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Financial Inclusion in Ukraine's Territorial Communities under Wartime Conditions

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Abstract: In the context of the war in Ukraine, financial inclusion has become an important factor in maintaining the socio-economic stability of local communities. The scientific novelty of this study lies in the empirical analysis of financial inclusion in the context of war, taking into account territorial, age, gender and other factors. The study aims to demonstrate how financial inclusion can be a powerful tool for strengthening resilience and stimulating the socio-economic development of local communities in Ukraine during wartime. The study is based on original data from a survey of residents of territorial communities ($n = 157$). The research methodology combines descriptive statistics and frequency distributions, Pearson's chi-square test, one-factor analysis of variance, construction of a composite index of financial inclusion, and binary logistic regression to determine the determinants of financial inclusion. The results confirm clear territorial inequality in access to financial services and infrastructure. Residents of rural and some settlement communities are much more likely to lack financial institutions near their homes than urban residents. The composite financial inclusion index indicates a moderate average level of inclusion, while showing significant internal differentiation, with the lowest values in rural communities. At the same time, despite limited physical access to financial infrastructure, most respondents have well-developed digital payment skills and actively use remote banking services. The results of the regression analysis show that more intensive use of mobile banking applications is statistically significantly associated with higher trust in financial institutions, even after controlling for socio-demographic and territorial characteristics. Overall, the findings provide a reliable empirical basis for developing a differentiated financial inclusion policy that takes into account the specific characteristics of territorial communities, as well as for further developing digital financial services and financial education programmes amid military challenges and post-war recovery.

Keywords: Digital financial services, financial inclusion, financial services, local communities in Ukraine, mobile banking, trust in financial institutions, Ukraine, wartime economy.

Introduction

Financial inclusion – that is, the real ability of people to access and use basic financial services – has become key to the sustainable development of communities. Numerous studies confirm that access to financial services contributes to poverty reduction, reduced social inequality, entrepreneurship development, and increased household financial stability, especially in rural and remote areas (Demirgüç-Kunt et al., 2022; Ozili, 2025).

For Ukraine, the analysis of financial inclusion at the local community level became particularly relevant after the start of the full-scale invasion. The war caused massive upheavals: mass displacement of the population, falling incomes, and serious damage to both physical and digital infrastructure. Many Ukrainians suddenly found themselves without access to basic banking and payment services. At the same time, while digital financial instruments were one of the key drivers of financial inclusion before the war, a contradictory situation has emerged in the context of military operations: new digital opportunities have emerged, but at the same time, risks have increased, especially for vulnerable groups of the population (Abramova et al., 2023).

Since 2022, financial inclusion has become one of Ukraine's most pressing challenges. Although the Financial Sector Development Strategy through 2025 has brought about certain institutional changes, the situation remains difficult: a significant portion of the population, especially in rural communities, continues to have limited access to financial services (National Bank of Ukraine, 2021). This not only creates everyday inconveniences but also directly worsens households' well-being, weakens communities' financial capacity, and complicates efforts to restore and strengthen their resilience. The key problem is that existing financial inclusion mechanisms are not sufficiently adapted to wartime conditions and the territorial heterogeneity of communities, which reduces their effectiveness for local development.

In scientific research, financial inclusion is viewed as a phenomenon that combines institutional, technological, social and behavioural aspects. The basic definition focuses on responsible access to key financial services, primarily transaction accounts, which enable people to participate fully in economic life (Demirgüç-Kunt et al., 2022). Other approaches emphasise its role in ensuring sustainable development, in particular by reducing financial vulnerability and increasing households' ability to manage risks (Muvunyi et al., 2025). Recent research increasingly focuses on the relationship among financial inclusion, digital finance, and well-being during crises and large-scale shocks (Ananzeh et al., 2025). At the same time, the number of studies that directly analyse the financial inclusion of local communities during military operations remains extremely limited.

Most existing studies are conducted at the macro or national level, which does not allow for the specifics of how financial inclusion actually works 'on the ground' – where households interact with banks, local infrastructure, and authorities. It is in the context of war that local communities become the space where the effects of war shocks, internal displacement, infrastructure destruction and digital inequality in access to financial services are most clearly manifested.

In addition, local communities differ significantly in terms of settlement type, population density, institutional capacity and level of digital readiness. Such diversity cannot be adequately reflected using purely national indicators. As a result, there is a significant research gap: a lack of empirical studies that explain how financial inclusion works in communities during wartime. Filling this gap is critically important, as it will enable the development of more effective, context-sensitive policies to strengthen community resilience, support households in the adaptation process, and improve the effectiveness of post-war recovery.

Research Problem and Focus of the Study

Ukrainian researchers have been studying financial inclusion for about a decade, but their work has been fragmented. The vast majority of studies focus on the national or sectoral level and reflect the state of financial inclusion in the pre-war period. A significant part of the work analyses financial inclusion through the prism of banking system stability, payment system development, digital finance, and reforms initiated by the National Bank of Ukraine. Such studies provide valuable information on access to basic financial services, the spread of cashless payments, and the role of fintech in expanding financial inclusion.

At the same time, the territorial dimension of financial inclusion in Ukraine remains insufficiently explored. Even in studies that analyse regional differences, highly aggregated data are usually used. As a rule, no distinction is made between cities, villages and rural communities, and local differences in the development of financial infrastructure, digital readiness or institutional capacity are rarely taken into account. As a result, the real mechanisms of financial inclusion – how households in specific communities interact with financial institutions in practice – are overlooked.

The full-scale invasion of 2022 has further exacerbated these research gaps. Recent analytical and policy reports actively discuss the challenges for the financial sector in wartime, including ensuring the continuity of payment systems, supporting banking services, and countering cyber threats. However, there is very little systematic empirical research on financial inclusion in wartime. There is a particularly noticeable lack of survey data to assess how various war shocks – internal displacement of the population, destruction of infrastructure, forced accelerated digitalisation – affect the population's access to financial services and the level of trust in financial institutions at the local community level.

Another aspect that has not been sufficiently researched in domestic scientific works is the behavioural dimension of financial inclusion. This refers to financial literacy, digital skills, and everyday household financial management practices. These issues are rarely analysed, especially in times of crisis and military uncertainty. Without taking behavioural factors into account, it is difficult to assess whether people not only have formal access to financial services but also use them effectively and sustainably.

