

Institutional Support, Digital Tools and Bank-Based Financial Inclusion of Women Entrepreneurs in Morocco's Informal Sector: An Analysis of Associated Factors

Accompagnement institutionnel, outils numériques et inclusion financière bancaire des femmes entrepreneures du secteur informel au Maroc : une analyse des facteurs associés

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Abstract

Whether a woman entrepreneur in Morocco's informal sector gains access to the banking system is not determined by economic characteristics alone. Between the application and the effective use of an account, institutional, formal and discretionary filters may intervene; institutional theory and the notion of bank gatekeeping provide a theoretical lens for interpreting these processes. Bank gatekeeping is not directly measured in the present survey. This article examines the characteristics associated with the active use of a business bank account among 138 women entrepreneurs running unregistered businesses in the Fès-Meknès region. A binary logistic regression estimated by Firth's penalized likelihood and internally validated by bootstrap resampling relates this outcome to the entrepreneur's profile, the productive resources of her business, her professional use of digital tools and her access to institutional support. Two associations are both large and stable across alternative specifications: professional use of a smartphone (adjusted odds ratio 5.06; 95% CI 2.15–12.94) and access to a public loan or support program (4.39; 95% CI 1.69–12.37). Higher education is also positively associated with bank-based financial inclusion (adjusted odds ratio 3.52; 95% CI 1.46–9.04). Entrepreneurial tenure follows no monotonic gradient: the adjusted probability of bank-based financial inclusion is lowest among women with 11 to 15 years of activity and partially recovers beyond 16 years. The optimism-corrected area under the ROC curve is 0.809. The results identify two distinct characteristics associated with participation in formal finance, one related to institutional support and the other to professional digital use, while showing how narrow the reach of institutional support remains (25.4% of participants). Given the cross-sectional design, all findings are associations rather than causal effects.

Keywords : Institutional support; bank-based financial inclusion; women entrepreneurs; bank gatekeeping; logistic regression; informal sector; Fès-Meknès; Morocco

Résumé

L'accès d'une femme entrepreneure du secteur informel marocain au système bancaire ne dépend pas uniquement de ses caractéristiques économiques. Entre la demande et l'usage effectif d'un compte peuvent intervenir des filtres institutionnels, formels et discrétionnaires, que la théorie institutionnelle et la notion de sélectivité bancaire (bank gatekeeping) permettent d'interpréter. Cette dernière est mobilisée ici comme une grille de lecture théorique et n'est pas mesurée directement dans l'enquête. Cet article examine les caractéristiques associées à l'usage actif d'un compte bancaire professionnel chez 138 femmes entrepreneures exerçant une activité non enregistrée dans la région de Fès-Meknès. Une régression logistique binaire, estimée par la vraisemblance pénalisée de Firth et validée en interne par rééchantillonnage bootstrap, relie cette variable au profil de l'entrepreneure, aux ressources productives de son activité, à son usage professionnel des outils numériques et à son accès à l'accompagnement institutionnel. Deux associations sont à la fois fortes et stables d'une spécification à l'autre : l'usage professionnel d'un smartphone (odds ratio ajusté 5,06 ; IC à 95 % 2,15–12,94) et l'accès à un prêt public ou à un programme d'accompagnement (4,39 ; IC à 95 % 1,69–12,37). Le niveau d'études supérieur va dans le même sens (3,52 ; IC à 95 % 1,46–9,04). L'ancienneté entrepreneuriale ne suit pas de gradient monotone : la probabilité ajustée d'inclusion financière bancaire est la plus faible entre 11 et 15 ans d'activité et remonte partiellement au-delà de 16 ans. L'aire sous la courbe ROC corrigée de l'optimisme est de 0,809. Les résultats mettent en évidence deux caractéristiques distinctes associées à l'accès à la finance formelle, l'une liée à l'accompagnement institutionnel et l'autre à l'usage professionnel des outils numériques, tout en montrant la portée encore étroite de l'accompagnement institutionnel (25,4 % des participantes). Compte tenu du caractère transversal de l'enquête, tous les résultats relèvent d'associations et non d'effets causaux.

Mots clés : Accompagnement institutionnel ; inclusion financière bancaire ; femmes entrepreneures ; sélectivité bancaire ; régression logistique ; secteur informel ; Fès-Meknès ; Maroc

Introduction

Morocco has multiplied public and banking schemes aimed at women entrepreneurs over the past decade, yet the gender gap in access to formal finance remains among the widest in the region (Klapper et al., 2025). The coexistence of an expanding supply of support (dedicated guarantees, support programs, gender-lens initiatives) with persistent exclusion raises a question that the Moroccan literature has so far addressed only indirectly: is access to institutional support actually associated with women entrepreneurs' participation in the conventional banking system? National research on women's finance has concentrated largely on microcredit and participatory finance, and much less on the bank account and bank credit that institutional schemes are ultimately meant to open up. This article addresses that gap for a population that survey data rarely reach: women who run unregistered businesses.

