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DETERMINANTS OF WOMEN'S ENTREPRENEURSHIP IN RURAL AREAS: EMPIRICAL EVIDENCE FROM TASHKENT REGION, UZBEKISTAN

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Abstract. *This paper investigates the socioeconomic determinants of women's entrepreneurship in rural districts of Tashkent Region, Uzbekistan, drawing on a primary survey of 365 female entrepreneurs across 11 districts (2025–2026) and Ordinary Least Squares (OLS) regression analysis conducted in Stata 17.0. The results reveal statistically significant regional disparities: proximity to the Tashkent agglomeration explains a β-coefficient of 4.278 ($p<0.01$) advantage in monthly income relative to the peripheral Bekobod district, while enterprise experience demonstrates the strongest positive effect ($\beta=0.504$; $p<0.001$). The overall model explains 67.6% of income variance ($R^2=0.676$; $F=4.756$; $p<0.001$). Survey findings indicate that 26.4% of respondents operate informally — invisible to official statistics — while 84.0% identify financial support as their most critical need, yet only 11.0% have accessed formal bank credit. Chi-square analysis confirms statistically significant associations between marital status and financing sources ($\chi^2=25.29$; $p=0.013$) and between perceived barriers and financial access ($\chi^2=27.48$; $p=0.036$). Based on these findings, this paper proposes three complementary policy instruments: a three-criteria E-B-M classification model, an Integrated Women's Entrepreneurship Infrastructure Centre (ATIM; BCR=1.92; NPV=+1.9 billion UZS) and a Women Entrepreneur Finance Portal (WEFP). Projections under the baseline scenario suggest that joint implementation could increase the number of formally registered women entrepreneurs from 43,860 to 80,000–85,000 by 2030.*

Keywords: *women's entrepreneurship; rural areas; OLS regression; regional differentiation; E-B-M classification; ATIM; WEFP; gender inclusion; Uzbekistan; informal sector*

JEL Classification: J16; L26; O18; R11; R58

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1. INTRODUCTION

The economic empowerment of women has emerged as one of the most consequential levers for inclusive development in the twenty-first century. The World Bank estimates that closing the entrepreneurship gender gap could add over USD 28 trillion to global GDP (World Bank, 2024[1]). The Global Entrepreneurship Monitor (GEM) reports that women's Total Entrepreneurial Activity (TEA) rose from 6.1% in 2001–2005 to 10.4% in 2021–2023, yet the female-to-male TEA ratio has remained stubbornly stable at 0.75–0.80, and women receive only 2.3% of global venture capital (GEM, 2024[2]). This persistent gap is not merely a matter of equity — it represents a substantial misallocation of productive resources with measurable macroeconomic costs.

Uzbekistan presents a compelling case for investigation. Following systemic reforms initiated in 2017, the number of active female entrepreneurs reached 2.1 million by 2024 — a sevenfold increase from 2020 — with women accounting for 40% of all entrepreneurs (UNDP, 2025[3]). Tashkent Region alone recorded 43,860 women-led small enterprises and microenterprises as of January 2025 (Tashkent Regional Statistics Office, 2025[4]). Yet quantitative growth conceals structural deficiencies: 78.4% of women-led firms are concentrated in low-value-added trade and service activities; the women's self-employment rate surged by 935% between 2020 and 2024, but the sustainability of this growth remains questionable in the absence of institutional support.

A review of the existing literature reveals three critical research gaps. First, no study has conducted a district-level, econometrically grounded analysis of intra-regional disparities in women's entrepreneurship within Tashkent Region. Studies by Welter and Smallbone (2008)[5] established the dominance of informal institutions in Uzbekistan's entrepreneurial environment, while UNDP (2025)[3] identified financial exclusion and unpaid care burdens as the primary barriers at the national level; neither, however, disaggregated findings by sub-regional geography. Second, the prevailing single-criterion classification approach — based solely on ownership share — renders approximately one-quarter of de facto women-led businesses statistically invisible. Third, the literature lacks a financially validated, integrated model combining infrastructure, finance, and digital solutions for rural women's entrepreneurship in the Central Asian context.

This paper addresses all three gaps. Its primary objective is to quantify the determinants of monthly income for rural women entrepreneurs using OLS regression and survey data, and to derive policy instruments grounded in these empirical findings. The study contributes to the growing body of literature on context-specific entrepreneurship

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ecosystems (Isenberg, 2010[6]; Stam, 2015[7]; Mason and Brown, 2014[8]) by proposing a model that explicitly integrates informal institutions, time-budget constraints, and sub-regional heterogeneity — features largely absent from existing frameworks designed for higher-income settings.