In view of the above, this study aims to fill an obvious research gap. It offers an empirical analysis of financial inclusion in Ukraine at the local community level during martial law. The study combines territorial, digital, and behavioural approaches and considers trust in financial institutions a key performance indicator. This approach expands the national scientific discourse and complements existing macro-level and institutional studies by providing a deeper understanding of the processes of financial inclusion 'on the ground'.

Research Aim and Research Questions

This study aims to show how financial inclusion can be a real tool for strengthening sustainability and stimulating socio-economic development of local communities in Ukraine in wartime conditions.

To achieve this goal, the following tasks have been set:

- to analyse how contemporary scientific research conceptualises financial inclusion and what its key components are;
- to assess the impact of military challenges on the actual access of local communities to financial services and the practices of their use;
- to identify the main barriers and risks that limit the access of different population groups to financial services;
- to justify the priority areas for developing financial inclusion, taking into account the processes of digitalisation and Ukraine's European integration priorities.

In line with these objectives, the study formulates the following research questions:

- RQ1: How has the war transformed the functioning of financial inclusion at the level of local communities?

- RQ2: What institutional and digital factors determine the access of different social groups to financial services?
- RQ3: How can financial inclusion contribute to strengthening the resilience of local communities in the post-war recovery process?

A distinctive feature of this study is its comprehensive approach to analysing financial inclusion in local communities in Ukraine amid the war. The study takes into account the interaction among financial, digital, and social factors. It identifies directions for adaptive development in which financial inclusion is considered an effective tool for ensuring a sustainable economic recovery.

Literature Review

Recent studies increasingly view financial inclusion as a complex, multidimensional phenomenon that extends beyond simply having a formal bank account. It typically encompasses not only access to financial services but also the intensity of their use, affordability, service quality, and the level of consumer protection. In this approach, financial inclusion is seen as an institutionally and technologically supported financial infrastructure that improves household welfare, reduces vulnerability to economic shocks, and supports local economic activity and dynamism (Allen et al., 2024; Ozili, 2021). Closely related theoretical approaches draw on information asymmetry theory, transaction cost economics, and the concepts of capabilities and empowerment. Within these approaches, financial inclusion works by reducing the costs of participating in formal financial systems, expanding opportunities for savings and risk sharing, and reallocating resources to more productive and welfare-enhancing uses (Chakrabarty & Mukherjee, 2022; Sahay et al., 2015).

Parallel lines of research focus on the institutional and governance foundations of financial inclusion. Empirical evidence shows that the positive effects of expanding access largely depend on the quality of regulation and the state's institutional capacity, which determine whether financial inclusion translates into broader human development outcomes (Barakat et al., 2025). Recent studies also emphasise that the positive impact of digital payment services is determined not only by access to technology but also by trust in banking institutions and the broader institutional environment, which shape the reliability of services and user confidence (Broekhoff et al., 2024). Taken together, these findings reinforce the argument that financial inclusion should be viewed not as an isolated policy goal, but as part of a broader development model.

At the same time, the scientific literature points to a persistent conceptual gap between approaches on the supply side of financial services – focused on infrastructure, delivery channels, and digital platforms – and constraints on the demand side related to trust, financial literacy, and behavioural barriers. This discrepancy has important implications for methods of measuring financial inclusion and leads to conflicting empirical results across countries and over time (Ozili, 2021; Liu et al., 2024). Consistent with this approach, research on financial literacy shows that expanding access alone is insufficient in the absence of adequate user skills, further underscoring the importance of demand-side factors (Grohmann et al., 2018).

Since 2020, academic research has documented a clear structural shift from traditional banking presence to digital financial inclusion. Mobile money, fintech platforms and digital payment ecosystems are increasingly seen as the main channels for providing financial services. Cross-country studies show that digital channels can significantly reduce geographical barriers and expand access to financial services for underserved communities, especially in areas with limited bank branch networks (Mhlanga, 2020; Shaikh et al., 2023). At the same time, empirical studies show that digital finance can simultaneously promote economic growth and financial inclusion. However, the strength and mechanisms of this impact largely depend on the quality of institutions and the overall level of financial development (Daud & Ahmad, 2023).

At the household and enterprise level, digital finance is associated with improved consumption smoothing, increased productivity of small and medium-sized enterprises, and growth in entrepreneurial activity. These micro-level effects on well-being are often overlooked in macroeconomic research, but they provide important insights into the mechanisms of financial inclusion (Zhou et al., 2025). At the same time, the literature also highlights significant risks. Several studies warn that digital financial inclusion may exacerbate existing inequalities when access to digital skills, connectivity, or affordable devices is unequal, leading to the persistent exclusion of older people, rural residents, and low-income households (Liu et al., 2025; Tok et al., 2022). Spatial studies also show that without accompanying policies and infrastructure investments, digital finance can exacerbate regional disparities rather than reduce them (Wu et al., 2025; Huang et al., 2025).

A significant body of empirical work has examined the relationship among financial inclusion, income inequality, and poverty reduction. Overall, the results indicate that greater financial inclusion is associated with higher household welfare and lower vulnerability. However, the estimated effects remain sensitive to the choice of indicators and to endogeneity issues. Entropy-based approaches show that financial inclusion promotes more diversified consumption patterns, suggesting welfare benefits beyond purely income effects (Ananzeh et al., 2025). Micro-level studies also link financial inclusion to increased household resilience to shocks and strengthened financial stability (Charfeddine et al., 2022).

At the same time, cross-country results on distributional effects remain mixed. While some studies document the contribution of financial inclusion to reducing income inequality (Saka et al., 2015), others find weak, context-dependent, or nonlinear effects driven by demographic structure and institutional environment (Bittencourt, 2021). Recent studies directly consider demographic moderators and show that population ageing may weaken the inequality-reducing effect of financial inclusion (Md Jamil et al., 2024). Taken together, these results suggest that expanding financial access alone does not guarantee equitable outcomes, especially in the context of rapid digitalisation.

A separate line of research analyses the link between financial inclusion, entrepreneurship and local economic development. Empirical evidence confirms that improving access to finance can reduce credit constraints and stimulate business creation, especially in regulatory environments that support formalisation and business growth (Chen et al., 2019). Fintech-driven inclusion is also associated with innovation and productivity effects, although their strength varies depending on the level of competition in the banking sector and market structure (Choudhary et al., 2025).