The question also has a practical origin. Professional experience in the Moroccan banking sector suggests that lending decisions concerning women entrepreneurs are seldom reducible to a technical assessment of risk. Informal lending criteria, the perceptions of bank staff and the perceived complexity of procedures may act before or alongside the financial analysis and may screen out applications regardless of the quality of the underlying project. Institutional theory, read together with the notion of bank gatekeeping, offers a theoretical lens for interpreting observable correlates of this screening. Because the survey does not measure loan-officer decisions, refusals, discriminatory treatment or other bank-level screening practices directly, bank gatekeeping is used here as an interpretive framework rather than as an empirically tested mechanism.

Research question: To what extent are exposure to public financing or support programs, professional smartphone use, education, entrepreneurial tenure and productive resources associated with active business-related use of a bank account among women operating unregistered businesses in Morocco's Fès-Meknès region? The study estimates associations, not causal pathways or bank-level screening practices.

The analysis considers two sets of observed correlates of banking participation: exposure to public financing or support programs and professional use of digital tools. These are descriptive associations rather than tested causal routes or mediation mechanisms. Drawing on a survey of 138 women entrepreneurs, the article uses institutional theory and the bank-gatekeeping literature as an interpretive framework without claiming to measure bank-level screening. The article's intended contribution is a critical institutional interpretation of the observed

associations, focusing on the distinction between access to support schemes, active business-related account use and unobserved bank-level selection processes.

The remainder of the article is organized as follows. Section 1 reviews the literature on bank gatekeeping, the ambivalent effects of support schemes, the role of digital tools and education, and the Moroccan institutional context. Section 2 states the hypotheses and Section 3 the methodology. Section 4 reports the results, Section 5 discusses them, and the conclusion closes with policy implications and the limitations of the study.

1. Literature Review

1.1. Bank gatekeeping as a theoretical lens

Access to bank credit is not governed solely by the conventional criteria of profitability, collateral and track record. In markets with imperfect information, lenders ration credit rather than raise its price, so that some creditworthy applicants are refused at the prevailing rate (Stiglitz & Weiss, 1981); how this rationing falls across applicants depends on the institutions through which they are screened. Institutional theory helps to specify these channels. Institutions are the formal and informal constraints that structure economic exchange (North, 1990), and Scott (2001, 2008) distinguishes three pillars through which they operate: a regulative pillar (laws and banking regulation), a normative pillar (professional practices and lending criteria) and a cultural-cognitive pillar (the taken-for-granted representations that bank staff hold of women entrepreneurs). Each of them can shape who is treated as a legitimate borrower.

Recent evidence from Sub-Saharan Africa is consistent with this reading. In a multi-country survey of women SME owners, high collateral requirements and interest rates remain the main obstacles to credit, especially for the smallest and informal enterprises, while financial literacy emerges as a key enabler (Irene et al., 2025). Exclusion, on this evidence, reflects not only the economic marginality of the businesses concerned but also the way institutional requirements are set and applied.

Several studies have observed gatekeeping directly at the level of the loan officer, who stands between the application and the lending decision. Using Italian loan-level data, Bellucci et al. (2010) find that women entrepreneurs face tighter credit availability than men without paying higher interest rates, and that female loan officers are more risk-averse than their male colleagues toward new, unestablished borrowers. In a loan-application experiment with 77 officers in Turkish banks, 35 percent of officers were biased against female applicants, and each

additional year of banking experience reduced gender-biased allocations by about 6 percent (Alibhai et al., 2019). Interviews with 15 credit professionals in Nigerian commercial banks further show that relationship and account officers often act as intuitive gatekeepers who screen applications before any formal risk assessment, their discretion being shaped by performance targets, past loan outcomes and institutional accountability norms (Obembe et al., 2026). Taken together, these studies give the notion of institutional gatekeeping an empirical anchor: the filter lies not only in formal rules but also in the everyday discretion exercised at the counter.

1.2. The ambivalent role of support schemes

Credit is not the only lever available to support programs. In rural Bangladesh, training and support services raise the income of women's micro-enterprises, but their effect depends on the sector: skills-based training benefits tailoring, whereas market-access support benefits basket weaving (Begum et al., 2026). The same services may also achieve little where social norms restrict women's room for maneuver. In a field experiment with clients of a women's bank in India, a short business training increased loan take-up and sales among upper-caste Hindu women, who faced intermediate social restrictions, but had no discernible effect among Muslim women, whose mobility and social interactions were the most tightly constrained (Field et al., 2010). Program design, in other words, interacts with the normative environment in which beneficiaries operate.