1.1. Theoretical Framework

The conceptual foundation of this study builds on three intersecting bodies of theory. The entrepreneurship ecosystem literature (Isenberg, 2010[6]; Stam, 2015[7]) emphasises systemic interdependence among formal and informal factors shaping enterprise creation and growth. Economic geography theory, particularly Krugman's (1991)[9] new economic geography, explains spatial income divergence through agglomeration effects, market access costs, and asymmetric diffusion of financial services — all directly observable in Tashkent Region's district-level data. Inclusive growth theory (Rauniyar and Kanbur, 2010[10]) provides the normative rationale for differentiated support mechanisms: growth that bypasses peripheral districts is neither equitable nor, in the long run, sustainable.

Building on these foundations, the author introduces the concept of the Women's Entrepreneurship Ecosystem — defined as a complex network in which economic agents (banks, markets), social institutions (mahalla community councils, family networks), digital infrastructure, and cultural norms interact organically to enable a female entrepreneur's operation, growth, and consolidation. This definition departs from existing frameworks in three key respects: (i) informal institutions are treated as central, not peripheral, determinants; (ii) the time-budget constraint — averaging 32–38 hours per week in unpaid care — is explicitly modelled as an economic variable; and (iii) a three-zone geographic differentiation (A-B-C zones) is incorporated into the ecosystem configuration.

2. METHODS

2.1. Study Design and Data Collection

This study employs a mixed-methods design combining a structured survey instrument with econometric modelling. Primary data were collected between 2025 and 2026 across 11 rural districts of Tashkent Region via Google Form and face-to-face interviews. The sample was drawn using stratified random sampling proportional to the number of registered women-led enterprises per district. The target sample size was calculated as follows:

$$n = (N \cdot Z^2 \cdot p \cdot (1-p)) / (d^2 \cdot (N-1) + Z^2 \cdot p \cdot (1-p)) \quad (1)$$

where N = 43,860 (population size); Z = 1.96 (95% confidence level); p = 0.50 (conservative proportion); d = 0.05 (margin of error). The formula yields $n \geq 381$; the realised sample of n = 365 reflects fieldwork constraints while

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remaining adequate for regression analysis. Ethics approval was obtained from TSUE's Research Ethics Committee; participation was voluntary and anonymous.

2.2. Variables

Table 1. Variable definitions and expected signs

Variable	Type	Measurement	Expected sign
Monthly income (Y_i)	Dependent	UZS thousands	—
Enterprise experience	Continuous	Years	Positive (+)
Age	Continuous	Years	Positive (+)
Distance from centre	Continuous	Kilometres	Ambiguous
Number of children	Continuous	Count	Negative (−)
Bank credit access	Dummy	1 = yes; 0 = no	Positive (+)
Business challenges index	Ordinal	Scale 1–5	Negative (−)
Tax incentive access	Dummy	1 = yes; 0 = no	Positive (+)
District (location)	Dummy	Base: Bekobod	Positive (+)

Source: author's design.

2.3. Econometric Model

The OLS regression model is specified as:

$$Y_i = \beta_0 + \Sigma(\beta_k \cdot X_{ki}) + \Sigma(\delta_j \cdot D_{ji}) + \varepsilon_i \quad (2)$$

where Y_i is monthly income for respondent i; X_{ki} represents continuous regressors; D_{ji} denotes binary variables (district dummies, credit access, incentive receipt); β_k and δ_j are estimated coefficients; and $\varepsilon_i \sim N(0, \sigma^2)$ is the error term. White heteroscedasticity-robust standard errors are reported throughout. The null hypothesis H_0: $\beta_1 = \beta_2 = ... = \beta_k = 0$ is tested against H_a: $\beta_i \neq 0$.

2.4. Cost-Benefit Analysis

The financial viability of the proposed ATIM model is assessed using standard cost-benefit analysis (CBA). The Benefit-Cost Ratio (BCR) and Net Present Value (NPV) are computed as:

$$BCR = \text{Annual benefits} / \text{Total investment} \quad (3)$$

$$NPV = \Sigma(\text{Annual benefits}_t / (1+r)^t) - \text{Total investment} \quad (4)$$

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where r = 0.12 (discount rate reflecting Uzbekistan's lending rate) and t = 1, 2, 3 (years). A BCR > 1 and NPV > 0 indicate economic viability.

