The Impact of Digitalization on Financial Mechanisms for Managing the Strategic Development of Enterprises in The Face of Modern Challenges

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Abstract

The article is devoted to the analysis of the digitalization impact on the financial mechanisms of managing the strategic development of enterprises. The global trends in spending on digital transformation technologies and services in the world, as well as the Digital Transformation Index and Industry Digital Transformation in Ukraine for 2024 are studied. The positive dynamics of digital transformation are identified, which create challenges for modern enterprises both in the Ukrainian market and in the global market. The methodology and stages of assessing the effectiveness of digitalization of financial mechanisms of enterprises are considered. Given that digitalization can completely change existing processes at enterprises, it is necessary to assess the effectiveness of implementing transformational changes at each stage of their implementation. The article analyzes the activities of Nova Digital, which represents the modern company Nova Poshta and is a digital leader in the Ukrainian market. Based on the study, practical conclusions are drawn and recommendations are provided for other enterprises seeking to use digital solutions in financial management.

Keywords: Management, Strategy, Financial Mechanism, Financial Institution, Digitalization, Financial Market, Enterprise, Strategic Management, Economic Development.

Introduction

Today, the impact of digitalization on the strategic management of the enterprise development and financial mechanisms for its management is already undeniable, but given the rapid pace of development of the external environment, the emergence of new digital tools, new challenges for effective financial management and strategic development are constantly emerging. The development of modern enterprises is taking place at rapid pace that they have to build their strategy on the principles of flexibility and adaptability, continuously implement new digital technologies, update their material and technical base and review their own management system. Because of this, the digitalization itself is no longer an auxiliary tool, but a factor that can change almost every aspect of the enterprise's activities. The rapid

development of digital technologies is changing business processes from production to marketing. That requires a new, more flexible approach to the formation of financial mechanisms for managing the strategic development of enterprises. The ability of the enterprise to quickly process data and respond to changes in the information environment is becoming almost the main condition for making effective management decisions. That is why there is a need for a deeper understanding of how digitalization affects the strategic development of the enterprise and what the optimal approaches to integrating digital solutions should be to ensure long-term competitiveness.

In the current conditions of global digital transformation, the financial and economic environment is undergoing significant changes. Traditional methods of planning, accounting and control, built on linear models, are increasingly showing their limitations, they cannot keep up with the dynamics of information flows and changing market logic. The growing role of tools, including big data analytics, blockchain, artificial intelligence and CRM systems is forming a new paradigm for managing financial resources and risks. However, the problem is that a significant imbalance may arise between the inertia of economic mechanisms of enterprises and the requirements of the digital economy. As a result, fragmented digitalization, without adapting the organizational structure, corporate culture and internal communications, does not provide the expected results, and sometimes has the opposite effect, creating risks for financial stability. In addition, the development level of market relations requires innovative, modern and more effective management that takes into account the key trends of digital transformation. The accelerated movement towards a digital economy is becoming the main prerequisite for updating the theoretical foundations of strategic management. New technologies, which are actively introduced into the activities of enterprises, determine their ability to maintain their positions in the market and strengthen their own competitiveness. Therefore, the development of digital tools as a means of increasing management efficiency is naturally becoming one of the key areas of modern scientific research and practical developments.

Literature review

Tepliuk M. et al. (2025); Tian Y. et al. (2025); Zhao Y. (2024); Dubyna M. et al. (2025) proposed a mechanism for coordinating financial subsidies and tax incentives for the intellectual transformation of manufacturing enterprises, investigated the features of using digital credit and technological innovations in enterprises, as well as the mechanism of transmission and regulatory influence of financial supervision. Ma B. et al. (2024); Liu T. et al. (2024); Kryshntanovich, M. et al. (2024); Marhasova V. et al. (2024) analyzed the mechanisms of financial support for innovations at enterprises, revealed the features of the mechanism of digital transformation of enterprises in the context of financial stability.

Bakmaz O. et al. (2024); Davydenko N. et al. (2024); Zhang Y. et al. (2024); Tarasenko O. et al. (2022) the mechanism of making management decisions of individual enterprises is analyzed, the mechanism of neutralizing risks in managing the financial security of enterprises is substantiated, and the mechanism of distributing the financial resources of the enterprise in the security environment of the Internet of Things is developed. Yu W. et al. (2024); Bakmaz O. et al. (2023); Zhang Z. (2022); Abramova A. et al. (2021) developed a model of financial management of the enterprise, analyzed the features of the implementation of internal control mechanisms and the possibilities of improving financial management at enterprises, and investigated the mechanism of financial risk management of an enterprise.

