# BANK PROFITABILITY MANAGEMENT IN THE CONTEXT OF FINANCIAL RISK MANAGEMENT IN THE CONTEXT OF INDUSTRY 4.0

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***Abstract.*** *The conditions of martial law and the digital transformation of the banking sector require new approaches to managing bank profitability, especially in the context of rising financial risks. The relevance of the chosen topic is driven by the need to adapt banking strategies to the challenges of Industry 4.0, which include automation, digitalization and the introduction of innovative technologies into financial processes. The purpose of the study is to identify effective approaches to managing bank profitability in an unstable risk environment, focusing on its components, principles of formation and factor influences. The object of the study is the profitability of banking institutions as an indicator of financial stability. The theoretical basis is the concepts of strategic profit management, anti-crisis risk management and financial diagnostics. In the course of the study, the methods of economic and statistical analysis, comparative dynamics, structural analysis and generalization were applied. The results of the study allowed to identify the key problems that hinder the growth of banks' profitability, in particular, an increase in credit risks, macroeconomic instability and poor adaptation to technological changes. The article also substantiates the ways to increase profitability in times of war, including: digital transformation of risk management, optimization of banking products and services, as well as improving the efficiency of internal control, optimization of the revenue structure, implementation of adaptive and product policies, integration of ESG approaches into the development strategy, institutional strengthening of internal control and compliance, digitalization of financial processes and introduction of smart technologies. The practical value of the work lies in the formation of an adaptive bank profit management system that meets the modern requirements of financial security and the digital environment.*

***Keywords****: banking institution; profit; banking operations; risks; financial risks; profit management; industry 4.0.*

***JEL Classification: G21, G32, G28, L21, O33***

***Formulas: 0; fig.: 3; tabl. 0; bibl.: 14***

**Introduction.** In today's unstable economic environment and transforming financial markets, the importance of effective bank profitability management is growing. Geopolitical tensions, the impact of military operations on the macroeconomy, increased regulatory pressure, and changing consumer expectations place new demands on the adaptability of banking strategies. The profitability of financial institutions is not only an indicator of their financial efficiency, but also a criterion of their viability and competitiveness in a risky environment.

At the same time, the banking sector is undergoing a digital transformation under the influence of the Industry 4.0 concept, which is driving profound changes in approaches to organising financial processes. The use of innovative technologies, such as artificial intelligence, big data and business process automation, has a significant impact on the mechanisms of bank profit generation, as well as on the methods of identifying, assessing and minimising financial risks. In this context, there is an urgent need to rethink management decisions on profitability, which should take into account not only financial indicators but also technological trends.

At the same time, during the period of military challenges, banks face a number of problems that limit their profitability, including increased credit risk, devaluation fluctuations, and impaired customer solvency. Therefore, the study of strategic approaches to profitability management based on a risk-oriented model is of particular importance. It is important to find management solutions that allow banks not only to maintain financial stability but also to realize their development potential in the new digital economy.

**Literature review.** The issue of banks' profitability is traditionally considered in the context of their efficiency, financial stability, and ability to withstand systemic risks. Well-known researchers point to a close relationship between the level of bank profitability and the quality of financial risk management (Katan L. and Plachotnik M., 2018). Classical works focus on optimizing assets and liabilities, controlling the loan portfolio, and developing a profit strategy as an instrument of financial balance (Makarenko Yu. and Morokhovets K., 2017). In the international discourse, bank profitability is increasingly linked to regulatory changes, the impact of global crises, and digital transformation (Claessens & Kodres, 2014; Berger et al., 2017).

Over the past decade, research on the role of digital technologies in improving the financial efficiency of banks has become increasingly widespread. Within the framework of the Industry 4.0 concept, scholars highlight the potential of big data, artificial intelligence, blockchain, and cloud solutions to ensure stable profits and minimize risks (Brynjolfsson & McAfee, 2018). In particular, it is emphasized that digital solutions can reduce costs, improve service quality and optimize risk management processes in real time. Domestic authors also emphasize the need to digitalize Ukraine's banking system, noting that the use of FinTech solutions can significantly increase the profitability of institutions even in a crisis (Raevnev, 2022; Sydorenko, 2023).

In the context of war and economic instability, the profitability of banking institutions loses the character of a purely financial indicator and becomes an indicator of risk adaptability and the ability to innovate. Recent studies have shown an increase in the impact of such risks as macroeconomic instability, currency fluctuations, a decline in customer solvency, and cyber threats (Denysenko, 2022; Butko, 2023). Thus, the formation of an effective profitability management system in the context of Industry 4.0 requires an integrated approach that combines financial analytics, digital technologies and risk-oriented strategies.