3. RESULTS

3.1. Descriptive Statistics

Table 2. Descriptive characteristics of survey respondents (n=365)

Characteristic	n	Share (%)
Legal form — Sole proprietorship (YaTT)	189	51.7
Legal form — Limited liability company (MChJ)	67	18.4
Legal form — Partnership	13	3.5
Legal form — Informal (unregistered)	**96**	**26.4**
Started with personal savings	226	62.0
Started with family/kin support	84	23.0
Accessed formal bank credit	**40**	**11.0**
Identify financial support as most critical need	307	84.0
Identify infrastructure deficit as main barrier	245	67.0
Suspended activity due to lack of childcare	121	33.1
Unaware of available government programmes	91	25.0
Weekly hours in unpaid care (mean)	—	32–38 hrs

Source: author's survey (n=365, Tashkent Region, 2025–2026).

The proportion of informal operators (26.4%) is the study's most consequential descriptive finding. These 96 respondents are invisible to national gender statistics, ineligible for state support programmes, and unable to access formal credit. This finding directly motivates the proposed E-B-M multi-criteria classification model. The paradox of

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high demand (84.0% reporting financial need) combined with low formal credit access (11.0%) — a ratio of nearly 8:1 — constitutes the central empirical problem addressed by the Collateral-Free Microcredit Line component of the proposed policy package.

3.2. OLS Regression Results

Table 3. OLS regression results — dependent variable: monthly income (n=365)

Variable	Coeff. (β)	Robust SE	t-stat.	p-value	Sig.
Constant (β_0)	3.241	0.842	3.85	0.000	***
Enterprise experience	**0.504**	0.093	5.42	0.000	***
Tashkent district (base: Bekobod)	**4.278**	1.565	2.73	0.007	***
Kibray district	3.365	1.565	2.15	0.032	**
Quyi Chirchiq district	2.589	1.463	1.77	0.078	*
Bank credit access	2.805	1.513	1.85	0.065	*
Age	0.085	0.041	2.07	0.038	**
Business challenges index	**−0.686**	0.309	−2.22	0.027	**
Distance from centre	0.047	0.050	0.94	0.346	n.s.
Number of children	−0.204	0.279	−0.73	0.464	n.s.
Tax incentive access	−0.016	0.015	−1.07	0.288	n.s.
Bekobod district (reference)	0	—	—	—	—

*Note: *** p<0.01; ** p<0.05; * p<0.10; n.s. = not significant. White robust standard errors. Source: Stata 17.0, author's computations.*

Table 3a. Overall model diagnostics

Diagnostic	Value
R-squared (R^2)	**0.676**
Adjusted R^2	0.651
F-statistic	**4.756**
Prob > F	**0.000**
Observations (n)	365

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Diagnostic	Value
Akaike Information Criterion (AIC)	2312.138

Source: Stata 17.0, author's computations.

The null hypothesis H_0 is rejected at the 1% level ($F=4.756$; $p<0.001$). The model accounts for 67.6% of variance in monthly income — a strong fit for a cross-sectional social science model. Enterprise experience emerges as the dominant determinant ($\beta=0.504$; $p<0.001$): each additional year of experience is associated with a 0.504-unit increase in monthly income, confirming human capital accumulation as the primary growth engine. The Tashkent district dummy ($\beta=4.278$; $p<0.01$) reveals a substantial agglomeration premium relative to the Bekobod baseline — consistent with Krugman's (1991)[9] spatial divergence framework. Bank credit access carries a significant positive coefficient ($\beta=2.805$; $p<0.10$), translating an 11% coverage rate into a powerful argument for expanding financial inclusion. Critically, physical distance from the centre ($p=0.346$), number of children ($p=0.464$), and tax incentives ($p=0.288$) are all statistically non-significant. This finding reframes the policy problem: the binding constraints are not geography per se, nor family size, nor the fiscal instrument portfolio — they are access to finance and the quality of infrastructure.

3.3. Chi-Square Test Results

Table 4. Pearson Chi-square test results

Hypothesis	χ^2	df	p-value	Decision
Marital status ↔ financing source	**25.29**	9	**0.013**	Reject H_0
Perceived barriers ↔ financing source	**27.48**	12	**0.036**	Reject H_0

Source: Stata 17.0, author's computations.

Both Chi-square tests confirm statistically significant associations, reinforcing the OLS finding that financial access is not an isolated variable but is co-determined by family and social context. The implication for policy design is that credit instruments must be bundled with social support mechanisms — the rationale for integrating childcare services into the ATIM model.