From a methodological perspective, the literature highlights the tension between macro-level panel studies and micro- or regional analyses. While macro studies often find statistically significant average effects (Duvendack & Mader), regional and spatial studies reveal significant heterogeneity and spillover effects that national aggregates tend to obscure (Shang et al., 2024; Yu et al., 2023). Such heterogeneity is particularly important for spatially differentiated economies and confirms the relevance of subnational analytical approaches.

In post-pandemic research, financial inclusion is increasingly seen as a factor in economic resilience. Panel data at the city and regional levels show that digital finance enhances resilience by improving capital allocation efficiency, strengthening innovation capacity, and stabilising consumption patterns (Hou et al., 2023; Zou et al., 2024). At the same time, several studies identify thresholds and nonlinear effects, suggesting that the positive impact weakens with excessive financialisation and that careful policy calibration is needed (Hou et al., 2023).

Cross-country panel analyses also confirm the developmental significance of financial inclusion indicators – such as ATM density, bank branch density, and Internet usage – demonstrating statistically significant long-term relationships (Ananzeh et al., 2025). At the same time, studies caution that the development of fintech alone cannot eliminate structural inequalities, particularly gender and regional ones, without complementary institutional and social policies (Tok et al., 2022).

At the territorial and community levels, it is increasingly emphasised that the outcomes of financial inclusion depend on the interaction between infrastructure conditions and behavioural factors. Rural and remote communities typically face multiple overlapping barriers, including limited service availability, poor connectivity, and higher transaction costs. Empirical evidence confirms that adoption rates and welfare effects are largely determined by digital readiness, institutional trust, and the presence of functional local financial ecosystems (Shaikh et al., 2023).

In the context of Ukraine, there remains a significant research gap. Much of the available evidence is either aggregated at the national level or based on peacetime institutional conditions. Studies on Ukraine emphasise the importance of aligning community-level financial inclusion strategies with the EU's experience in post-war reconstruction (Abramova et al., 2023). At the same time, the international literature still lacks sufficiently detailed empirical approaches that simultaneously account for war-induced population displacement, infrastructure destruction, the expansion of digital services, and outcomes for community resilience (Hou et al., 2023; Shang et al., 2024).

Filling this gap requires thorough scientific research to identify cause-and-effect relationships and to support the development of sound policies on financial inclusion for communities affected by military action.

Materials and Methods

Study design and research setting

The study was based on a cross-sectional survey aimed at analysing the level, structure and determinants of financial inclusion among different population groups in the context of martial law in Ukraine. Given the significant restrictions on mobility, security risks, and infrastructure destruction caused by the full-scale war, the study was conducted as a local, voluntary, and anonymous online survey. The main objective was not to form a nationally representative sample, but to record context-driven experiences, behavioural patterns and restrictions on access to financial services during the war.

Data collection was conducted between 30 January and 1 May 2023, using Google Forms to administer the questionnaire and export data. The link to the questionnaire was shared via the university's official Facebook page and other online channels, ensuring the widest possible reach among respondents given the limited opportunities for field research.

Sample and participants

The sample was formed through probability-uncontrolled selection based on convenience and respondents' self-selection. This methodological approach is justified by the impossibility of forming a proportional sample under martial law, as well as by the locally oriented strategy for distributing the questionnaire online. This approach is consistent with the practices of previous empirical studies conducted under crisis and conflict conditions, where the use of probability sampling is often methodologically and practically impossible.

The final analytical sample included 157 respondents with the following self-declared characteristics:

- 1). Gender: 63.7% women; 36.3% men.
- 2) Age: 18–29 years old – 52.2%; 30–59 years old – 38.2%; 60 years old and older – 9.6%.
- 3). Type of territorial community: urban – 62.4%; rural – 23.6%; settlement – 14.0%.
- 4). Region of residence: 98.1% – residents of de-occupied territorial communities in Zhytomyr Oblast (northern Ukraine); 2.0% – representatives of 'support' communities in Kirovohrad Oblast; 0.6% – residents of de-occupied communities in Sumy Oblast.

Displacement status: 94.9% – permanent residents; 5.1% – internally displaced persons.

The criteria for inclusion in the sample were: age 18 or older; residence in Ukraine during the period of martial law; and informed and voluntary consent to participate in the study. The exclusion criteria included the absence of confirmed consent to participate and the identification of duplicate questionnaires during the data cleaning stage.

Instrument (questionnaire)

The questionnaire was structured in thematic blocks corresponding to the conceptual dimensions of financial inclusion and specific wartime constraints. It included the following modules:

- 1) Socio-demographic characteristics: age, gender, type of territorial community, region of residence and displacement status.
- 2) Access to and use of financial services: availability of bank accounts, frequency and forms of payments, use of digital financial channels.
- 3) Barriers to financial inclusion: constraints related to physical financial infrastructure, level of digital skills, trust in financial institutions, security risks and service disruptions caused by the war.
- 4) Financial capabilities: self-assessment of financial literacy and digital competence.
- 5) Open-ended questions: qualitative explanations of perceived barriers, adaptation strategies, and unmet financial needs in a state of war.

Most variables were measured using categorical or Likert-type scales, which allowed for both descriptive profiling of the sample and inferential statistical analysis.

Data collection procedure and data management

The questionnaire responses were submitted voluntarily via Google Forms. To ensure data quality, transparency, and reproducibility of results, several data management procedures were applied:

- 1) Initial screening for missing key variables (in particular, age group and type of territorial community).
- 2) Identification of duplicates based on timestamps and identical response patterns in relevant cases.
- 3) Logical consistency check: responses were analysed for internal inconsistencies (e.g., indicating 'no bank account' while also reporting 'regular use of mobile banking'); such cases were flagged and further checked during data cleaning.
- 4) Handling of missing values: valid subsamples of responses were used in the descriptive analysis; in the inferential models, listwise deletion was used to analyse complete cases, with sensitivity checks performed where necessary.
- 5) Anonymisation: personal identification data was not collected; open-ended responses were checked to remove any accidental identifiers before archiving the dataset.

Data analysis and statistical techniques

The analytical research strategy combined quantitative statistical methods with elements of qualitative content analysis, reflecting the mixed structure of the questionnaire and the research objectives.

