approximately 148,000 adults in 141 economies. It includes updated measures of account ownership and use as well as new globally comparable information on mobile-phone ownership and internet use (Klapper et al., 2025). The report emphasizes the foundational role of digital connectivity while documenting persistent gaps in access to digital and financial services. These data make it possible to examine whether cross-economy differences in women's internet use are associated with differences in women's account ownership.

Previous research has identified a range of determinants of women's financial inclusion. Deléchat et al. (2018) examine cross-country variation and emphasize that financial inclusion reflects not only individual circumstances but also the wider economic and institutional environment. Roy and Patro's (2022) systematic review

synthesizes research on women's access to finance and identifies socio-economic, cultural, and institutional barriers, alongside emerging questions concerning digital financial services. Other studies examine gender gaps in access to finance across countries or regions, including Morsy (2020), Chundakkadan and Sasidharan (2022), Mndolwa and Alhassan (2020), and Loaba (2023). These studies establish that gender gaps vary across contexts and that financial inclusion should not be treated as a single outcome independent of the institutional and socio-economic setting.

A related body of research focuses on the opportunities and limitations associated with digital finance. Gammage et al. (2017) review evidence on gender and digital financial inclusion and identify unresolved questions about the conditions required for women to benefit from digital services. Kulkarni and Ghosh (2021) examine gender disparities in the digitalization of financial services in India and discuss the challenges that can prevent technological expansion from translating into substantive inclusion. Kofman and Payne (2021) similarly caution that digital financial inclusion raises ethical questions that cannot be resolved by access to technology alone. The distinction between digital connectivity and financial inclusion is therefore substantive: internet use may reduce some access barriers, but it does not automatically guarantee ownership of an account or use of formal financial services.

Institutional conditions provide another important perspective. Laws may establish formal rights, while public policies and institutions may support implementation; neither necessarily guarantees that rights are enforced in practice. The World Bank's Women, Business and the Law (WBL) 2026 framework explicitly separates legal frameworks, supportive frameworks, and enforcement perceptions across ten topics related to women's economic opportunities. Its entrepreneurship topic is particularly relevant to the legal and institutional conditions surrounding women's economic participation, although it does not measure financial inclusion directly (World Bank, 2026). Research by Gibson et al. (2024) connects digital finance and gender equality to legal and policy conditions, while the cross-country literature also

suggests that institutional indicators should not be assumed to have identical effects across all contexts.

Ukrainian scholarship provides an additional perspective on the measurement and development of digital financial inclusion. Naumenkova et al. (2019, 2023) examine digital financial inclusion and its policy relevance, while Prymostka et al. (2020) consider determinants and evaluation of financial inclusion in Ukraine. These studies are useful for conceptualizing digital financial inclusion and its institutional and practical barriers. Their country-specific focus, however, differs from the present study's cross-economy design and does not by itself establish the global relationship between women's internet use and women's account ownership.

Despite this growing literature, further cross-economy analysis is useful for examining how the association between women's internet use and account ownership changes when different dimensions of the institutional environment are considered separately. In particular, legal frameworks, supportive frameworks, and enforcement perceptions represent conceptually distinct dimensions and should not be collapsed into a single institutional score without testing their separate associations. The present study does not claim that this relationship has never been examined; rather, it contributes an updated analysis combining gender-disaggregated Global Findex indicators for 2024 with the entrepreneurship indicators of WBL 2026.

The study addresses three questions: (1) Is women's internet use positively associated with women's financial account ownership across economies? (2) Are entrepreneurship-related legal frameworks, supportive frameworks, and enforcement perceptions associated with account ownership after accounting for internet use? (3) Does the association between internet use and account ownership vary with enforcement perceptions? The analysis is designed to estimate cross-sectional associations rather than causal effects.

2. Methods

2.1. Data sources and sample. The analysis combines two World Bank datasets. The Global Findex Database 2025 provides economy-level indicators based on surveys conducted in 2024. The main variables are women's account ownership and women's internet use in the past three months. Additional outcomes include women's mobile-phone ownership, making or receiving digital payments, saving formally, and borrowing formally. The WBL 2026 dataset provides scores for the Entrepreneurship topic under three pillars: Legal Frameworks, Supportive Frameworks, and Enforcement Perceptions. The WBL 2026 report states that its data cover 190 economies and that the three pillars capture laws, policies and institutions supporting implementation, and expert perceptions of enforcement, respectively (World Bank, 2026).