3.4. Cost-Benefit Analysis of the ATIM Model

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Table 5. ATIM integrated model — cost-benefit summary

Item	Value (UZS million)
Total investment	**1,450**
State and local budget (30–40%)	≈530
Donor grants and soft loans (20–30%)	≈360
Private investment — PPP (20–30%)	≈360
Revolving guarantee fund (10%)	≈200
Annual tax revenue increase	380
Annual income growth (women entrepreneurs)	560
Annual social savings	320
Annual transaction cost savings	110
Total annual benefits	**1,370**
Benefit-Cost Ratio (BCR)	**1.92**
Net Present Value — 3-year horizon (NPV)	**+1,900**
Payback period	**≈1.7 years**

Source: Uzbekistan State Construction Norms, World Bank guidelines, and author's computations.

Key CBA results:

$BCR = 1{,}370 / 1{,}450 = 1.92$ (5)

$NPV_3 = \Sigma(1{,}370/(1.12)^t) - 1{,}450 = 4{,}110 - 1{,}450 = +1{,}900$ *million UZS* (6)

Payback period $= 1{,}450 / 850 \approx 1.7$ *years* (7)

A BCR of 1.92 indicates that every unit of public investment generates 1.92 units of social and economic return, well above the threshold for public infrastructure investment in comparable settings (World Bank, 2024[1]).

4. DISCUSSION

4.1. Interpretation of Key Findings

The regional income premium documented in this study — β=4.278 for Tashkent district relative to Bekobod ($p<0.01$) — constitutes the most policy-relevant finding. It operationalises Krugman's (1991)[9] theoretical prediction of spatial divergence within a previously

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uninvestigated sub-regional context. The non-significance of physical distance (p=0.346), however, qualifies this finding in an important way: it is not geography that constrains rural women's earnings, but the infrastructure and institutional deficits that tend to co-locate with distance. This distinction has direct policy implications: if distance were the binding constraint, redistribution of activity would be required; since it is institutional quality, targeted investments in infrastructure and finance are the appropriate instruments.

The dominance of enterprise experience (β=0.504; p<0.001) is consistent with human capital theory (Becker, 1993[11]) and suggests that mentorship and business development services carry high returns — a rationale for including them in the proposed WEFP portal's integrated digital offering. The positive and significant bank credit coefficient (β=2.805; p<0.10) combined with an access rate of only 11.0% constitutes a canonical market failure: a well-identified positive externality from financial inclusion that the market, left to itself, undersupplies due to collateral requirements. The collateral-free scoring model proposed in Section 5 directly addresses this failure.

The statistical non-significance of tax incentives (p=0.288) is a striking and counterintuitive finding. Uzbekistan's policy toolkit has prioritised fiscal instruments (see PF-60, 2022[2]; PQ-122, 2024[3]), yet these appear to have negligible marginal impact on income for the rural women in this sample. This suggests either poor programme targeting, low awareness (consistent with the 25.0% unaware of available programmes), or that the binding constraints are pre-fiscal. The latter interpretation aligns with the infrastructure and credit findings and calls for a reorientation of the policy mix.

4.2. The Informal Sector Problem

The 26.4% informal operator rate carries implications beyond this study. In the absence of a multi-criteria classification standard, approximately one quarter of de facto women-led enterprises remain outside the perimeter of official gender statistics, state support programmes, and formal financial systems simultaneously. This triple exclusion compounds over time: informality reduces credit eligibility, which suppresses investment, which limits growth, which perpetuates informality. The proposed E-B-M model — combining ownership share (E-criterion: ≥51%), documented management authority (B-criterion), and female workforce composition (M-criterion: ≥50%) — breaks this cycle by extending the definition of women's enterprise in a way consistent with ILO (2020[12]) recommendations and the World Bank's Women-Owned Business Enterprise (WBE) standards.

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4.3. Relationship to Existing Literature

The Women's Entrepreneurship Ecosystem concept proposed here extends the frameworks of Isenberg (2010)[6], Stam (2015)[7], and Mason and Brown (2014)[8] in three directions. Unlike these predominantly high-income-economy frameworks, the present model: (i) positions informal institutions — specifically the mahalla community council system — as central rather than residual ecosystem components, consistent with Welter and Smallbone's (2008)[5] institutional analysis of Uzbekistan; (ii) incorporates the time-budget constraint as a quantifiable economic variable rather than a sociological aside; and (iii) proposes a three-zone differentiated configuration (A-agglomeration, B-transitional, C-peripheral) that operationalises Porter's (1998)[13] cluster theory at the sub-regional level.