The design of public schemes has itself been questioned. Comparing policy support in Canada, Germany, Ireland, Norway and the United States, Coleman et al. (2019) find that four of the five national policies examined rest on a neoliberal logic that frames women entrepreneurs primarily as economic assets, which limits their capacity to address the structural causes of financial exclusion rather than its symptoms. In Sub-Saharan Africa, government-backed credit schemes contribute positively to women's access to finance but are weakened by implementation inefficiencies (Irene et al., 2025). Support schemes may therefore ease the institutional filter without dismantling it.

1.3. Digital tools and education in relation to institutional filters

If institutional filtering operates through an officer or a procedure, digital tools and education may be associated with entrepreneurs' ability to navigate those processes. Mobile payments were identified early as a means of reaching unbanked populations outside branch-based intermediation (Donovan, 2012), and the Kenyan M-PESA experience showed that mobile financial infrastructure can deepen inclusion at scale (Jack & Suri, 2014). For the informal

economy, however, the effect of digital technology is not necessarily a movement toward formalization, so digital use should not be interpreted as evidence of a transition out of informality (Garcia-Murillo & Velez-Ospina, 2017). More broadly, ICT adoption has been positively associated with SMEs' access to finance across a large cross-country sample (Mushtaq et al., 2022), while evidence from Africa highlights both the inclusion potential and the institutional and infrastructural constraints associated with mobile financial technologies (Osabutey & Jackson, 2024).

Education works through a different mechanism, oriented toward navigating the institutional system from within rather than bypassing it. It raises financial literacy and eases the administrative steps involved in opening and maintaining an account (Fungáčová & Weill, 2015; Klapper et al., 2015). Its protective effect is uneven, however. In the MENA region, economically vulnerable populations have been found to be significantly less likely to be financially included, while the relationship between financial literacy and financial behavior varies across population groups (Lyons & Kass-Hanna, 2021). Education alone may thus be insufficient to offset gatekeeping when several markers of disadvantage accumulate.

1.4. The Moroccan context: an institutional architecture under construction

The Moroccan gender gap in financial inclusion remains substantial. Account ownership among adults aged 15 and over reached 44.4% in 2024, up from 28.6% in 2017, but this average conceals a 19.9-point gap between women (34.7%) and men (54.6%). The gap has narrowed since 2017, when it stood at 24.7 points, yet it remains roughly four times the average for developing economies (Klapper et al., 2025). The National Financial Inclusion Strategy, finalized in 2018 by the Ministry of Economy and Finance and Bank Al-Maghrib, accordingly identifies women, young people and the rural population as priority targets (Bank Al-Maghrib, 2019). At the micro level, evidence on 5,110 Moroccan adults shows that the determinants of formal finance and mobile banking differ from those of informal finance: higher education and labor-market participation favor formal inclusion, mobile banking helps to loosen involuntary barriers such as distance and cost, and being a woman, being older or having a lower level of education raises the probability of relying on informal finance (Ezzahid & Elouaourti, 2021). These national indicators concern financial inclusion at the population level; the present study uses a narrower outcome, namely active use of a business bank account.

Several public schemes target women entrepreneurs specifically. Tamwilcom, the public guarantee institution formerly known as the Caisse Centrale de Garantie, raises the guarantee

cover of its Damane Express product from 70% to 80% of the loan principal for businesses promoted mainly by one or more women (Tamwilcom, n.d.-a). It also offers Ilayki Invest, an investment loan granted jointly with Moroccan banks to enterprises majority-owned or managed by women (Tamwilcom, n.d.-b). The Maroc PME agency and the World Bank's Women Entrepreneurs Finance Initiative (We-Fi) have, in addition, run since 2022 an e-commerce support program targeting 1,500 women-led businesses (Maroc PME, 2022). Two features of these schemes matter for what follows: the financial instruments are channeled through the banking system, since guarantees cover bank loans and co-financing is provided alongside a bank, and both products are reserved for enterprises incorporated under Moroccan law, which unregistered businesses by definition are not.

2. Research Hypotheses

Four hypotheses follow from this review, formulated within the limits of the variables available in the survey instrument. Figure 1 summarizes the resulting framework.

H1. Access to institutional support (a public loan or a support program) is positively associated with the bank-based financial inclusion of women entrepreneurs.