Zachosova N. et al. (2022); Xie B. et al. (2022); Reznik N. et al. (2025); Kosach I.A. et al. (2019); Jakubek P. et al. (2023) proposed a strategy and mechanism for managing the financial and economic security of enterprises in conditions of war, Industry 4.0, analyzed the mechanism of financial support for enterprises, and outlined the strategic management of innovative development of enterprises under the influence of digital changes. Bulkina I. et al. (2022); Fang L. et al. (2025); García-Vidal G. et al. (2025); Fedyshyn M.F. (2019) investigated the role of global digitalization in the strategic development of enterprises, the importance of the digital economy in the qualitative development of enterprises, and assessed models for implementing artificial intelligence in micro and small

enterprises based on the analysis of strategic decision-making.

Li L. et al. (2025); Iastremka O. et al. (2025); Zalutska K. et al. (2025) investigated the development path of strategic enterprises under the influence of innovations, analyzed the features of financing the innovative and strategic development of enterprises, and outlined the role of decision-making in determining the direction of the enterprise's strategic development.

Boldiuieva O. et al. (2025); Iorgachova M. et al. (2025); Djumanova A. B. et al. (2025) revealed the features of strategic development of enterprises in the context of digital transformation. Zavrazhnyi K. et al. (2024); Kulish D. et al. (2024); Ferede D. M. et al. (2024); Slobodeniuk A. et al. (2024) outlined the formation of strategic directions for the use of artificial intelligence at an enterprise, developed a financial model of exports in the context of strategic planning of foreign economic activity of enterprises.

Methodology

The study proposes to apply a comprehensive methodological apparatus for quantitatively measuring the effectiveness of digitalization of financial mechanisms in the strategic development of enterprises. The methodology is based on the integration of normalized indicators of digital maturity, financial effects, risk-adjusted results and investment efficiency using mathematical modeling, simulation procedures and regression analysis. The algorithm with all stages of assessing the effectiveness of digitalization of financial mechanisms is given in Table 1.

Table 1. Stages of assessing the effectiveness of digitalization of financial mechanisms of enterprises

Evaluation stage	Formula / Approach	Description and purpose	Indicators / Components
Digital Maturity Index of Financial Mechanisms (DMI)	$I_{ЦЗ} = \sum_{i=1}^{n} w_i x_i , \sum w_i = 1$	Assesses the level of digital integration of financial mechanisms using a weighted linear model.	Share of automated operations, ERP/MIS/CRM integration, IT costs, digital competence of staff, frequency of manual financial incidents
Financial effect of digitalization (E_{fin})	$EF_j = \frac{p_j^{post} - p_j^{base}}{p_j^{base}}$	Reflects **the change or effect of a specific financial or operational indicator under the influence of digitalization**.	Allows you to assess how much the implementation of digital solutions has improved or worsened performance results, serves as a basis for calculating integral and risk-adjusted performance metrics.
Risk-Adjusted Effectiveness Index (RAE)	$\Delta Risc = Risc_{post} - Risc_{base}$ $RAE = \frac{EF_j}{1+\Delta Risc}$	Adjusts the financial effect of changes in risks (cyber risks, operational, financial).	$\Delta Risk < 0$ — RAE increase
NPV and IRR taking into account the digital effect	$NPV_d = \sum_{t=0}^{T} \frac{CF_{t,base} + \Delta CF_{t,digital}}{(1+r)^t} - IC$	Modification of cash flows under the influence of digitalization; determines investment efficiency.	IC — investment, ΔCF — additional monetary effect, T — analysis horizon
Risk-adjusted ROI of digital investments	$ROI_a = \frac{\sum_{t=0}^{T} \Delta CF_{t,digital}(1 - \lambda * \Delta Risc)}{IC} * 100\%$	Takes into account changing risk and management's sensitivity to risks.	λ is the sensitivity coefficient (0.3–0.7), ΔRisk — change in risk
Integral indicator of the impact of digitalization (I_{pc})	$I_{пц} = a * I_{ЦЗ} + b * EF_j + c * ROI_a + d * (1 - Risc)$	Comprehensive assessment of the impact of digitalization on financial mechanisms.	Recommended weights: a=0.25, b=0.35, c=0.25, d=0.15
Regression model of the impact of digitalization	$\Delta Y_{it} = \beta_0 + \beta_1 I_{ЦЗ,it} + \beta_2 x_{it} + \gamma_i + \delta_t + \varepsilon_{it}$	Testing the hypothesis of the positive impact of digital maturity on financial results.	Y — ROA, profitability of services, EBITDA; X — control variables; γ — fixed effects; δ — time effects

