

DIGITALIZATION OF MICROFINANCE INSTITUTIONS IN THE CONTEXT OF ECONOMIC RESILIENCE IN THE REPUBLIC OF MOLDOVA

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Abstract: The paper analyzes the role of digitalization of microfinance institutions in strengthening economic resilience in the Republic of Moldova, starting from the premise that digital transformation can increase operational efficiency, risk management quality and continuity of financial services in times of economic shocks. The objective of the research is to assess the level of digital maturity of OCN and identify the mechanisms through which digitalization influences institutional resilience (operational, financial and customer-oriented), as well as the associated emerging risks (fraud, cybersecurity, data protection, over-indebtedness). Methodologically, the study uses documentary analysis of the regulatory framework and supervisory reports, quantitative and qualitative analysis of OCN activity indicators. The conclusions propose digitalization as a strategic lever for increasing the resilience of microfinance, provided that a responsible digital transformation is implemented, supported by investments in security, data and skills.

Keywords: *microfinance, digitalization, economic resilience, operational resilience, risk management, cybersecurity, Republic of Moldova.*

Introduction

In the digital age, information and communication technology (ICT) underpins the complex systems used for everyday activities. It supports the activity of our economies in key sectors, including the financial sector, and improves the functioning of the internal market. Increasing digitalization and interconnection also amplify ICT risks, making society as a whole and the financial system in particular more vulnerable to cyber threats or ICT-related disruptions. While the extensive use of ICT systems and the high degree of digitalization and connectivity are now core features of the activities of financial institutions in the Union, their digital resilience still needs to be better addressed and integrated into their wider operational frameworks.

In recent decades, the use of ICT has become essential in the provision of financial services, now becoming critical to the operation of the day-to-day functions of all financial institutions. Today, digitalization covers, for example, payments, which have increasingly moved from cash and paper-based methods to the use of digital solutions, as well as securities clearing and settlement, electronic and algorithmic trading, lending and financing operations, person-to-person lending, credit rating, receivables management and back-office operations. The insurance sector has also been transformed by the use of ICT, from the emergence of insurance intermediaries offering their services online using InsurTech, to insurance underwriting using digital means. Not only has finance become largely digital across the sector, digitalization has also deepened the interconnections and dependencies within the financial sector, as well as the relationship with third-party infrastructure and service providers.

In recent years, ICT risks have attracted the attention of policy makers, regulators and standard-setting bodies at national, international and Union levels, in an attempt to enhance

digital resilience, set standards and coordinate regulatory or supervisory work. At international level, the Basel Committee on Banking Supervision, the Committee on Payments and Market Infrastructures, the Financial Stability Board, the Financial Stability Institute, as well as the G7 and G20, aim to provide competent authorities and market operators in different jurisdictions with tools to strengthen the resilience of their financial systems. This work has also been driven by the need to properly consider ICT risks in the context of a highly interconnected global financial system and to pursue greater coherence of relevant good practices.

Despite specific policy and legislative initiatives at national and Union level, ICT risks continue to pose a challenge to the operational resilience, performance and stability of the Union financial system. The reforms that followed the 2008 financial crisis primarily strengthened the financial resilience of the Union financial sector and aimed to protect the competitiveness and stability of the Union from an economic, prudential and market conduct perspective. While ICT security and digital resilience are part of operational risk, they have been less central to the regulatory agenda in the wake of the financial crisis and have only been developed in certain areas of the Union financial services policy and regulatory framework or only in a few Member States (National Bank of Moldova, 2023, July 1).

In the period 2026–2027, the National Bank of Moldova (BNM) is focusing its supervisory priorities on strengthening the resilience of the banking and non-banking sector, with a focus on operational risk, ICT (IT) risks, information security and business continuity. This orientation is determined by the process of harmonization with the European Union regulatory framework and the increasing exposure of financial institutions to cyber threats, in a context of accelerated digitalization of financial services. In this logic, the NBM promotes the adoption of requirements close to European standards for digital operational resilience, in the spirit of the EU DORA regulation (ICT risk management, incident reporting, digital resilience testing and supervision of ICT service providers). The implementation of such requirements aims to reduce the probability and impact of cyber incidents, as well as increase the capacity of banks to prevent, manage and recover quickly from technological disruptions. From the perspective of supervised institutions, this process involves reviewing and gradually increasing investments in IT infrastructure, security controls, testing, auditing and business continuity/recovery plans (BCP/DRP), so that operational resilience becomes a structural component of governance and risk management.