1) Descriptive analysis. Frequencies, percentages and distribution profiles by gender, age group, displacement status and type of territorial community were used to characterise key indicators of financial inclusion.

2) Bivariate analysis. The relationships between categorical variables were assessed using the chi-square (χ^2) test, particularly for the analysis of territorial differences in access to financial infrastructure and the use of digital financial services. For comparisons of index variables between groups, one-way ANOVA was used, with effect size indicators presented where appropriate.

3) Multivariate analysis. Binary logistic regression was used to identify the determinants of trust in financial institutions and assess the role of digital financial behaviour. The dependent variable was trust in financial institutions (coded as a dichotomous indicator). In contrast, the main explanatory variables included the intensity of mobile banking use, age, gender, type of territorial community, and the presence of financial institutions in the area of residence. The model parameters were estimated using maximum likelihood, and the results are presented as odds ratios with confidence intervals and p-values.

4) Construction of a composite index. For an integrated assessment of financial inclusion, a composite index was constructed by aggregating indicators of access, use, digital skills, and trust. The component variables were recoded and normalised to a 0–1 scale, then aggregated with equal weights to obtain a generalised index suitable for intergroup comparisons.

Index components. The composite financial inclusion index includes the following observed variables (based on questionnaire survey data):

- presence of financial institutions/branches in the area of residence (yes/no);
- presence of a bank account (yes/no, if available in the data set);
- intensity of mobile banking app use (never/sometimes/always);
- skills in using digital payment instruments (yes/no);
- trust in financial institutions (yes/no/ “hard to say”, with subsequent recoding);
- availability of savings (yes/no);
- regularity of expense planning (always/sometimes/never);
- expense tracking (done/not done).

5). Recoding and normalisation. All components were transformed to a common 0–1 metric. Binary variables were coded as 0/1. Ordinal variables were mapped to equidistant scores and then normalised to [0,1]; for example, mobile banking use was coded as 0 = never, 0.5 = sometimes, 1 = always; expenditure planning was coded as 0 = never, 0.5 = sometimes, 1 = always. Where min–max normalisation was required, it followed the standard transformation: $x_i' = (x_i - \min(x)) / (\max(x) - \min(x))$.

6). Weighting and aggregation. The index was computed as the arithmetic mean of normalised components (equal weights): $FII_i = \frac{1}{k} \sum_{j=1}^k x_{ij}$, where k is the number of included indicators.

7) Rationale for equal weights. Equal weighting was chosen because: the study conceptualises financial inclusion as a balanced multidimensional construct (access–use–capability–trust), the sample size and measurement structure do not provide a sufficiently strong basis for stable data-driven weights (e.g., PCA) without risking overfitting, and equal weights improve transparency and replicability for policy use.

8) Sensitivity/robustness check. To verify the stability of the results, a comparison of alternative methods for aggregating the composite index was conducted, specifically by excluding behavioural components or varying the weighting coefficients in the digital use block. This made it possible to ensure that the dominance of a single indicator did not cause intergroup differences by type of territorial community. To assess the internal consistency of multi-point blocks/scales (where applicable), the internal consistency of multi-point blocks/scales (where applicable) was checked using Cronbach's alpha coefficient. Alpha values were interpreted according to generally accepted thresholds (≈e.g., approximately 0.70 as an acceptable level for scientific research). Indicators with low item-total correlations were further analysed to avoid artificially increasing measurement error in the composite construct.

10) Qualitative analysis. Respondents' open-ended responses were analysed using thematic content analysis with a focus on recurring barriers (in particular, problems with internet connectivity, interruptions in the provision of financial services, lack of trust in financial institutions) and adaptation strategies (transition to digital channels, increased use of cash, reliance on informal support networks).

The qualitative results obtained were used to contextualise and interpret the quantitative patterns in greater depth.

Ethical considerations

Participation in the study was completely anonymous and voluntary. Respondents were informed about the purpose of the study and the non-commercial nature of the use of the results. Given the war conditions, no personal identifiers were collected, and all analyses and presentations of results were conducted exclusively in aggregate.

Transparency, prior disclosure and data accessibility

Some of the survey results have been previously presented in part in earlier publications by the research group (Abramova et al., 2023). The study was subsequently expanded through in-depth data structuring and documentation, resulting in an open research database hosted on the Zenodo platform to enhance the transparency and reproducibility of the results (Abramova, 2025). This dataset provides a basis for more thorough and detailed analyses of financial inclusion during a state of martial law, particularly in the context of digitalisation, territorial disparities, and community resilience — issues that go beyond the scope of the initial publication and are the focus of this study.

Results

1. Sample characteristics

The study's empirical basis is data from an online survey of 157 respondents conducted during martial law in Ukraine. The sample is non-representative and local, which is explained by the wartime context and the use of online data collection tools. At the same time, the sample size enables the identification of statistically significant structural relationships and intergroup differences in the study.

The sample structure is presented in Table 1.

Table 1

Socio-demographic profile of the sample (n = 157)

Indicator	Category	Count	%
Gender	Women	100	63.7
	Men	57	36.3
Age	18–29	82	52.2
	30–59	60	38.2
	60+	15	9.6
Community type	Urban	98	62.4
	Settlement-type	22	14.0
	Rural	37	23.6
Residence status	Permanent residents	149	94.9
	Internally displaced persons	8	5.1

Source: Author's own work.

The respondents were predominantly women (63.7%), young adults aged 18–29 (52.2%), and residents of urban territorial communities (62.4%). Most participants lived in de-occupied communities of the Zhytomyr region (98.1%), allowing the findings to be interpreted as a typical snapshot of financial inclusion in the Northern macro-region of Ukraine under wartime conditions. The share of internally displaced persons was 5.1%.

2. Core indicators of financial inclusion under wartime conditions

The descriptive results indicate that, despite wartime pressures, basic access to financial services remains relatively high, yet is accompanied by notable behavioural and territorial imbalances (Table 2).

Table 2*Key financial inclusion indicators, % (n = 157)*

Indicator	Response option	%
Savings	Yes	62.8
Expenditure planning	Always	42.9
	Sometimes	44.9
	Never	12.2
Expense tracking	Track expenses	34.4
	Do not track	65.6
Digital payment skills	Have skills	92.4
Mobile banking app use	Always	52.9
	Sometimes	35.0
	Never	12.1
Trust in financial institutions	Yes	60.5
	Hard to say	29.3
	No	10.2

Source: Author's own work.