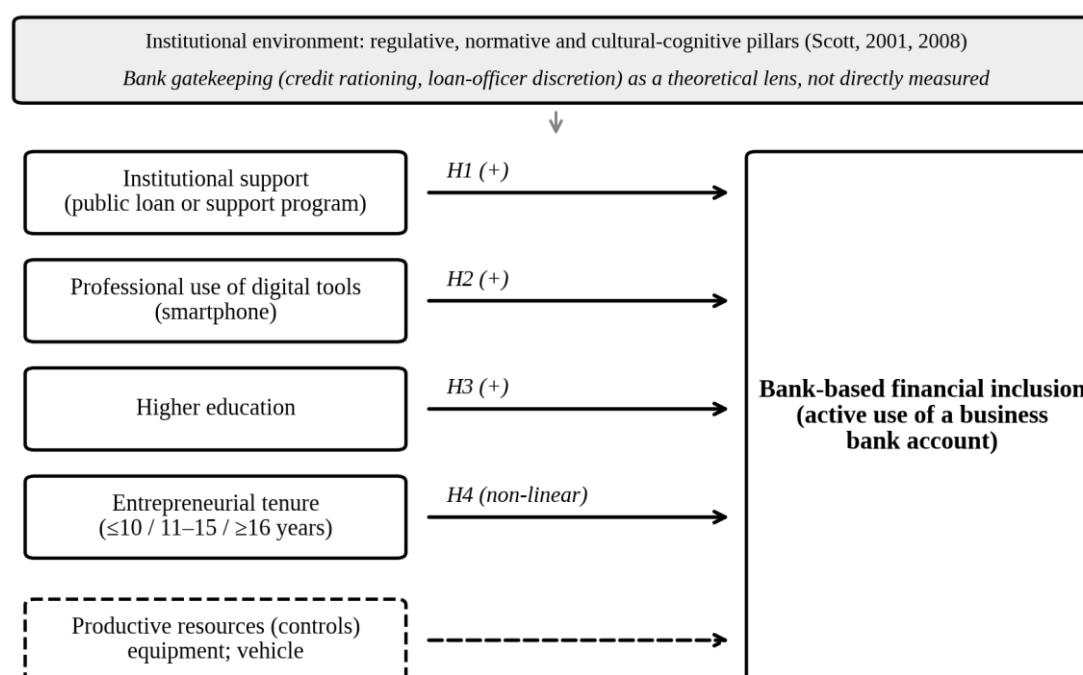
H1 concerns a conditional association only. Public support may precede banking participation, follow it, or be jointly related to entrepreneurial viability; the cross-sectional data do not identify the direction of this relationship.

H2. Professional use of digital technology (a smartphone) is positively associated with bank-based financial inclusion.

H3. Higher education is positively associated with bank-based financial inclusion.

H4. Entrepreneurial tenure is associated with bank-based financial inclusion, although the association is not necessarily linear, since formal and informal financing arrangements may coexist or succeed one another over the business life cycle.

Figure N°1 : Conceptual framework and research hypotheses.



Source: Authors' conceptual synthesis (theoretical framework; not a tested mediation model).

3. Methodology

3.1. Study design

The study uses a cross-sectional quantitative design based on a structured questionnaire administered face to face to women entrepreneurs in the informal sector of the Fès-Meknès region. The association between institutional support and bank-based financial inclusion is estimated by binary logistic regression, adjusting for entrepreneurial experience, education, productive resources and professional use of digital tools, so that the coefficient on institutional support is interpreted as a conditional association, holding the other measured characteristics constant.

3.2. Sample

The sample comprises 138 women entrepreneurs whose businesses were owned and managed by women, economically active at the time of the survey and not formally registered. For this study, an activity was classified as unregistered if it was neither entered in the trade register nor operated under the auto-entrepreneur status. Fieldwork covered Fès, Meknès and surrounding areas, including very small informal businesses and sellers of local products. Initial contacts were established through cooperatives and at the International Agricultural Show in Morocco

(SIAM) in Meknès in April 2025; interviews were conducted subsequently. In the absence of an exhaustive sampling frame, a non-probability convenience approach was used, with efforts to diversify participants by sector, location and business age. Of 300 women approached, 138 completed the questionnaire (46%). Participation was voluntary; the sample is not statistically representative of women entrepreneurs in Morocco.

The questionnaire was available in Arabic and French. Data were collected between May and December 2025 through structured face-to-face interviews using a digital data-entry tool with mandatory responses. No item-level missing data were reported for questionnaires retained in the analysis.

Because participation was voluntary, participants may differ systematically from the women who declined: they may be more educated, more digitally connected or more familiar with institutions. Such self-selection may affect both prevalence estimates and the observed associations, a concern made more relevant by the 46% participation rate.