**Aims.** The main objective of this study is to comprehensively examine the mechanisms of bank profitability management in the context of increased financial risks and digital transformation caused by the implementation of the Industry 4.0 concept. Particular attention is paid to determining the composition of banking institutions' profit, analyzing its dynamics, structure and factors of formation in the current crisis environment accompanied by war and economic instability.

The study aims to identify the key problems that hinder the growth of profitability of domestic banks, in particular the impact of credit, currency, operational and systemic risks. The study also analyses the relationship between risk management and bank profitability and identifies the limitations that arise in the process of applying traditional instruments of profit management in times of war.

At the same time, the study aims to develop strategic directions for increasing bank profitability, considering not only financial but also technological, institutional and macroeconomic factors. Using empirical data, statistical analysis, and digital risk management concepts, the article seeks to form a systemic vision of how banks can improve their financial efficiency while ensuring resilience to external shocks and meeting the challenges of Industry 4.0.

**Methodology.** The study uses a qualitative and quantitative methodology that combines elements of financial analysis, risk management, and the digital economy. The analytical part is based on the study of scientific literature, regulatory documents, statistical reports of the National Bank of Ukraine and banking institutions. The theoretical basis is provided by the concepts of bank profitability, financial risk management models, and principles of adaptation to the challenges of Industry 4.0. The empirical data include aggregate statistics on bank profits for the period 2020-2024, which allowed identifying trends, risks and potential areas for increasing profitability in wartime. The methods of structural and dynamic analysis, comparative analysis, generalization and logical modelling are used to formulate practical recommendations.

**Results.** The bank's profit is a key indicator of its financial performance, reflecting the excess of income over expenses for a certain period. It is generated as a result of the bank's core business activities - lending, investing, providing paid services, and operations in the financial markets. Structurally, the bank's profit consists of interest income, fee and commission income, results of revaluation of financial instruments and operating profit. Its volume depends on the quality of assets, efficiency of risk management, interest margin and income diversification strategy.

Profit performs several critical functions in a banking institution's operations. It is a source of reserve capital, ensures the financial stability of the bank and increases its investment attractiveness. Profit also serves as an indicator of management efficiency and high-quality asset and liability management. In the strategic dimension, profitability determines the bank's ability to expand operations, implement innovations, withstand external shocks and meet regulatory requirements. Thus, a sustainable level of profit is a prerequisite for the long-term development of a banking institution in a competitive and risky financial environment.

At the same time, the main sources of profit generation for domestic banks include the following:

- income from the provision of credit resources to individuals and legal entities;
- profit from operations with securities and other financial instruments;
- revenue from commission-based services (settlement and cash services, currency exchange, money transfers, etc.);
- results of trading on the interbank foreign exchange market;
- income from investment activities and asset management;
- interest accrued on client account balances and transactions involving government securities;
- profit from financial services related to digital platforms and online banking;
- other operational income, including the sale of banking products and services through partner channels.

In the context of martial law, macroeconomic instability and accelerated digital transformation, profitability management of domestic banks is of strategic importance. Effective profit management ensures not only the financial stability of a banking institution, but also the ability to respond quickly to changes in the risk environment, including credit, currency, interest rate and operational risks. At the same time, the development of Industry 4.0 is transforming traditional banking models, enhancing the role of digital technologies in generating revenue, managing costs, and forecasting risks. This context requires a revision of approaches to bank profitability, with a focus on innovation, adaptability and analytical decision support, which in turn determines the bank's competitiveness in the modern financial market. The key aspects of this are the following management components (Figure 1).

Despite the three-year-long war and the economic crisis that has had a negative impact on all areas of the financial sector, banking institutions have been able to adapt to current realities by introducing new tools for generating profits, reducing risks, and focusing on increasing profitability from various types of operations and banking products. The final version of the banking system's balance sheets for 2024, published by the National Bank of Ukraine and including all adjustments, showed a slight (≈1%) decline in pre-tax profit, while accrued tax liabilities increased by almost 15%. As a result, the banking sector's total net profit declined to UAH 90.9 billion, with 93% of the additional tax charges coming from state-owned institutions.

The total pre-tax profit, as in the NBU's previous operational estimates, is UAH 186.8 billion, but after tax, the net financial result decreased by UAH 12.8 billion (≈12%), leaving the sector with UAH 90.9 billion. This decline was driven by a significant increase in corporate income tax, which rose to UAH 95.9 billion and now 'absorbs' 51% of the income earned by banks (compared to 48% in 2023 and 25% in 2022) (Figure 2).