Literature review

The methodological and informational support of the research is based on the systemic approach to the research object. The scientific works of renowned authors in the field of strategic management and organizational governance, such as: Ansoff I., Hofer G. and Schendel D., Daft R., Andrews K., Carles J., Wheelen and Hunger, serve as a guide for this study. An important contribution to the theoretical foundation was also made by the research of Romanian and Russian economists: Nicolescu O., Verboncu I., Istocescu A., Tanțău A.D., Popa I., Romanov A.P., Jarikov I.A., Marcova V.D., Kuznetova S.A., Liukshnov A.N., etc., as well as by local researchers: Stratan A., Catan P., Erhan L., Oleiniuc M., Cotelnic A., etc.

At the same time, to diagnose the sector and anchor the analysis in the current realities of the reforms, recent strategic documents and national programs were examined, including the National Development Strategy "European Moldova 2030" (adopted by law), as well as economic planning and reform documents applicable to the current period (e.g.: Economic Reform Program 2025–2027). In the area of financial markets, the analysis is updated by using the recent strategic and institutional framework for capital market development for the period 2025–2030 (adopted by law, with an explicit role for the NCFM in implementation and monitoring). As information support, the author used current legisla-

tive and regulatory acts relevant to non-bank lending/microfinance (including Law No. 1/2018 on non-bank lending organizations), official reports and publications of the NCFM (in particular annual reports/activity reports for 2023 and 2024, as well as sectoral summaries), as well as data and analyses published by the NBM (Annual Report 2024; Financial Stability Report 2024; information on the situation of the banking sector as of 31.12.2024). The research is also based on statistical data sets and prudential reports collected from the NBM and the NCFM, used to construct quantitative and qualitative indicators, as well as to assess the degree of implementation of planned actions (Tanase, 2017).

Internationally, relevant methodological benchmarks were capitalized on from studies and guides developed by specialized institutions and networks, such as the World Bank, the European Commission, the European Microfinance Network (EMN), as well as centers and organizations dedicated to microfinance and financial inclusion (e.g. MFC), in order to ensure comparability of approaches and alignment with European best practices.

Research results

Microfinance in the Republic of Moldova has evolved visibly in recent years, moving from a marginal lending instrument to an increasingly important financing channel for individuals and small and medium-sized enterprises. This evolution is explained by a set of trends that, on the one hand, expand access to financing and diversify the offer, and on the other hand, increase the complexity of risks and governance requirements. First of all, the expansion of credit accessibility is observed. Microfinance has become more present in both urban and rural areas, offering an alternative for clients who do not meet traditional banking criteria or for those who need quick and flexible solutions. The increase in the number of institutions offering microfinance services, including specialized organizations and initiatives with a social component, has reduced entry barriers and brought financial services closer to communities. In practice, this trend contributes to financial inclusion: households and small entrepreneurs can access working capital, cover seasonal expenses (in agriculture) or make small investments that would otherwise be postponed.

Secondly, there is a diversification of financial products. The sector tends to go beyond the classic “small credit” model, expanding its offer towards service packages: savings products (where the framework allows), insurance (especially those associated with loans), payment services, solutions for SMEs (inventory financing, equipment, simplified factoring, etc.). This diversification has two effects: it increases the attractiveness for a wider range of clients and, at the same time, offers institutions the opportunity to balance their income and better manage risk, by distributing it across multiple products and segments.

Thirdly, digitalization is becoming a defining trend. More and more institutions are introducing online platforms for informing clients, submitting applications, preliminary assessment, signing documents and managing reimbursement. Digitalization reduces operational costs, shortens processing times and makes services more accessible to the young population and small businesses, especially in urban areas. At the same time, digitalization changes the way of competing in the market: institutions that invest in technologies (scoring, workflow automation, CRM, data analysis) can react faster to economic changes and offer personalized products. However, this progress also comes with a “hidden side”: increased dependence on IT infrastructure, exposure to fraud and cyberattacks, and the risk that the speed of granting weakens the prudential filter if there are no solid controls.