3.3. Operationalization of variables

The dependent variable is self-reported active use of a bank account for business purposes (binary). It is an operational measure of bank-based financial inclusion, not a measure of inclusion across credit, savings, insurance, digital payments and financial resilience. The institutional-support indicator is coded as exposure to a public loan OR participation in a public support program. It is a heterogeneous composite indicator of exposure to public action, not a homogeneous measure of support quality, intensity or timing. A banking relationship may also be a prerequisite for some programs. Professional smartphone use captures reported business use of a smartphone, not necessarily the use of a digital banking application. These distinctions constrain the interpretation of the coefficients.

3.4. Estimation strategy and model validation

The binary outcome is modeled by logistic regression (Hosmer et al., 2013). With 58 events for seven explanatory parameters (8.29 events per parameter), maximum-likelihood estimates are exposed to small-sample bias; the model is therefore estimated by Firth's penalized likelihood, which reduces this bias and yields finite, more stable estimates (Firth, 1993). This choice is also appropriate when sparse data or separation can destabilize ordinary logistic estimates; penalized-likelihood intervals are generally preferable to relying only on conventional Wald intervals in such settings (Heinze & Schemper, 2002). Estimates are reported as odds ratios with 95% confidence intervals based on the profile penalized likelihood. Internal validation

relies on bootstrap resampling: in each replication, the full model is re-estimated on the resampled data and evaluated both on that sample and on the original data, and the mean difference between the two is subtracted from the apparent performance to correct for optimism (Harrell, 2015). Performance is assessed in terms of discrimination (area under the ROC curve) and calibration (calibration slope and Brier score). Sensitivity analyses re-estimate the model under alternative codings of experience and education and remove, in turn, each of the two most strongly associated predictors. All analyses were performed in R, and the bootstrap validation used 1,000 replications. Adjusted probabilities by tenure category are average predicted probabilities: tenure is set in turn to each category for every participant, the other covariates being kept at their observed values, and predictions are averaged over the sample.

4. Results

4.1. Sample characteristics

Fewer than half of the participants meet the study's operational definition of bank-based financial inclusion: 58 of 138 (42.0%) hold and actively use a bank account for their business. Access to the two characteristics examined in this study is highly unequal. A majority, 81 participants (58.7%), use a smartphone to manage their business, whereas only 35 (25.4%) have benefited from a public loan or support program. Productive resources lie between these two extremes: 70 participants (50.7%) own professional equipment and 50 (36.2%) own a vehicle used for the business. Fifty-two participants (37.7%) have a higher-education level. Experience is fairly evenly distributed: 37 participants (26.8%) have five years or less, 27 (19.6%) six to ten years, 31 (22.5%) eleven to fifteen years and 43 (31.2%) sixteen years or more. The first two categories are merged into the reference category (10 years or less) in the regression. Table 1 summarizes these characteristics.

Table N°1 : Characteristics of the participants (n = 138).

Variable	Category	n	%
Bank-based financial inclusion (active business account)	Yes	58	42.0
Professional use of digital tools	Yes	81	58.7
Institutional support	Yes	35	25.4
Equipment ownership	Yes	70	50.7
Vehicle ownership	Yes	50	36.2
Education	Higher education	52	37.7
Entrepreneurial tenure	5 years or less	37	26.8
	6 to 10 years	27	19.6
	11 to 15 years	31	22.5
	16 years or more	43	31.2

Source: authors' estimates based on survey data (n = 138).

Table 2 cross-tabulates bank-based financial inclusion with the characteristics entered in the model. These contrasts are descriptive and hold nothing else constant, but they show the raw counts from which the adjusted odds ratios are estimated. Inclusion is more frequent among participants who use a smartphone for their business (54.3% against 24.6%) and among those who have received institutional support (62.9% against 35.0%). In the 11–15-year tenure category, only 5 of the 31 participants are financially included (16.1%), against 54.7% among those with 10 years or less and 41.9% among those with 16 years or more.

Table N°2 : Bank-based financial inclusion by participant characteristics (n = 138).

Variable	Category	Not included (n = 80)	Included (n = 58)	Total	% included
Professional use of digital tools	Yes	37	44	81	54.3
	No	43	14	57	24.6
Institutional support	Yes	13	22	35	62.9
	No	67	36	103	35.0
Equipment ownership	Yes	36	34	70	48.6
	No	44	24	68	35.3
Vehicle ownership	Yes	27	23	50	46.0
	No	53	35	88	39.8
Entrepreneurial tenure	10 years or less	29	35	64	54.7
	11 to 15 years	26	5	31	16.1
	16 years or more	25	18	43	41.9
Education	Higher education	24	28	52	53.8
	Other levels	56	30	86	34.9

Source : authors' calculations based on survey data. Percentages in the last column are the share of participants in each category who are financially included; differences are descriptive, the adjusted associations being reported in Table 3.