The vast majority of the additional liabilities - UAH 11.78 billion, or 93% of the total amount - fell on banks with state participation. The most significant increase was recorded at Oschadbank: its income tax after adjustments increased by 2.5 times, from UAH 4.3 billion to UAH 10.66 billion (plus UAH 6.36 billion). For Ukreximbank, tax deductions increased by UAH 2.94 billion, equivalent to a fifteenfold increase, and for Sens Bank (formerly Alfa-Bank), by 58 times, to UAH 1.97 billion. At the same time, Ukrgasbank was the only state-owned institution to reduce its tax burden (-UAH 455 million).

**The main components of bank profit management**

**1. Analysis of the structure and dynamics of profit:** determination of the share of interest and non-interest income in the overall profit structure; analysis of the dynamics of profitability in recent periods (quarters, years); assessment of the impact of internal and external factors on profit; determination of the efficiency of the main sources of income.

**2. Financial risk management**: identification of the main risks (credit, currency, operational, interest rate); calculation of risk indicators (VaR, NPL, LCR, etc.); development of policies to minimize risk losses; implementation of early warning of risk situations.

**3. Optimization of banking products and services:** analysis of the profitability of products and services; reduction of customer service costs; expansion of the range of services with high margins; targeted adjustment of the tariff policy.

**4. The use of digital technologies (Industry 4.0):** the introduction of Big Data-based analytics to forecast profitability; the use of artificial intelligence to automate financial decisions; the use of digital platforms for customer service; and increased efficiency through the robotization of routine processes.

**5. Strategic planning and budgeting:** setting target financial indicators of profitability; risk-based scenario planning; optimization of the bank's expenses in the strategic horizon; linking strategic goals with operational KPIs.

**6. Internal control and management accounting:** implementation of a management accounting system by profit centers; regular monitoring of budget performance; assessment of the effectiveness of structural units; use of internal audit systems to evaluate decisions.

**Figure 1. Components of bank profit management**

*Source: developed by the authors*

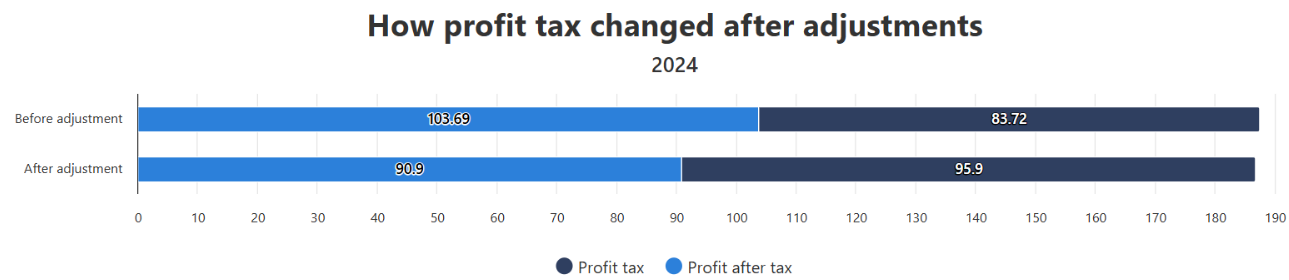


**Figure 2. The level of corporate income tax of Ukrainian banks after adjustment in 2024 [10]**

The structure of additional charges for non-state players was much more modest. Banks with foreign capital received a total additional liability of only UAH 118.57 million. In the segment of private banks, the total amount of additional charges amounted to UAH 1.34 billion, with A-Bank (+UAH 541 million), Pivdenny Bank (+UAH 308 million), and MTB Bank (+UAH 225 million) bearing the brunt. The Ukrainian Bank for Reconstruction and Development showed record dynamics: after adjustments, its income tax increased 84 times - from UAH 247 thousand to UAH 20.76 million. In total, 22 banks saw their tax liabilities increase by UAH 12.7 billion, while 12 banks saw their tax liabilities decrease by UAH 513.4 million (mainly due to Ukrgasbank), resulting in the total tax amount exceeding the sector's net profit by UAH 5 billion.

In 2024, Ukraine's banking system demonstrated positive financial dynamics: net profit of banking institutions after income tax reached UAH 103.7 billion, up 20% year-on-year. The total tax liabilities of banks under this tax amounted to UAH 83.72 billion, which is 14% more than in 2023, indicating an increase in the fiscal burden on the sector due to tighter regulatory control and higher taxable income.