Source: generated by the authors

The Table presents a consistent methodology for assessing the effectiveness of digitalization of financial mechanisms at enterprises. At the first stage, the digital maturity index of financial mechanisms (DMI) is formed, which assesses the integration level of digital technologies into financial processes, in particular the share of automated operations, ERP/MIS/CRM integration, IT costs and digital competence of personnel. The indicator of the financial effect of digitalization (Efin) determines the relative change in key financial indicators after the implementation of digital solutions, including operating and administrative expenses, EBITDA, margin and duration of the financial cycle. For a more accurate reflection of efficiency, the risk-adapted indicator RAE is used, which adjusts the financial effect taking into account changes in the level of cyber risks, operational and financial risks, increasing the value of the indicator in case of risk reduction. The investment efficiency of digitalization is assessed using modified NPV and IRR cash flows, taking into account additional revenues and cost savings resulting from digital solutions, and risk-adjusted ROI allows you to take into account the sensitivity of management to risks and their change in the digitalization process. The integral indicator of the impact of digitalization (IPI) combines data on digital maturity, financial effect, investment efficiency and risk level, using recommended weights for strategic management. To test the hypothesis of a positive impact of digitalization on financial results, a panel regression model is used, which takes into account both fixed effects of the institution and time changes and control variables, and at the final stage, the reliability of the estimates is increased using statistical and simulation procedures, such as t- test, Wilcoxon test, PCA, Bootstrapping and Monte Carlo, which allows you to model various development scenarios and build confidence intervals for integral indicators. The entire process provides a comprehensive, comparative, and reliable assessment of the effectiveness of digitalization of financial mechanisms of enterprises.

Results

In 2020–2025, digital transformation, scaling its spheres of influence, introduced significant changes to the financial sphere, changing the principles and methods of forming financial mechanisms for managing the strategic development of enterprises. Like the digitalization, changes in financial mechanisms occurred quite quickly and comprehensively, from managing cash flows to risk control and capital planning. New technologies, including artificial intelligence, big data, blockchain, automation, quickly began to be used on a massive scale and replaced traditional approaches to this. Because of this, enterprises must review and make changes to existing financial mechanisms. The variability of the market environment, fierce competition, changing needs and new expectations and requirements of consumers, threats associated with martial law strengthen the role of digital solutions for enterprises.

In the scientific literature, two main approaches to disclosing the content of the financial mechanism are usually distinguished. The first approach is that the financial mechanism is understood as the functioning of the finances of enterprises, considering the material reflection of financial relations in the form of cash flows. The organization of these flows, the order of their implementation occurs according to certain rules and directions, which forms the financial mechanism. This approach describes and focuses on the structure of finances. The second approach considers the financial mechanism as a set of methods, forms, tools, techniques and levers of influence on the state and development of the enterprise. Attention is focused on the external effect, on how finances become a management tool that affects the economic state of the enterprise. That is, the financial mechanism in this sense is not so much the internal organization of money, but the way in which the management apparatus can influence the enterprise through financial resources.

The introduction of automated financial management systems in recent years has become almost a necessity. Especially for large enterprises, where a significant amount of financial flows, traditional methods do not cope with all the necessary tasks. These systems are used to reduce the human factor, reduce the risk of errors and increase the efficiency of operations. However, it is important to consider that the introduction of automated systems can be an effective tool only if there are highly qualified personnel able to work with them. When using any innovative

technologies, there are needs for adaptation, that is, it takes time for the staff to adapt and for the system to start working in a coordinated manner.

Artificial intelligence is actively used to analyze financial data, detect fraud, optimize investment strategies and improve customer service. This does increase the competitiveness of enterprises, but the effect often appears gradually, and not always in the short term. Blockchain adds transparency and security to transactions, reduces the risk of fraud and increases the trust of customers and partners, although the implementation of this technology can be complex and requires additional resources.