4.2. Results of the penalized logistic regression

Table 3 reports the penalized estimates of the main model. The reference categories are 10 years of experience or less, an education level below higher education, and absence of the characteristic for each binary variable.

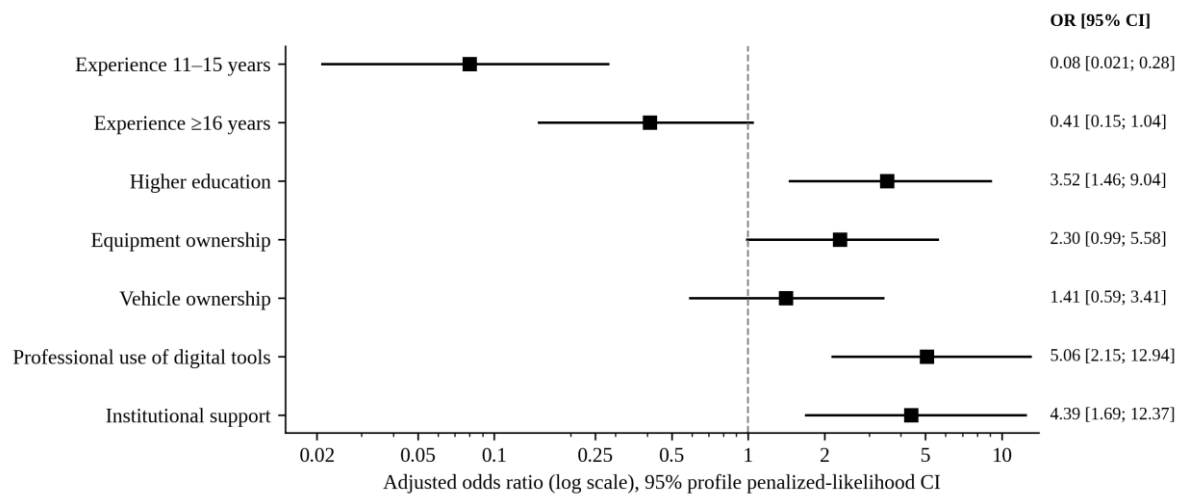
Table N°3 : Penalized logistic regression of active business bank-account use (n = 138; 58 events).

Variable	Odds ratio	95% CI	Statistical evidence
Experience 11–15 years	0.08	[0.021; 0.28]	Strong
Experience 16 years or more	0.41	[0.15; 1.04]	Limited
Higher education	3.52	[1.46; 9.04]	Strong
Equipment ownership	2.30	[0.99; 5.58]	Limited
Vehicle ownership	1.41	[0.59; 3.41]	Insufficient
Professional use of digital tools	5.06	[2.15; 12.94]	Strong
Institutional support	4.39	[1.69; 12.37]	Strong

Source: authors' estimates based on survey data (n = 138).

Two characteristics stand out for both magnitude and precision. Professional use of digital tools has the largest adjusted odds ratio (5.06; 95% CI 2.15–12.94), followed by access to institutional support (4.39; 95% CI 1.69–12.37). Higher education is also positively associated with bank-based financial inclusion (3.52; 95% CI 1.46–9.04). The two productive-resource variables are less clearly determined: equipment ownership leans toward a positive association (2.30), but its interval includes 1, and vehicle ownership cannot be distinguished from no association (1.41). Figure 2 displays the penalized estimates and their intervals on a logarithmic scale.

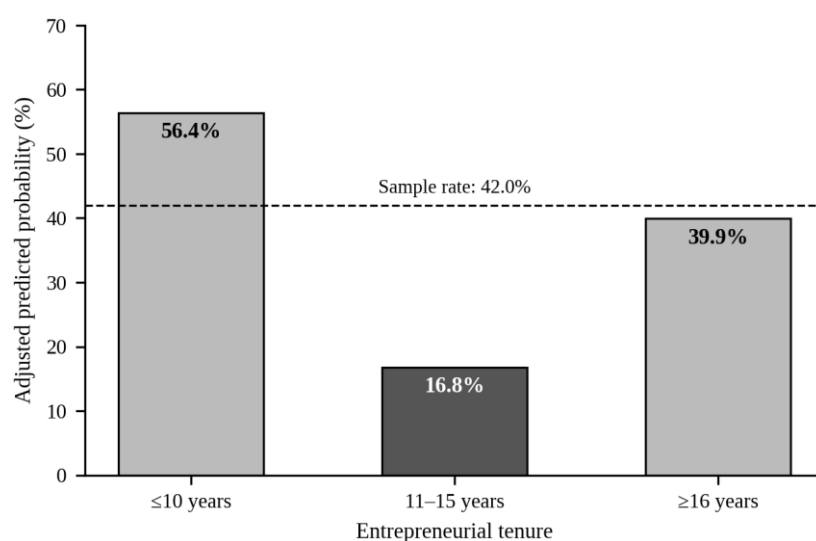
Figure N°2 : Adjusted odds ratios and 95% confidence intervals from the penalized logistic regression (n = 138).