The datasets were merged using economy-level three-letter country codes. The resulting analytic file contains 140 economies with matched account-ownership, internet-use, and entrepreneurship legal/supportive scores. Enforcement-perception scores are available for 128 of these economies. Sample sizes for alternative outcomes are smaller because the 2024 Global Findex questionnaire did not collect every financial-use indicator in every economy. The Global Findex report notes that data on financial use and financial health were focused on low- and middle-income economies and that an abridged telephone questionnaire was used in several economies, including Ukraine (Klapper et al., 2025). These design features should be considered when interpreting the variation in sample sizes.

2.2. Variables. The dependent variable in the main models is the percentage of women aged 15 and older who report owning an account at a financial institution or through a mobile-money provider. The primary explanatory variable is the percentage of women who report using the internet in the past three months. The institutional variables are WBL Entrepreneurship scores for legal frameworks, supportive frameworks, and enforcement perceptions, each scaled from 0 to 100. Alternative dependent variables are women's use of digital payments, formal saving, and formal

borrowing. Findex proportions were multiplied by 100 so that coefficients can be interpreted in percentage-point units. WBL scores were retained on their 0–100 scale.

2.3. Empirical strategy. The baseline ordinary least squares model is: Account_i = β0 + β1 Internet_i + ε_i. Separate institutional specifications are estimated as Account_i = β0 + β1 Internet_i + β2 Institution_i + ε_i, where Institution_i refers in turn to legal frameworks, supportive frameworks, or enforcement perceptions. Separate specifications are preferred because the three indicators represent distinct institutional dimensions and may be correlated. The moderation model includes centered internet-use and enforcement-perception scores and their interaction: Account_i = β0 + β1 Internet_c,i + β2 Enforcement_c,i + β3(Internet_c,i × Enforcement_c,i) + ε_i. A positive β3 would be consistent with a stronger internet–account association at higher enforcement-perception scores, but statistical significance is required before treating this as evidence of moderation.

All regressions use heteroskedasticity-robust HC3 standard errors. Descriptive statistics are reported as unweighted averages across economies; they should not be interpreted as population-weighted global estimates for women. Sensitivity analyses replace account ownership with digital payments, formal saving, and formal borrowing. The models are cross-sectional and do not identify causal effects. The current specification does not include GDP per capita or other macroeconomic controls; this is treated as a limitation rather than implying that the reported coefficients are independent of economic development.

3. Results

3.1. Descriptive statistics. Table 1 summarizes the variables used in the analysis. The mean account-ownership rate for women across the 140 matched economies is 67.51%, while the mean share of women using the internet is 71.30%. Average mobile-phone ownership is higher, at 86.25%. The institutional scores show substantial variation across economies: the mean legal-framework score is 53.21, the mean supportive-framework score is 56.16, and the mean enforcement-perception score is

44.50. The enforcement measure has fewer observations because it is unavailable for 12 economies in the matched sample. These are simple economy-level means, not global population-weighted rates.

Table 1

Descriptive statistics

Variable	N	Mean	SD	Min	Median	Max
Women's account ownership (%)	140	67.51	25.29	11.91	71.36	99.85
Women's internet use (%)	140	71.30	25.55	7.17	82.51	99.57
Women's mobile-phone ownership (%)	140	86.25	13.46	30.13	91.13	100.00
Women making/receiving digital payments (%)	97	47.58	22.15	5.97	45.87	96.50
Women saving formally (%)	90	24.79	13.13	3.33	21.69	65.88
Women borrowing formally (%)	56	17.43	8.65	5.97	14.56	41.64
WBL legal-framework score	140	53.21	20.96	0.00	50.00	100.00
WBL supportive-framework score	140	56.16	24.44	0.00	55.00	100.00
WBL enforcement-perception score	128	44.50	17.14	0.00	43.75	84.38

Source: authors' calculations based on Global Findex Database 2025 and Women, Business and the Law 2026.