62.8% of respondents reported having savings, indicating that households remain financially stable even during crises. At the same time, only 42.9% systematically plan household expenses, while 65.6% do not keep track of expenses, indicating a weak level of structured financial behaviour. This means that financial inclusion is more developed in terms of 'access and use' than in 'financial capability/behaviour,' which may limit the potential of financial services to improve stability.

Digital financial capability is high: 92.4% of respondents said they know how to use payment cards, terminals and electronic payments, and 52.9% regularly use mobile banking apps to control their expenses. The level of trust in financial institutions is moderate: only 60.5% of respondents explicitly expressed trust, while almost a third (29.3%) took a neutral position. A significant proportion of 'difficult to say' responses indicates increased uncertainty and risk sensitivity in financial decision-making during wartime.

3. Territorial inequality of access to financial infrastructure

A key empirical finding is the statistically significant relationship between the type of territorial community and the presence of financial institutions/branches in a settlement (Table 3).

Table 3*Availability of financial institutions by community type*

Type of community	Existing institutions, %	Absent, %
Urban	99.0	1.0
Settlement	59.1	40.9
Rural	40.5	59.5

Note. ($\chi^2 = 68.81$; $p < 0.001$; Cramer's $V = 0.47$).

Source: Author's own work.

Running a few minutes late. My previous model linking the type of community to the availability of financial infrastructure is statistically significant and strong ($\chi^2 = 68.81$; $p < 0.001$; Cramer's $V = 0.47$), indicating a large effect size. In terms of content, rural communities and some urban communities are much more likely to report a lack of financial institutions or their branches. In contrast, in urban communities, access to financial infrastructure is almost universal. The results empirically confirm the

existence of a clear territorial asymmetry in financial inclusion, which becomes particularly pronounced under martial law and limited population mobility.

4. Composite financial inclusion index and intergroup differences

A financial inclusion index was developed to provide an integrated assessment of financial inclusion. This index summarises key measures of access to financial services, their actual use, digital financial capability, and trust in financial institutions. The index was normalised to a 0–1 scale, with higher values indicating greater financial inclusion (Table 4).

Table 4

Financial Inclusion Index by community type

Type of community	Mean	SD
Urban	0.716	0.15
Settlement	0.663	0.16
Rural	0.597	0.17

Note. (ANOVA (one-way): $F = 7.73$; $p = 0.00063$).

Source: Author's own work.

The index was compiled in several stages. In the first stage, the primary variables (availability of savings, frequency of expense planning, expense tracking, digital payment skills, use of mobile banking apps, availability of financial institutions, and level of trust) were recoded into binary or ordinal formats and then converted to a single scale using min-max normalisation. In the second stage, the normalised indicators were aggregated with equal weights and computed as the arithmetic mean, in line with common practice for constructing socio-economic composite indices.

The average index value in the sample is 0.68 (SD = 0.17; median = 0.70), indicating a moderate overall level of financial inclusion with significant inter-individual variability. Intergroup differences in the Financial Inclusion Index values by community type were tested using a one-way ANOVA.

5. Digital determinants and trust in financial institutions

To analyse the relationship between digital financial behaviour and trust in financial institutions, a binary logistic regression model was evaluated. This approach is methodologically sound when the dependent variable is dichotomous and represents the probability of a specific event occurring.

Model specification

Dependent variable (Y): trust in financial institutions, recoded into a binary format:

Y = 1 – respondent reports trust (“yes”); Y = 0 – respondent reports no trust (“no”).

Responses “hard to say” were excluded to ensure unambiguous interpretation in a binary framework. After data cleaning, the regression sample size was $n = 111$.

Key explanatory variable (X_1): intensity of mobile banking app use (ordinal scale):

0 – never; 1 – sometimes; 2 – always.

This variable serves as a proxy for digital financial engagement and day-to-day interaction with formal financial services.

Control variables:

X_2 – age (categorical);

X_3 – gender (1 = woman; 0 = man);

X_4 – community type (urban / settlement-type / rural);

X_5 – presence of financial institutions/branches in the locality (1 = yes; 0 = no).

The probability that respondent i trusts financial institutions is modelled using a binary logit specification:

$$\Pr(Y_i = 1) = \frac{1}{1 + \exp(-Z_i)}$$

where the latent index Z_i is defined as:

$$Z_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5.$$

Equivalently, the model can be written in log-odds (logit) form as: $\ln\left(\frac{\Pr(Y_i=1)}{1-\Pr(Y_i=1)}\right) = \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5$.

Table 5

Binary logistic regression results: determinants of trust in financial institutions (Estimation method: Maximum Likelihood (Logit). Sample size: n = 111)

Variable	β	SE	OR	95% CI for OR	p-value
Mobile banking app use intensity	0.997	0.415	2.71	1.21–6.08	0.016
Age	0.084	0.091	1.09	0.92–1.30	0.354
Gender (1 = woman)	0.215	0.462	1.24	0.50–3.07	0.643
Community type	–0.318	0.287	0.73	0.42–1.28	0.268
Financial institutions present (1 = yes)	0.402	0.511	1.50	0.55–4.05	0.432
Constant	–1.843	0.934	–	–	0.048

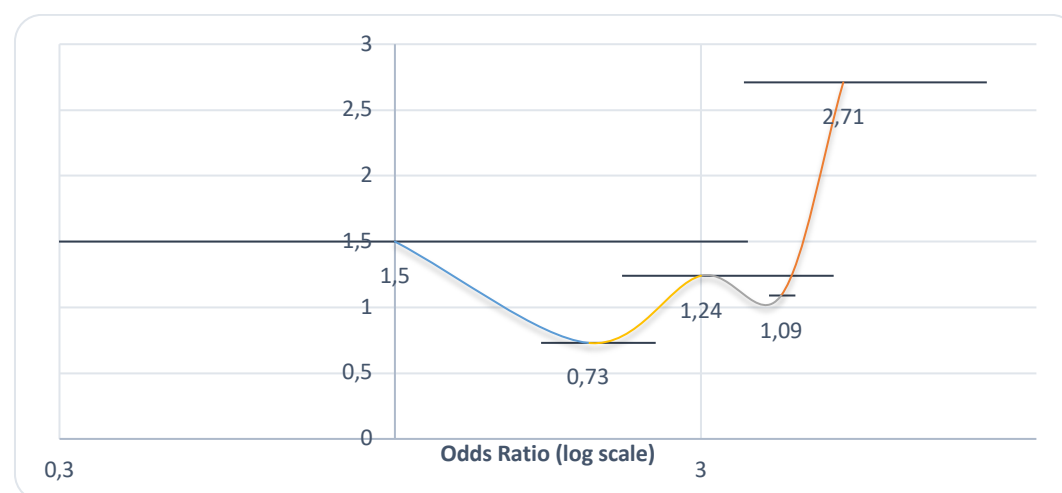
Note. (Model statistics: LR $\chi^2 = 11.32$; $p = 0.0269$; Pseudo R^2 (Nagelkerke) = 0.19).