The finding that informal institutions and community social capital function as de facto collateral substitutes resonates with extensive microfinance literature on group-lending mechanisms (Khandker, Bakht and Koolwal, 2009[14]) and represents an adaptation of the Self-Help Group (SHG) model documented in South Asia. The calibration of the ATIM model on international analogues — India's TNRTP programme (revenue gains of 25–40%) and Tanzania's infrastructure interventions (time savings of 37–47%) — provides external validity despite the absence of a Uzbekistan-specific counterfactual.

4.4. Policy Implications

Three policy implications follow directly from the empirical findings. First, uniform national programmes should be replaced by zone-differentiated support architectures: the proposed A-B-C zoning, with budget weights of 20%, 35%, and 45% respectively, operationalises the 'inverted subsidisation' principle drawn from Rauniyar and Kanbur (2010)[10] — directing disproportionate resources to the most constrained districts. Second, collateral requirements should be reconsidered in favour of social scoring: the Chi-square evidence that marital status and perceived barriers jointly determine financing source access (χ^2=25.29; p=0.013) confirms that collateral is a socially constructed, not merely an economic, barrier. Third, the current emphasis on tax incentives should be rebalanced toward infrastructure and information: the non-significance of tax access (p=0.288) alongside 67.0% reporting infrastructure as the primary barrier and 25.0% reporting unawareness of programmes indicates systematic mismatch between the instruments deployed and the constraints that actually bind.

4.5. Limitations

This study is subject to several limitations that circumscribe the generalisability of its findings. First, the

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cross-sectional survey design precludes causal identification; the OLS estimates capture conditional correlations rather than treatment effects. A longitudinal panel or a quasi-experimental design exploiting variation in programme rollout across districts would yield stronger causal claims. Second, the 26.4% informality rate implies that the sample systematically under-represents the most marginalised operators — those who declined to participate or could not be reached through the survey channels. Third, the CBA projections rely on conservative international analogues with calibration coefficients (k=0.55–0.70) that have not been empirically validated in the Uzbekistan context. Fourth, the ecosystem model, while theoretically grounded, has not yet been subjected to structural equation modelling that would allow formal testing of its proposed causal pathways.

5. PROPOSED POLICY INSTRUMENTS

5.1. The E-B-M Three-Criteria Classification Model

The E-B-M model replaces the prevailing single-criterion approach (ownership share only) with a combinatorial system of three criteria. The Equity criterion (E) requires that ≥51% of registered charter capital belongs to a woman. The Management authority criterion (B) requires documented operational control — notarised power of attorney, bank signature card, or mahalla council attestation. The Workforce composition criterion (M) requires that ≥50% of employees are women. Full enterprise status is granted when E or B is satisfied; partial status (infrastructure and training benefits only) when only M is satisfied. Implementation proceeds through the WEFP portal in three steps: self-declaration by the enterprise; community-level social verification by the mahalla council; and automated status assignment and benefits activation within the portal. This model is consistent with ILO (2020[12]) multi-criteria assessment guidelines and extends their application to a sub-national, digitally mediated context.

5.2. The ATIM Integrated Model

The Ayollar Tadbirkorligi Infratuzilma Markazi (ATIM — Women's Entrepreneurship Infrastructure Centre) is proposed as a district-level hub combining, in a zone-differentiated configuration: a collection and aggregation centre; a mini cold storage facility (−18°C); a digital trade hub (e-hub); a small-scale processing workshop; a business incubation room; and a childcare service. The last component directly addresses the Chi-square finding that perceived barriers — including the care burden — jointly determine financing source access. The zone-differentiated deployment follows the budget weights derived from OLS district coefficients: Zone A (agglomeration) —

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20% of regional budget, e-hub and certification centre format; Zone B (transitional) — 35%, collection and storage centre format; Zone C (peripheral) — 45%, full complex format. With BCR=1.92 and NPV=+1,900 million UZS over three years, the model meets the standard threshold for public infrastructure investment and is suitable for co-financing by the World Bank's Rural Infrastructure Development Project (P168233, 2024) and Asian Development Bank gender-focused programmes.