3.2. Main regression results. Table 2 reports OLS estimates with HC3 robust standard errors. In the baseline model, the coefficient for women's internet use is 0.587

($p < 0.001$; $R^2 = 0.352$). Thus, a one-percentage-point difference in women's internet use is associated with approximately a 0.59-percentage-point difference in women's account ownership across economies. This is an association, not an estimate of a causal effect.

When the legal-framework score is added, the internet coefficient remains positive and statistically significant (0.536, $p < 0.001$), while the legal-framework coefficient is 0.262 ($p = 0.003$). The model R^2 rises to 0.396. In the model with supportive frameworks, the internet coefficient remains positive (0.573, $p < 0.001$), but the supportive-framework coefficient is not statistically significant (0.061, $p = 0.432$). In the enforcement-perception model, the internet coefficient is 0.528 ($p < 0.001$) and the enforcement coefficient is 0.365 ($p < 0.001$), with $R^2 = 0.439$. Because each institutional dimension is estimated in a separate specification, these coefficients should not be interpreted as mutually adjusted effects of all three dimensions.

Table 2

OLS models predicting women's account ownership

Variable	Model 1	Model 2	Model 3	Model 4
Women's internet use	0.587*** (0.057)	0.536*** (0.059)	0.573*** (0.064)	0.528*** (0.063)
WBL legal frameworks	—	0.262** (0.088)	—	—
WBL supportive frameworks	—	—	0.061 (0.078)	—
WBL enforcement perceptions	—	—	—	0.365*** (0.108)
N	140	140	140	128
R^2	0.352	0.396	0.355	0.439

Notes: HC3 heteroskedasticity-robust standard errors in parentheses. *** $p < 0.001$; ** $p < 0.01$. Dependent variable: women's account ownership (%).

3.3. Interaction and alternative outcomes. The interaction specification uses 128 economies with non-missing enforcement scores. The centered internet-use coefficient is 0.554 ($p < 0.001$), and the enforcement-perception coefficient is 0.357 ($p < 0.001$). The interaction coefficient is positive (0.0068) but does not reach conventional 5% significance ($p = 0.064$; $R^2 = 0.452$). Therefore, the analysis does not provide sufficient evidence to conclude that enforcement perceptions statistically moderate the association between women's internet use and account ownership.

Sensitivity analyses show that women's internet use is positively associated with digital-payment use (coefficient 0.305, $p < 0.001$; $N = 97$; $R^2 = 0.128$) and formal borrowing (coefficient 0.207, $p < 0.001$; $N = 56$; $R^2 = 0.170$) in models containing internet use alone. The association with formal saving is not statistically significant (coefficient 0.071, $p = 0.146$; $N = 90$; $R^2 = 0.019$).

Table 3

Sensitivity checks using alternative outcomes

Outcome / specification	**N**	**Internet coefficient**	**Institution coefficient**	**R^2**
Digital payments; internet only	97	0.305***	—	0.128
Digital payments; internet + legal score	97	0.301***	0.110 (ns)	0.138
Digital payments; internet + enforcement	91	0.313***	0.231 (ns)	0.175
Formal saving; internet only	90	0.071 (ns)	—	0.019
Formal borrowing; internet only	56	0.207***	—	0.170

Notes: HC3 robust standard errors used for inference; ns = not statistically significant at the 5% level. Coefficients are in percentage-point units.

When legal-framework or enforcement scores are added, internet-use coefficients remain positive for digital payments and formal borrowing, while the institutional coefficients are not statistically significant in those smaller outcome-specific samples. These analyses are exploratory because sample coverage differs across outcomes.

4. Discussion

The results indicate a robust positive cross-economy association between women's internet use and account ownership. This is consistent with the view that digital connectivity can reduce some practical barriers to participation in formal financial systems. It also aligns with the emphasis placed on digital connectivity in the Global Findex 2025 report (Klapper et al., 2025) and with literature identifying digital finance as a potential route to expanded access (Gammage et al., 2017; Kulkarni & Ghosh, 2021). However, the analysis does not show that internet access alone is sufficient to achieve financial inclusion. The association may also reflect wider differences in income, education, infrastructure, financial-sector development, and public institutions.