Fourth, international cooperation is intensifying. Moldovan institutions are increasingly seeking partnerships with international organizations and external financial institutions to attract resources, obtain financing lines and take over know-how (governance models, risk policies, products adapted to certain groups). International cooperation can support the capitalization and professionalization of the sector, but can also bring additional requirements regarding

reporting, compliance, transparency and risk management standards.

Overall, microfinance confirms its role as a support mechanism for SMEs, farmers and individuals with limited access to bank credit. By financing small economic activities and covering urgent liquidity needs, microfinance can contribute to maintaining local economic activity and reducing social vulnerability. However, the rapid development of the sector also amplifies the problems that need to be managed: the risk of over-indebtedness, pressure on portfolio quality in times of economic shock, reputational risks associated with cost transparency, as well as digital risks (fraud, data breaches, operational disruptions) (Basel Committee on Banking Supervision, 2011).

From this perspective, the sustainability and resilience of microfinance institutions become essential conditions for long-term success. Sustainability refers to the capacity of institutions to operate efficiently, profitably and responsibly, without compromising client protection and financial stability. Resilience, on the other hand, aims at the ability to anticipate, absorb and overcome shocks (economic, social, technological), maintaining the basic functions: granting and administering loans, data protection, continuity of services and public trust. In an unstable context, resilient institutions are those that have prudent risk policies, clear governance, adequate capital and liquidity, secure digital systems, continuity plans and the managerial capacity to adapt quickly.

In the research, digitalization is not treated as a simple technical modernization, but as a change in operational and managerial model: the way in which MFOs attract clients, assess risk, manage the portfolio, communicate, report and ensure the continuity of services in shock conditions. Thus, the author defines concretely what “digitalization” means for microfinance and delimits the components that will be measured. The focus is on the entire chain of creation of the microcredit service: from client information and application submission, to contract signing, disbursement, monitoring and reimbursement. In this regard, a framework for assessing digital maturity is established in the following dimensions: (i) digital channels and client access (web platforms, applications, online payments, remote communication), (ii) digitalization of internal processes (workflow, electronic archiving, automation), (iii) use of data and analytics in decision-making (CRM, scoring, early warning tools), (iv) governance and technological management (IT strategy, systems integration, skills), (v) information security and operational continuity (access control, backup, continuity plans, incident response). Based on this framework, a digital maturity score is built, which allows organizations to be compared with each other and to identify points where digitalization is superficial or, on the contrary, integrated into management (National Bank of Moldova, 2023, July 1).

Digitalization significantly changes the way microfinance institutions operate. Through online platforms, mobile applications, electronic signature, workflow automation and the use of analytics, the lending process becomes faster, more transparent and more accessible. For institutions, digitalization can reduce operational costs (fewer manual operations, less paper, standardized processes), improve risk management (digital scoring, automated checks, early monitoring of delays) and increase operational resilience (continuity in crisis situations, remote working, 24/7 services). For customers, the advantages are reflected in reduced approval times, easier access from remote areas and the ability to manage repayments through digital channels.

In this context, in this paper, we propose the application of quantitative methods that measure the strategic resilience of non-bank lending organizations, using a system of resilience indicators of the NCO. Therefore, the system of indicators, proposed by the author in the paper, is intended to measure strategic resilience on the following four aspects:

- Assessment of activity indicators of the non-bank lending sector in the Republic of Moldova (by establishing indicators that characterize the basis of trends within the NCO);

- Impact of the microfinance sector (NCO) on the main macroeconomic indicators (by identifying changes in the value of the main macroeconomic indicators, especially GDP, under the incidence of using the financial indicators of the NCO: analyzes the degree of financial intermediation assessed from the perspective of the share of assets, loans, credits received, equity, etc.);
- The connection between the financial indicators of the banking and non-banking sectors (comparative analysis of the banking and non-banking sectors by establishing the degree of concentration of the sectors (CR-4, HHI));
- The connection of OCN with the online environment (by identifying the performance of the online marketing organization/and tracking the consumption of content on the OCN website, measuring visitor interaction, tracking the performance/results of the organization) (Popa et al., 2013).