5.3. The WEFP Digital Portal

The Women Entrepreneur Finance Portal (WEFP) addresses the information asymmetry finding (25.0% unaware of available programmes) through six integrated functions: (i) single-entry electronic registration; (ii) transparent, consolidated information on all state grants, credits, and training opportunities; (iii) automated E-B-M status verification; (iv) online financial and digital literacy courses; (v) real-time market and price information; and (vi) synchronised operation with ATIM centres. The portal generates an annual Women's Entrepreneurship Index at the district level, composed of three weighted components: economic inclusion (40% weight) — credit coverage and formalisation rate; income and employment (35%) — average income growth and jobs created; service coverage (25%) — ATIM and WEFP active users. This index provides the monitoring infrastructure for evidence-based policy adjustment — a capacity identified as absent in the current system.

5.4. Projections to 2030

A three-scenario projection to 2030 is constructed using the Compound Annual Growth Rate (CAGR) formula, international analogue calibration, and expert elicitation:

$$CAGR = (43{,}860 / 19{,}108)^{(1/4)} - 1 \approx 23.1\% \quad (8)$$

$$\Delta G = \delta\_analogue \times k\_adaptation = 22\% \times 0.60 = 13.2\% \quad (9)$$

$$P\_t = P_0 \times (1 + r\_natural + \Delta G\_scenario)^{t} \quad (10)$$

$$Baseline\ scenario\ (t=6):\ P_{2030} = 43{,}860 \times (1.217)^6 \approx 82{,}450\ enterprises \quad (11)$$

Table 6. Three-scenario projections for Tashkent Region (2030)

Indicator	2024 (actual)	2030 pessimistic (prob. 25–30%)	2030 baseline (prob. 50–55%)	2030 optimistic (prob. 15–25%)
Registered women entrepreneurs (thousands)	43.9	65–70	**80–85**	95–100
Formal bank credit access	11.	16–20	**28–**	38–45

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Indicator	2024 (actual)	2030 pessimistic (prob. 25–30%)	2030 baseline (prob. 50–55%)	2030 optimistic (prob. 15–25%)
(%)	0		**33**	
Digital trade coverage (%)	28.0	36–42	**50–57**	63–70
Average monthly income growth	—	+10–14%	**+20–27%**	+30–38%
New jobs created (per year)	3,200	4,500–5,500	**7,500–9,500**	11,000–14,000
Formalisation rate (informal→formal, %)	12.0	16–20	**33–40**	48–55

Source: equations (8)–(11), international analogue calibration, and expert elicitation. Author's computations.

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6. CONCLUSION

This study makes four empirically grounded contributions to the literature on women's entrepreneurship in transitional economies. First, it provides the first district-level OLS regression analysis of income determinants for rural women entrepreneurs in Tashkent Region, documenting that institutional access — credit, infrastructure, information — rather than physical geography or family size, is the primary binding constraint. Second, it quantifies the informal sector exclusion problem (26.4%) and proposes a multi-criteria classification standard (E-B-M) that extends the definitional frontier of women's enterprise to render previously invisible operators policy-eligible. Third, it develops and financially validates an integrated infrastructure model (ATIM; BCR=1.92; NPV=+1,900 million UZS) that combines storage, digital trade, processing, incubation, and childcare functions in a zone-differentiated format aligned with the empirical gradient of income across districts. Fourth, it proposes a digital portal (WEFP) that addresses information asymmetry and enables continuous monitoring through an annual index — providing the feedback mechanism currently absent from Uzbekistan's women's entrepreneurship support architecture.

Taken together, these four instruments constitute an integrated ecosystem response to the multi-dimensional barriers revealed by the data. Infrastructure without finance is insufficient; finance without information is underutilised; information without classification reform excludes the most marginalised operators. Only the joint deployment of all four components — E-B-M, ATIM, Collateral-Free Microcredit Line, and WEFP — is projected to achieve multiplicative rather than additive returns. Under the baseline scenario, this integrated approach is projected to nearly double the number of formally registered women entrepreneurs in Tashkent Region by 2030, while raising bank credit access from 11% to 28–33% and digital trade coverage from 28% to 50–57%. These outcomes are directly aligned with Uzbekistan's «2030 Strategy» (Presidential Decree PF-158, 2023) targets on gender equality, employment, and rural development.

Future research should address the causal identification problem through longitudinal panel data collection across the 11 districts studied here, and through quasi-experimental evaluation of the proposed models once piloted. Intersectionality analysis — examining how age, education level, and ethnicity interact with the identified barriers — would further refine targeting. Structural equation modelling of the ecosystem framework would allow formal testing of the proposed causal pathways between ecosystem components and enterprise outcomes.

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