Source: authors' estimates based on survey data (n = 138).

Entrepreneurial experience does not follow a monotonic gradient. Holding the other characteristics at their observed values, the predicted probability of bank-based financial inclusion is 56.4% for participants with 10 years of experience or less, 16.8% for those with 11 to 15 years and 39.9% for those with 16 years or more. The lowest adjusted probability is thus found in the intermediate category rather than among the most recently established entrepreneurs, with a partial recovery among the longest-established group. The contrast between the intermediate category and the reference is estimated with precision (OR = 0.08; 95% CI 0.021–0.28); the interval for the longest-established category includes 1.

Figure N°3 : Adjusted predicted probability of bank-based financial inclusion by entrepreneurial tenure.



Source: authors' estimates based on survey data (n = 138).

The two main associations are stable across the sensitivity analyses: the odds ratio for digital use ranges from 4.54 to 5.06 across alternative specifications, and that for institutional support from 3.77 to 4.39. Removing either predictor leaves the other coefficients broadly unchanged. These results indicate that the two measured characteristics retain their associations with bank-based financial inclusion when the specifications are varied; they do not establish that the two mechanisms are causally independent.

The results provide evidence consistent with H1, H2 and H3, as the corresponding 95% confidence intervals exclude 1. For H4, the results are consistent with a non-linear association, with the clearest contrast observed for the 11–15-year category: the intermediate tenure group has a lower adjusted probability of bank-based financial inclusion, whereas the confidence interval for the ≥ 16 -year category includes 1. H4 should therefore be interpreted as evidence compatible with a non-linear association rather than as confirmation of a uniformly significant tenure effect. Table 4 summarizes the hypothesis tests.

Table N°4 : Summary of hypothesis tests.

	Variable	Expected sign	Adjusted OR [95% CI]	Decision
H1	Institutional support	+	4.39 [1.69; 12.37]	Evidence consistent with H1
H2	Professional use of digital tools	+	5.06 [2.15; 12.94]	Evidence consistent with H2
H3	Higher education	+	3.52 [1.46; 9.04]	Evidence consistent with H3
H4	Tenure 11–15 years (ref. ≤ 10)	Non-directional	0.08 [0.021; 0.28]	Evidence compatible with a non-linear association
	Tenure ≥ 16 years (ref. ≤ 10)	Non-directional	0.41 [0.15; 1.04]	

Source: authors' estimates based on survey data (n = 138).

4.3. Model performance and validation

The model shows an apparent area under the ROC curve of 0.842. After bootstrap optimism correction, the AUC is 0.809, indicating satisfactory internal discrimination. The corrected calibration slope is 0.886, suggesting some overextreme predictions, while the corrected Brier score is 0.181. These indicators are reported as internal validation diagnostics rather than as evidence of external predictive performance. Because the study is designed primarily to examine associations rather than to develop a clinical-style prediction tool, threshold-dependent measures such as accuracy, sensitivity and specificity are not emphasized.

Table N°5 : Model performance and internal validation (bootstrap, 1,000 replications).

Measure	Value	Reading
AUC, apparent	0.842	Good discrimination
AUC, optimism-corrected	0.809	Satisfactory internal discrimination
Calibration slope, corrected	0.886	Slightly overextreme predictions
Brier score, corrected	0.181	Overall prediction error

Source: authors' estimates based on survey data (n = 138).

5. Discussion

This discussion interprets the estimates from an institutional perspective. It does not offer an independent replication or a new empirical test of bank gatekeeping. Four interpretive issues are considered: institutional support and possible administrative selection, professional digital

use as a correlate rather than an identified pathway, the unexpected tenure pattern, and the imprecise associations for productive resources.