The methodology for assessing the strategic resilience of OCN, proposed by the author, describes the methodological aspects of developing the system of strategic resilience indicators of the non-banking lending sector, defines the strategic resilience indicators and the requirements for the performance report.

In Table 1, the author characterizes the methodological framework of the resilience indicator system, intended for assessing the strategic performance of the non-banking lending sector, especially microfinance organizations in the Republic of Moldova. The system, proposed by the author, contains 9 strategic resilience indicators, which present the most important results of the main components of strategic management. Therefore, the author further proposes to analyze the microfinance sector through the lens of these strategic resilience indicators.

Table 1

System of strategic resilience assessment indicators of the non-bank lending sector (microfinance sector) in the Republic of Moldova

Indicator description	Calculation method and values
I. Assessment of activity indicators of the non-bank lending sector in the Republic of Moldova	
1.A. Penetration rate – difference between the number of loan beneficiaries and the active population, %	$1.A. = \text{Number of loan beneficiaries} / \text{Active population} * 100\%$
2.A. Mobility rate in the sector – represents the change in the number of organizations in the sector; provides information on entry barriers and the level of competitive pressure in the sector.	$2.A. = (\text{Number of MFOs in 2024} - \text{Number of MFOs in 2025}) / \text{Number of MFOs in 2024}, \%$
3.A. Capital adequacy. The solvency ratio is a debt assessment indicator that can be applied to any type of organization to evaluate how well it can cover both short-term and long-term financial risks.	$\text{Leverage effect} = \text{Total assets} / \text{Total capital};$ $\text{Solvency} = \text{Total assets} / \text{Borrowings received};$ $\text{General indebtedness ratio (financial leverage)} = \text{Borrowings received} / \text{Total capital}$
4.A. Return on Assets (ROA) – one of the main profitability indicators of an organization; measures the efficiency of asset use in terms of profit obtained and shows how many lei of profit are generated by one leu invested in assets.	$4.A. = \text{Profit} / \text{Assets} * 100\%$
5.A. Return on Equity (ROE) – reflects the efficiency of using shareholders' equity and is determined as the ratio between net profit	$5.A. = \text{Net profit} / \text{Equity} * 100\%$

and equity	
II. Impact of financial indicators on GDP	
2.B. Degree of financial intermediation shows the size of the sector relative to economic activity (it should be as high as possible).	$2.B. = \text{Total assets} / \text{GDP} * 100\%$; $2.B. = \text{Loans granted} / \text{GDP} * 100\%$; $2.B. = \text{Equity} / \text{GDP} * 100\%$; $2.B. = \text{Bank loans and borrowings received} / \text{GDP} * 100\%$; $2.B. = \text{Net profit} / \text{GDP} * 100\%$.
III. Linkage between financial indicators of the banking and non-banking sector	
3.C. Herfindahl–Hirschman Index (HHI), points – measures the degree of market concentration.	Values: Unconcentrated market: $HHI < 800$ Moderately concentrated market: $800 < HHI < 1800$ Highly concentrated market: $1800 < HHI < 10,000$ $HHI > 1400$ – additional review is required.
4.C. Market concentration ratio (CR-4), % – represents the sum of market shares of the largest k players in the market. Generally, it includes a small number of organizations to highlight a possible oligopolistic market structure (a small number of organizations control a significant share of the market)	Values: Unconcentrated market: $CR-4 < 35\%$ Moderately concentrated market: $35\% < CR-4 < 70\%$ Highly concentrated market: $70\% < CR-4 < 100\%$
IV. MFO connection with the online environment	
4.D. Key Performance Indicator (KPI) is a performance evaluation tool that illustrates the degree of achievement of a desired parameter.	➤ Number of sessions/visits – how much traffic comes and from which sources; ➤ Page views; ➤ Average session duration per website/page – the average time a user spends on the site, to see whether the content captured the visitor's attention/interest.

Source: Prepared by the author based on (Consiliul Concurenței, 2012) (Tanase, 2017) (Popa et al., 2013).