In terms of banking institutions, 52 banks ended the year with a profit totalling UAH 104.12 billion, while 9 institutions recorded losses totalling UAH 418 million. It is worth noting that at the end of the reporting period, Cominvestbank was classified as insolvent. Profit concentration in the sector remains high: 85% of the total net profit (UAH 88.57 billion) was generated by only ten largest banks. At the same time, the ranking's leaders underwent only minor changes - the private Universal Bank (Monobank) replaced the foreign capital representative Citibank in the top ten, reflecting the changing balance of power in the banking segment with the dominance of more flexible and digitally oriented financial institutions (Figure 3).

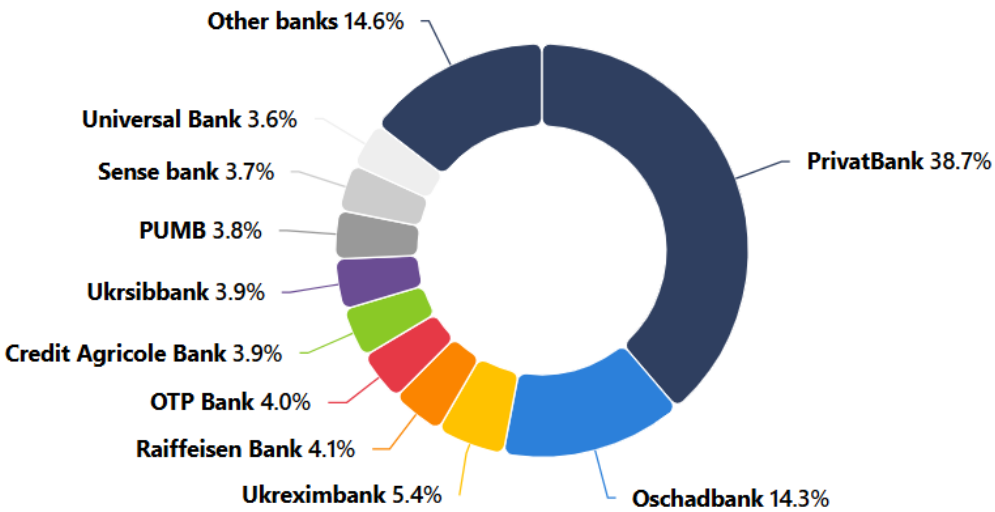


**Figure 3. Top 10 Ukrainian banks by profit in 2024 [10]**

The highest share in the structure of the banking sector's total net profit in 2024 was demonstrated by PrivatBank, which accounted for 39% of the total figure. Its profit after tax amounted to UAH 40.14 billion. At the same time, the amount of income tax transferred by this institution to the state budget reached UAH 40.86 billion, which corresponds to almost 50% of all tax revenues from banks in the reporting period.

The total financial result of the state-owned banking segment amounted to UAH 67.19 billion, which is 23% higher than in 2023. Thus, state-owned banks accounted for 65% of the total profit of the Ukrainian banking system. The most dynamic growth in profitability was recorded at Oschadbank, which tripled its financial result compared to the previous year. The total amount of income tax to be paid by state-owned banks for the year is UAH 48.36 billion.

For instance, in 2022, the total income of domestic banks amounted to slightly more than UAH 20 billion. The main factors that have negatively affected the level of profits and the process of increasing profitability of banks over the past three years include the following:

1. Macroeconomic instability: high inflation, declining purchasing power of clients, devaluation of the national currency, high unemployment, and a reduction in business activity.
2. Military actions and related risks: destruction of client infrastructure and banking assets, temporary loss of solvent markets due to territorial occupation, increased expenditures on security and risk provisioning, and growing credit losses due to loss of collateral.
3. Deterioration in the quality of the loan portfolio: rising share of non-performing loans (NPLs), delayed debt servicing by borrowers, and reduced lending to small and medium-sized enterprises.
4. Tightening of regulatory pressure: changes in tax legislation and increased tax obligations, heightened capital, liquidity, and reporting requirements, and complications in regulatory procedures during crisis periods.
5. Disruptions in logistical and payment chains: temporary suspension of business operations in critical regions, difficulties in client settlements and service provision in conflict zones, and costs associated with adapting the branch network.
6. Restrictions on the foreign exchange market and cross-border operations: administrative regulation of the exchange rate, reduced volumes of export-import financing, and limited access to international capital.
7. Increase in operational expenditures: rising costs related to cybersecurity, physical protection, and backup communication systems; higher prices for energy resources, IT infrastructure, and support for remote operations; and an increased social burden on banks during the crisis period.
8. Changes in customer behaviour: massive shift to a savings model of consumption; reduced demand for credit products; increased risks of fraud in electronic channels.
9. Reputational and systemic risks: loss of confidence in individual financial institutions due to sanctions or court cases; threat of systemic instability due to the bankruptcy of large banks; and a decline in investor interest in the banking sector.