Institutional support is associated with active business-related bank-account use (adjusted OR 4.39; 95% CI 1.69–12.37). Yet the indicator combines receipt of a public loan with participation in a support program, and these experiences may have different institutional implications. For bank-linked programs, holding or using an account may be an eligibility condition or consequence of participation. The observed association therefore cannot establish that institutional support reduced exclusion, nor can it identify which program component matters. Future work should separate financing, guarantees, training and advisory support, and record their sequence relative to account use.

Professional smartphone use is associated with active business-related account use (adjusted OR 5.06; 95% CI 2.15–12.94). This is consistent with several competing interpretations: digital tools may facilitate business organization and interaction with formal institutions; alternatively, better-resourced entrepreneurs may be more likely both to use smartphones and to operate bank accounts. The questionnaire does not establish that smartphones bypass loan officers, reduce screening or cause bank-account adoption. Accordingly, the proposed digital pathway remains a hypothesis for subsequent research rather than a mechanism demonstrated here.

The experience pattern is non-monotonic: the 11–15-year group has lower adjusted odds than the reference group (OR 0.08; 95% CI 0.021–0.28), while the estimate for 16 years or more is less precise (OR 0.41; 95% CI 0.15–1.04). This unexpected pattern should not be interpreted as evidence of institutional exclusion for a particular cohort. Small subgroup counts, differences in activity type, survival selection and unmeasured socioeconomic characteristics are alternative explanations.

Equipment ownership shows a positive but imprecise association (OR 2.30; 95% CI 0.99–5.58), whereas vehicle ownership does not show a clear association (OR 1.41; 95% CI 0.59–3.41). Neither estimate supports a definitive claim about the role of collateral, loan-officer decisions or the financing needs of these enterprises. These potential mechanisms should be treated as propositions for future qualitative or longitudinal investigation.

Conclusion and Managerial Implications

This article provides a theory-led interpretation of survey findings concerning 138 women entrepreneurs in Morocco's informal sector. The strongest adjusted associations with active business-related bank-account use concern professional smartphone use (OR 5.06) and

exposure to public financing or support (OR 4.39). The contribution advanced here is a critical distinction between observed correlates of bank-account use and hypothesized institutional selection mechanisms.

The theoretical perspective highlights questions the survey cannot resolve: whether bank-linked programs select already banked entrepreneurs; whether digital tools facilitate engagement with formal institutions or simply mark prior advantage; and how banking staff apply formal and informal eligibility criteria. These questions call for direct observation of program rules, loan applications and decisions, as well as longitudinal data. Policy recommendations should therefore emphasize evaluation and measurement rather than claim proven intervention effects. Two practical implications follow, both to be read in the light of the associative design. For banks, the strong association between professional smartphone use and active account use suggests that remote onboarding and simplified, mobile-based account offers may be relevant channels for reaching women who run unregistered businesses, provided they are adapted to their documentation constraints. For public operators such as Tamwilcom and Maroc PME, the low exposure to public support (25.4%) and the restriction of the main financial instruments to incorporated enterprises point to the need to examine eligibility pathways for informal businesses, for instance through the auto-entrepreneur status as a bridge towards formal schemes.

These findings describe associations observed at a single point in time among the study participants. They show neither that changing a given characteristic would alter the probability of bank-based financial inclusion nor that what holds for these participants holds for all Moroccan women entrepreneurs.

Limitations of the study

Several limitations qualify the interpretation. The cross-sectional design cannot establish temporal ordering or causality. In particular, public financing or program eligibility may require an existing bank account, so reverse causation and program selection are plausible. The institutional-support indicator combines different interventions without distinguishing their timing, type or intensity. Bank gatekeeping is not directly observed: the survey contains no bank-officer decisions, loan refusals or direct measures of discretionary screening. The dependent variable captures active business-related account use rather than multidimensional financial inclusion. The sample was recruited non-probabilistically, and voluntary participation by 138 of 300 women approached (46%) may generate selection bias if respondents were more

educated, connected or institutionally engaged than nonrespondents. The sample size and 58 outcome events constrain adjustment for additional confounders such as business size, revenue, sector, location, age, marital status, financial literacy and banking history. The striking association for 11–15 years of experience should be interpreted cautiously: the 11–15-year category comprises only 31 participants, 5 of whom are financially included, and in the absence of data on sector and business cohort, explanations of this pattern remain speculative. Internal bootstrap validation does not substitute for external validation, and findings should not be generalized to all women entrepreneurs in Morocco.

Declarations

Ethics and informed consent. Participation was voluntary. Before each interview, participants were informed of the purpose of the study and gave their oral informed consent. Responses were anonymized.

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Conflict of interest. The first author holds a professional position in the Moroccan banking sector; this is disclosed for transparency. The authors declare no other conflict of interest.

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