Source: Author's own work.

To facilitate interpretation of the regression estimates presented in Table 5, the odds ratios (OR) and corresponding 95% confidence intervals are visualised in Figure 1. This method of presenting data allows for a direct comparison of the direction and magnitude of the effects. Clearly, it reflects the accuracy of the estimates through the width of the confidence intervals.

Figure 1

Determinants of trust in financial institutions: odds ratio (OR) with 95% confidence intervals (logistic regression)



Note. ORs are presented on a logarithmic scale; OR > 1 indicates higher odds of trust, whereas OR < 1 indicates lower odds. Horizontal bars represent 95% CIs.

Source: Author's own work.

As shown in Figure 1, the most pronounced and statistically significant determinant of trust is the intensity of mobile banking use: higher levels of engagement with mobile banking are associated with a significantly higher likelihood of trust in financial institutions (OR = 2.71; $p = 0.016$). In contrast, the estimates for socio-demographic and territorial variables (age, gender, type of community, and presence of financial institutions) are close to OR = 1 and/or characterised by wider confidence intervals, indicating the absence of statistically significant effects within this sample.

Overall, the picture reinforces the study's key conclusion: under martial law, digital financial engagement (mobile banking use) is the main predictor of trust in financial institutions. At the same time, physical access and basic socio-demographic characteristics play a secondary role.

Model quality and interpretation of results

The overall statistical significance of the model was assessed using the likelihood ratio test (χ^2) by comparing the full model with a model containing only the constant term. The LR test confirmed the model's statistical significance ($p = 0.0269$), indicating the presence of systematic relationships between the included predictors and the probability of trusting financial institutions. Nagelkerke's pseudo- R^2 of 0.19 indicates moderate explanatory power: the included variables significantly improve the model's fit compared to a specification with only a constant. At the same time, a significant proportion of the variation in trust remains unexplained by observed factors.

To facilitate interpretation, the regression coefficients were expressed as odds ratios (ORs) with 95% confidence intervals. According to the results presented in Table 5 and Figure 1, the intensity of mobile banking use is positively and statistically significantly associated with trust, whereas the other covariates generally do not reach statistical significance in this specification. This result suggests that in wartime, the stability and convenience of remote financial services may play a more important role in building trust than socio-demographic characteristics or physical proximity to branches, at least within this sample.

Model diagnostics and predictive characteristics (at the reviewer's request) To take into account the reviewer's comments and ensure the reliability of the results; additional indicators of model diagnostics and its predictive quality are provided. Multicollinearity diagnostics were performed to assess the stability of the coefficients. The variance inflation factors (VIFs) did not indicate problematic multicollinearity among the predictors (VIF range: 1.11–1.67; all VIF < 2.00).

Model calibration was assessed using the Hosmer–Lemeshow goodness-of-fit test, which showed adequate fit of the model to the observed data ($\chi^2 = 6.83$; $df = 8$; $p = 0.555$).

The model's discriminatory ability was assessed using ROC analysis. The area under the ROC curve (AUC) was 0.753 (95% CI: 0.606–0.901), indicating an acceptable ability of the model to distinguish between 'trust' and 'distrust' outcomes.

At a probability threshold of 0.50, the model correctly classified 88.3% of cases (sensitivity = 98.9%, specificity = 25.0%). The relatively low specificity means that, at the selected threshold, the model identifies cases of 'trust' significantly more often than cases of 'distrust,' which may be due to class imbalance in the regression subsample and a conservative threshold choice.

Methodological note

The regression results reflect statistical associations rather than causal relationships. The identified link between digital financial behaviour and trust may partly reflect selection effects (e.g., respondents with higher digital capability may have a higher baseline level of trust). At the same time, the model provides compelling empirical evidence that digital financial instruments are an important mechanism for building trust in conditions of limited mobility, infrastructure risks and increased uncertainty.

6. Integrated interpretation of results

The results obtained comprehensively confirm that, under martial law, the financial inclusion of the Ukrainian population is shaped by the asymmetric interaction between digital capabilities and territorially determined restrictions. On the one hand, most respondents demonstrate a high level of proficiency with digital payment instruments and active use of remote banking services, indicating a relatively high adaptive capacity of the population to the functioning of the financial system under conditions of increased uncertainty and limited physical mobility. On the other hand, the results reveal persistent territorial and behavioural imbalances that significantly limit the potential of financial inclusion to contribute to socio-economic stability at the community level.

Empirical analysis provides compelling evidence of marked territorial inequality in access to financial infrastructure. Rural communities and some urban territorial communities are much more likely to lack physical financial institutions or bank branches, as indicated by high statistical significance and large effect sizes. Such inequality exacerbates the population's structural vulnerabilities in wartime, when reduced access to transport, security risks, and logistical disruptions limit the ability to use even basic financial services.

At the same time, the results of the composite assessment show that the average level of financial inclusion hides significant internal differentiation. The lowest values of the financial inclusion index are recorded in rural communities, confirming the systemic nature of territorial disparities and pointing to the need for targeted approaches to developing financial infrastructure and services at the local level. Accordingly, financial inclusion under martial law cannot be viewed as a homogeneous phenomenon and requires a spatially sensitive analysis and policy development.

An important finding of the study is the identification of the compensatory role of digital financial instruments. More intensive use of mobile banking applications is statistically associated with higher trust in financial institutions, indicating a shift in the mechanisms of interaction between households and the financial system. In conditions of limited physical access to infrastructure, digital channels ensure the continuity of financial transactions, support basic financial functions for households, and partially reduce territorial barriers.