The positive coefficient for entrepreneurship legal frameworks suggests that economies with stronger scores on this WBL dimension tend to have higher women's account ownership, even after including internet use in the model. The positive association with enforcement perceptions is also consistent with the distinction between formal legal rights and their practical implementation. This interpretation accords with the WBL framework, which separately measures laws, supportive institutions and policies, and expert perceptions of enforcement (World Bank, 2026). It also complements cross-country research emphasizing the importance of institutional and socio-economic conditions for women's financial inclusion (Deléchat et al., 2018; Roy & Patro, 2022; Morsy, 2020).

The supportive-framework coefficient is not statistically significant in the corresponding model. This should not be interpreted as evidence that supportive institutions are irrelevant. The score is specific to the WBL Entrepreneurship topic, the

sample contains only 140 matched economies, and the analysis does not control for GDP per capita or other potentially important confounders. Differences between the three institutional coefficients may reflect how the WBL dimensions are constructed, measurement error, differences in their variation, or omitted variables. Further work should compare models using harmonized samples, add macroeconomic and demographic controls, and test alternative operationalizations of the institutional environment.

The interaction between internet use and enforcement perceptions is positive but not statistically significant at the 5% level. Consequently, the data do not support a firm conclusion that the association between internet use and account ownership is stronger in economies where enforcement is perceived to be more effective. The positive main effects of internet use and enforcement should be distinguished from this unconfirmed moderation hypothesis. This distinction is important because the presence of two associated factors does not imply that one necessarily amplifies the effect of the other.

The alternative-outcome analyses suggest that the association with internet use is not identical across financial activities. The association is positive for digital payments and formal borrowing, but not statistically significant for formal saving in the available sample. These differences may reflect distinct motivations, product availability, income constraints, survey coverage, and sample sizes. Since the number of economies varies substantially across outcomes, these results should not be treated as direct comparisons of effect size. They instead indicate that account ownership and actual use of financial services should remain analytically distinct.

The study’s contribution is therefore bounded but useful: it combines gender-disaggregated measures from the 2024 Global Findex survey with the three-pillar WBL 2026 entrepreneurship framework and reports separate estimates for legal frameworks, supportive frameworks, and enforcement perceptions. The results reinforce the need for integrated policies that expand digital connectivity while also addressing legal and implementation barriers. For policymakers, digital infrastructure should be considered

alongside accessible financial products, financial capability, consumer protection, and credible enforcement of women's economic rights.

5. Conclusions

This study examined the cross-economy association between women's internet use and financial account ownership and assessed whether entrepreneurship-related institutional indicators were associated with account ownership. Across 140 economies, women's internet use was positively associated with account ownership in all principal models. Legal-framework scores and enforcement-perception scores were also positively associated with account ownership in separate specifications that included internet use, whereas supportive-framework scores were not statistically significant in the corresponding model. The interaction between internet use and enforcement perceptions was positive but did not reach the 5% significance threshold. Sensitivity checks found positive associations between internet use and digital-payment use and formal borrowing, but not formal saving.

The results are consistent with a multidimensional understanding of financial inclusion: digital connectivity matters, but it operates within broader legal, institutional, and socio-economic contexts. They do not establish causality and should not be interpreted as demonstrating that changes in internet use or institutional scores would necessarily produce the estimated changes in account ownership.

The principal practical implication is that strategies to improve women's financial inclusion should not rely exclusively on digital access. They should also consider the legal conditions for women's economic participation, the effective implementation of rights, consumer protection, and the availability of usable financial services. Future research should add GDP per capita and other controls, assess sensitivity to alternative samples and influential observations, use harmonized samples for outcome comparisons, and examine whether the relationships persist over time. The present analysis is limited by its cross-sectional design, missing values for some financial-use

outcomes, the use of entrepreneurship-topic scores as proxies for a broader institutional environment, and the absence of macroeconomic controls in the current specification.

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