That is why domestic banking institutions should rethink their approaches to profitability management by formulating an integrated strategy that combines anti-crisis risk management with digital transformation capabilities. In this context, we believe there are several key areas of strategic optimization:

1. Digitalization of financial processes and implementation of smart technologies. The transition to cloud-based architecture, automated analytics systems, and artificial intelligence in banking operations enables not only cost reduction, but

also prompt risk identification, profitability forecasting, and the adaptation of product strategies to market fluctuations.

2. Risk-oriented lending model. In the context of a rising share of distressed assets, it is essential to improve credit scoring models, portfolio monitoring systems, and reserve formation policies. Reducing the proportion of non-performing loans (NPLs) directly contributes to the stability of the bank's profitability.
3. Optimization of income structure. Diversifying profit sources—particularly through the development of non-interest income (e.g., fees, partner services, and digital platforms) - helps mitigate dependence on interest margins, which remain vulnerable to interest rate and currency fluctuations.
4. Adaptive pricing and product policy. Strategic modernization of banking products tailored to the needs of the digital customer allows for enhanced service profitability and sustained competitive positioning. Flexible pricing mechanisms make it possible to respond swiftly to changes in resource costs.
5. Institutional strengthening of internal control and compliance. Enhancing internal audit, crisis management protocols, and managerial reporting systems helps minimize operational and reputational risks, which is particularly relevant in the context of wartime challenges.
6. Integration of ESG approaches into development strategy. Embracing environmental, social, and governance (ESG) standards facilitates access to external financing, improves the bank’s reputational capital, and strengthens investor trust, thereby positively influencing profitability over the medium term.

**Discussion.** The study has confirmed that managing the profitability of banking institutions in the context of war and digital transformation is a critical tool for ensuring the financial stability, competitiveness and operational adaptability of the banking system. The analysis of profit dynamics, revenue structure, and tax burden showed a high level of concentration of financial results in the public sector, a significant impact of fiscal policy on banks' net profit, and a growing risk of loss of profitability amid military losses, inflationary pressures, and tightening regulatory requirements. At the same time, digital tools of Industry 4.0 open up new opportunities to improve the efficiency of management decisions, automate risk control, and generate alternative sources of income.

Further research in this area should focus on the development of adaptive profitability models taking into account the unstable risk environment, assessing the effectiveness of digital investments in banks, and the impact of ESG factors on the financial performance of the banking sector. Particular attention should be paid to changes in the behaviour of banking customers, the role of the regulator in balancing fiscal interests and promoting profitability, and scenario-based profit forecasting in the post-war period. The formation of a comprehensive strategy for sustainable profitable development of banks should take into account the interaction of technological, institutional and macroeconomic factors in the long term.

**Conclusions.** In the current conditions of war, macroeconomic instability, and the accelerated implementation of Industry 4.0 technologies, managing the profitability of banking institutions becomes a strategic imperative. The study confirms that bank profitability is no longer a static financial indicator but a dynamic reflection of institutional adaptability, innovation capacity, and resilience to systemic shocks. A comprehensive analysis of the structural components and drivers of profitability has shown that effective profit management must integrate digital technologies, risk mitigation strategies, and proactive regulatory compliance.

The digital transformation of banking processes enables institutions to forecast profitability more accurately, automate decision-making, and enhance operational efficiency. The integration of artificial intelligence, Big Data analytics, and cloud solutions is essential for navigating volatility and improving cost-income ratios. At the same time, a significant portion of profitability in Ukraine's banking sector remains concentrated in state-owned institutions, which are subject to increased fiscal pressure. The findings also highlight the rising importance of non-interest income and the need for product diversification in response to changing consumer behavior and regulatory frameworks.

Moreover, the introduction of adaptive pricing, internal audit enhancement, and ESG compliance mechanisms contributes to strengthening institutional trust, reputational capital, and investor confidence. The sharp increase in corporate income tax obligations across the sector underscores the role of fiscal policy as a determinant of net profitability, particularly in the post-war recovery period.

Ultimately, sustainable bank profitability in the context of Industry 4.0 requires a shift toward integrated management systems that align strategic planning, digital innovation, and risk control. Such systems must be flexible enough to respond to crisis dynamics while maintaining long-term financial sustainability. Future research should focus on modeling profitability scenarios under digital and geopolitical stressors, as well as on measuring the return on digital investments and ESG initiatives.

**Author contributions**. The authors contributed equally.

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