At the same time, the results reveal behavioural constraints to financial inclusion, particularly the low prevalence of systematic financial planning and expense tracking. The predominance of unstructured financial behaviour reduces the potential of financial services as instruments of long-term financial stability, which is critical in the context of post-war recovery and the socio-economic sustainability of local communities.

Overall, the results suggest that financial inclusion in Ukraine under martial law serves a dual function: on the one hand, it functions as a mechanism to adapt and support the financial viability of the population through digital channels; on the other hand, it reflects deeply rooted territorial and behavioural disparities. This duality necessitates a shift from universal policy decisions to differentiated financial inclusion strategies tailored to the specificities of territorial communities, levels of digital readiness, and the population's socio-demographic profiles. This approach provides an empirical basis for further research to assess the role of financial inclusion as a tool for recovery, social stabilisation, and strengthening the economic resilience of territorial communities in Ukraine in the post-conflict period.

Discussion

The results of this study are consistent with the dominant approach in contemporary scientific literature, which holds that financial inclusion is a multidimensional phenomenon shaped by the interaction of institutional, spatial, digital, and behavioural factors. At the same time, the results expand the existing theoretical framework by explicitly accounting for the context of martial law, which remains underrepresented in the international empirical literature. In the context of the research questions (RQ1–RQ3), the evidence obtained indicates that martial law does not lead to a uniform decline in financial

inclusion; rather, it reconfigures mechanisms at the level of territorial communities while simultaneously strengthening spatial constraints and increasing the functional centrality of digital channels.

The study's statistically significant territorial inequality in access to financial infrastructure confirms previous empirical results showing that rural residents consistently have more limited access to financial services than urban residents. Similar spatial disparities have been recorded in cross-country and regional studies conducted under conditions of relative economic stability (Sun et al., 2025). However, unlike these studies, this study finds that war conditions intensify existing spatial inequalities, pointing to the cumulative effect of crisis constraints on financial inclusion at the community level. Thus, in response to RQ1, war conditions transform financial inclusion, making the 'spatial component' (accessibility of local infrastructure and mobility restrictions) more decisive for basic access than in peacetime.

In this context, war acts not only as a temporary shock but also as a structural amplifier of regional asymmetries, consistent with arguments in the literature on the spatial dimension of financial development. The evidence presented shows that physical access to financial infrastructure becomes particularly critical in conditions of limited mobility, security risks and disruptions to transport and logistics chains. This is particularly relevant for rural and small-town communities, where the absence of branches is not just an inconvenience but a severe limitation that can delay or prevent access to even routine services (payments, cash withdrawals, account maintenance), thereby increasing the risk of financial exclusion.

The positive correlation between the intensity of digital banking use and trust in financial institutions is consistent with international studies that highlight the growing role of fintech and digital finance in expanding financial inclusion (Mhlanga, 2020; Ozili, 2021). At the same time, this study adds further analytical depth by demonstrating a reverse mechanism: not only is trust a prerequisite for using services, but active interaction with digital financial services also contributes to the formation of trust. Accordingly, about RQ2, digital engagement (the intensity of mobile banking use) emerges as a key behavioural-digital determinant that can partially compensate for infrastructure constraints and simultaneously build institutional trust in conditions of heightened uncertainty.

This result complements previous studies indicating that digital financial instruments can reduce transaction costs and information asymmetries, but do not automatically translate into trust in institutions without the appropriate context (Lyons & Kass-Hanna, 2021). In a state of martial law, this context changes fundamentally, as digital channels become the primary, and sometimes the only, means of maintaining financial interaction, transforming the processes of trust formation. In other words, the military environment reinforces the substitutive role of digital finance. When physical access is disrupted, the reliability and convenience of remote services serve as a direct 'signal' of institutional capacity, which in turn affects trust.

The low prevalence of systematic expenditure planning and accounting identified in the survey is consistent with findings from studies of financial behaviour in economies experiencing economic and social shocks (Grohmann et al., 2018; Charfeddine & Zaouali, 2022). Importantly, the coexistence of high digital capacity with low financial discipline reinforces the argument that access to financial technologies alone is insufficient to ensure rational financial behaviour. This is fundamental to the interpretation of RQ3: financial inclusion may remain predominantly transactional (the ability to make payments and transfers) without transforming into long-term household resilience, unless financial skills and behavioural routines are developed.

The results support a growing body of research that emphasises the need to integrate digital financial inclusion with targeted financial education and financial capability development programmes, especially at the local community level, where behavioural factors significantly influence the effective use of financial services. Accordingly, the contribution of financial inclusion to resilience (RQ3) should be conceptualised as two-tiered: short-term adaptive continuity enabled by digital channels, and medium-

and long-term resilience based on improved budgeting, expense tracking, and informed financial decision-making.

From an economic sustainability perspective, the results are broadly consistent with studies showing that digital financial inclusion can enhance the adaptive capacity of households and territories during crises (Yu et al., 2023; Hou et al., 2023). At the same time, unlike most existing studies based on macro-level or panel data, this study provides micro-level evidence of trust and inclusion formation within specific territorial communities, which is an important methodological and empirical contribution. Such a micro-level, community-oriented perspective is particularly valuable in wartime, when interactions between households, local infrastructure, and institutional capacity are key arenas for the manifestation of exclusion risks and adaptation strategies.

Overall, comparisons with international studies show that financial inclusion in Ukraine in wartime follows global patterns, while also exhibiting specific features related to military instability, territorial fragmentation, and accelerated digitalisation. These characteristics underscore the need for context-sensitive analytical frameworks and differentiated policy responses, rather than universal financial inclusion strategies. In practical terms, the results imply that post-war recovery policies should be differentiated by community type: for rural areas, the restoration of infrastructure and service delivery points (branches, ATMs, agent banking) remains critical, while for building trust and transforming digital access into sustainable outcomes, the reliability of digital services, user support, and financial capacity building are key.

In summary, the discussion provides clear answers to the research questions (RQ1–RQ3) in light of established international scientific approaches. Regarding RQ1, the results show that wartime conditions transform financial inclusion by redistributing its channels: spatial constraints become more severe at the community level (especially in rural and settlement areas), while digital channels shift from being complementary to functionally necessary. This configuration is consistent with the deterministic approach proposed by Sun et al. (2025), but the context of the war in Ukraine demonstrates that crisis environments can significantly amplify the ‘place effect’ and make local infrastructure gaps particularly consequential for inclusion.