According to the author's analysis, the results of the evaluation allow for a comparative and comprehensive analysis of OCN. Here, structural differences between institutions are highlighted: larger OCNs tend to adopt more complex digital solutions (integrated platforms, automation in credit analysis, multiple channels), while smaller OCNs remain dependent on manual processes and physical interaction. In practice, it would be necessary to analyze digitalization patterns: traditional OCNs (minimal digitalization), hybrid OCNs (physical-digital mix) and digitally oriented OCNs (digital-first). To also show where the "bottlenecks" of the sector are: as a rule, not in online communication, but in the integration of internal systems, the use of data for risk management, cybersecurity and operational continuity.

To argue that digitalization supports resilience, the author argues four directions. The first direction is operational resilience: digitalized OCNs can maintain activity under conditions of disruption, as critical processes (receipt of applications, verifications, approvals, payments, communication) can be performed remotely, without major blockages.

The second direction is risk and financial resilience: digitalization introduces faster and more consistent risk assessment and monitoring tools (scoring, automated verifications, behavioral monitoring), which can reduce portfolio deterioration and increase the speed of reaction to

shocks (e.g. adjustment of conditions, early restructurings).

The third direction is client-oriented resilience and financial inclusion: digitalization lowers access costs for the client and can extend services to areas or groups with limited access to finance, maintaining the socio-economic function of microfinance in times of instability.

The fourth direction is strategic resilience: institutions that digitize their processes have a greater capacity for adaptation (product launches, rapid adjustments, channel diversification), which improves competitiveness and stability in the medium term (European Banking Authority, n.d.) (European Central Bank, 2018).

Thus, to support these relationships, the research proposes correlating digital maturity with observed indicators of OCN performance and stability: operational efficiency (processing time, costs), portfolio quality (delays, recoveries), customer dynamics, the share of digital operations, as well as internal continuity measures (procedures, tests, system operation). The analysis can be carried out either by comparing groups of OCNs with different digital maturity, or by highlighting developments over time in the case of institutions that have implemented major digital solutions.

Conclusions

Overall, the challenges of the microfinance sector the high cost of credit, the risk of over-indebtedness, insufficient financial education, gaps in transparency and consumer protection, limited access to capital and vulnerability to economic shocks cannot be addressed by one-off measures alone, but require a modernisation of the way institutions manage their processes, risks and customer relationships. In this context, digitalisation becomes a key factor in strengthening sustainability and resilience, as it can transform microfinance from a predominantly reactive model to a preventive and data-driven one.

Therefore, digitalisation can contribute to reducing operational costs and increasing efficiency (automated application processing, electronic documentation, digital communication), which creates the conditions for moderating pressures on the price of credit. At the same time, the use of digital assessment and monitoring tools (scoring, automated checks, databases, early warning systems) allows for more rigorous risk management and can reduce the phenomenon of over-indebtedness by detecting multiple lending, risky behaviors and early deterioration of payment capacity. At the same time, digital channels can support financial education through standardized information, repayment simulators, notifications, warnings and increased transparency on the total cost of credit, reducing information asymmetries affecting vulnerable customers.

In this context, digitalization is not an “automatic” solution, as it introduces new risks: digital fraud, cyberattacks, data breaches, dependence on IT providers and the risk that the speed of online lending weakens the prudential filter. Therefore, the positive effect of digitalization on resilience depends on the existence of a solid framework of digital governance, information security and business continuity (internal controls, IT audit, backup, BCP/DRP plans, incident management). Similarly, the pressures to harmonise with European standards for digital operational resilience in the financial sector (like DORA) suggest that, in the medium term, the microfinance sector will also need to adopt more advanced practices in ICT risk management and consumer protection in the digital environment. In conclusion, digitalization should be seen as a strategic lever for microfinance: it can increase access and efficiency, improve risk discipline and transparency, and in times of crisis it can ensure the continuity of services. At the same time, to produce real resilience, digitalization must be accompanied by proportionate investments in security, data and skills, as well as clear rules on consumer protection (National Bank of Moldova, 2023, July 1).

In conclusion, the consolidation of the microfinance sector in the Republic of Moldova increasingly depends on the capacity of institutions to implement a responsible digital trans-

formation that reduces the traditional vulnerabilities of microcredit without amplifying emerging digital risks.

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