Regarding RQ2, the results confirm that access is shaped by the interaction of institutional presence and digital capability: limited physical presence of financial institutions narrows access. At the same time, greater use of mobile banking is associated with higher levels of trust. This is consistent with the argument that vulnerable groups may remain excluded when capabilities and enabling conditions lag behind the pace of technological diffusion (Lyons & Kass-Hanna, 2021), and at the same time supports the thesis of the potential of digital finance to expand inclusion through technology-mediated service delivery and risk management tools (Mhlanga, 2020).

Finally, in response to RQ3, the results show that financial inclusion contributes to community resilience primarily by ensuring the continuity of financial transactions and adaptive capacity through digital channels. However, its potential is limited by behavioural factors (poor budgeting and expense tracking). This duality is consistent with the current state of research on digital financial inclusion, which increasingly emphasises that technological access alone is insufficient without the parallel development of financial skills and appropriate institutional design. In this context, the bibliometric review by Gallego-Losada et al. (2023) is particularly relevant, demonstrating the evolution of digital financial inclusion research toward an integrated framework that combines technology, inclusion outcomes, and enabling conditions — an approach convincingly reinforced by micro-level data from war-torn Ukraine.

Conclusions and Implications

The study aimed to substantiate the role of financial inclusion in enhancing the resilience and socio-economic development of local communities in Ukraine under martial law. The empirical results allow us to formulate several generalised yet substantively justified conclusions that fully align with the study's

stated aim and the logic of the empirical analysis. In addition, these conclusions have practical implications for post-war recovery policies at the community level.

First, the study finds that wartime financial inclusion is characterised by marked spatial heterogeneity, determined by the type of territorial community. Statistical evidence confirms significant differences in access to financial infrastructure across urban, settlement, and rural communities, with rural areas remaining the most vulnerable. Such spatial inequality limits access to basic financial services and weakens the population's adaptive capacity in the face of crisis. The results obtained indicate the need to prioritise the restoration and diversification of local access points (branches, ATMs, agency banking, mobile service points) in rural and settlement communities, where the physical absence of infrastructure is a severe constraint.

Secondly, the composite assessment of financial inclusion reveals a moderate overall level of population involvement in the financial system, with significant internal differentiation. The lowest financial inclusion index values are consistently observed in rural communities, highlighting the systemic nature of territorial disparities and emphasising the need for spatially differentiated financial inclusion policies rather than uniform, universal approaches. These results indicate that inclusion goals and financial service delivery models should be differentiated by community type and level of 'digital readiness' rather than based on national averages, which mask local pockets of exclusion.

Third, the results demonstrate that digital financial instruments perform a compensatory function in conditions of limited physical access to financial infrastructure. More intensive use of mobile banking applications is statistically associated with higher trust in financial institutions, indicating a shift in how households interact with the financial system and the growing role of remote services in supporting household financial stability. Enhancing the reliability and convenience of digital services (connection quality, service continuity, customer support, cybersecurity communication) is critical to maintaining trust in times of instability.

Fourth, the analysis reveals behavioural constraints to financial inclusion, primarily the low prevalence of systematic financial planning and expense tracking. Such financial behaviour patterns limit the effective use of financial services as tools for long-term income stabilisation and savings accumulation, which is particularly important in the context of post-war recovery and long-term socio-economic stability. Digital financial inclusion initiatives should be complemented by targeted financial capacity-building measures (budgeting, expense tracking, savings routines), especially for rural communities and vulnerable households.

Overall, the results confirm that financial inclusion in Ukraine under martial law is a multidimensional and spatially sensitive phenomenon that combines the expansion of digital opportunities with deeply rooted territorial and behavioural constraints. This highlights the need to move from universal policy solutions to differentiated financial inclusion strategies tailored to the specific characteristics of territorial communities and their levels of digital readiness. Ultimately, a sustainable post-war financial inclusion agenda must combine spatially oriented infrastructure restoration, ensuring the continuity of digital services, and the development of financial behavioural skills as complementary components.

Suggestions for Future Research

Taking into account the results obtained, it is advisable to outline the following areas for further scientific research and practical policy:

- 1) Expanding the empirical base by forming representative interregional samples, which will allow for the assessment of financial inclusion, taking into account the differences between frontline, de-occupied, and rear (non-combat) territorial communities. Such designs should provide for stratification by community type (urban/settlement/rural), intensity of population displacement and level of infrastructure damage, with subsequent post-stratification weighting to increase external validity.

2) Dynamic analyses of financial inclusion based on panel data will allow tracking changes in access to and use of financial services during the war period and in the post-war recovery process. In the absence of the possibility of forming full-fledged panels, repeated cross-sectional surveys with fixed intervals and comparable measurement instruments can be used to assess trends in inclusion and trust.

3) Assessing the effectiveness of targeted policy instruments, including digital financial services, financial literacy programmes, and mobile service delivery formats targeting rural communities. To strengthen causal conclusions, it is advisable to use quasi-experimental approaches (e.g., difference-in-differences or comparable control communities) and to include process indicators (continuity of service delivery, frequency of disruptions, number of complaints, density of the agent network) alongside outcome indicators.

4). Comparative international studies aimed at comparing Ukraine's experience with that of countries that have undergone post-conflict recovery, with a view to adapting the most effective models of financial inclusion to national conditions. Such comparisons should be based on a common analytical framework and harmonised indicators (access, use, digital capacity, trust), enabling international benchmarking.

In terms of methodology, future research should also improve the toolkit by using validated multi-point scales to measure institutional trust, digital financial literacy, financial well-being and perception of military risks, followed by psychometric testing (internal consistency, factor structure). In addition, mixed designs combining surveys with semi-structured interviews and community case studies will help explain 'neutral/undefined' responses and identify informal coping mechanisms that substitute for formal financial instruments. Finally, combining micro-level survey data with objective geospatial indicators (distance to branches/ATMs, mobile coverage, frequency of power outages) will allow for more accurate modelling of territorial constraints and increase the explanatory power of statistical models.

The implementation of these research areas will not only deepen scientific understanding of financial inclusion in crisis conditions but will also contribute to the development of evidence-based recommendations for national and local policies aimed at strengthening the resilience of Ukraine's territorial communities.

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