Digital platforms allow you to centrally manage financial processes and integrate them with other business functions. This increases the overall efficiency of management, but sometimes there are problems with reconciling data from different sources. The preparation of financial statements becomes faster, more accurate and timely, but this does not protect against errors, so it is necessary to apply constant competent control. Digital tools help identify, assess and manage financial risks, reducing their impact on the company's activities. With the growth of digitalization of processes, the role of cybersecurity is also growing. Enterprises must constantly implement data protection measures and update security systems, because threats do not disappear by themselves.

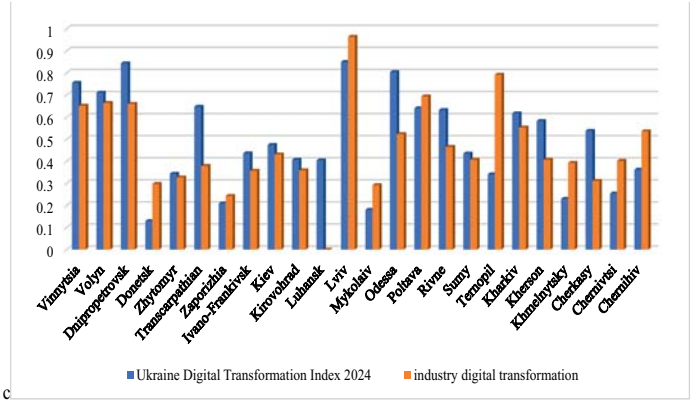
Financial analysts are also forced to adapt quickly. Learn to work with big data, artificial intelligence, automated systems, make changes to the processes of making informed decisions. Digitalization is changing the structure of financial departments: new roles, financial technologists, data analysts appear.

Modern tools allow for more accurate and flexible financial planning, taking into account different scenarios. But the market is volatile, competition is high, and the effectiveness of technologies depends not only on how perfect they are, but also on how people use them. Therefore, the training and retention of competent employees who possess innovative technologies and are ready to continue learning and improving their skills is becoming more relevant.

Digitalization has created conditions for the development of new business models. They are focused on data, client needs, and rapid adaptation. Enterprises that can work with data can innovate faster, adapt to the market, and update their financial products and services. Big data analysis allows you to see what was previously inaccessible, hidden trends, financial connections, weaknesses, and growth points. Thanks to this, financial planning becomes more accurate and forecasting is less chaotic.

The digital orientation of the state and the consideration of this trend in the strategic planning of enterprises is caused by both global trends and new opportunities and advantages that can be obtained in using digital technologies. After all, the digital format is convenient for both internal and external stakeholders, providing the ability to store and process information in a more convenient format, expanding opportunities for cooperation and potential investment. Ukraine, as a member of the world community, is actively pursuing the digitalization in both the public and private sectors. Of course, this process is experiencing significant obstacles, including those associated with military actions as a result of Russian aggression. However, an analysis of the reports of the Ministry of Digital Transformation on the activities of digital divisions of regional state administrations according to the Digital Transformation Index of Regions in Ukraine and the Sectoral Digital Transformation Index can emphasize that all regions are actively involved in the digitalization process, and highlight 3 leading regions in this area (Lviv, Dnipropetrovsk and Odessa), which is shown in Fig. 1.

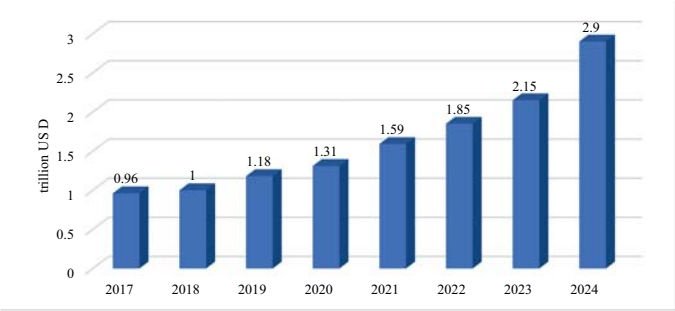
Fig. 1. Digital Transformation Index and Sector Digital Transformation Index in Ukraine, 2024



Source: compiled by the authors based on Ministry of Digital Affairs (2024)

The involvement of all regions in the digital transformation is determined not only by state policy, but also by new business conditions and global challenges. The modern economic space is transforming so rapidly that it is no longer possible without digital innovations. Digital technologies allow companies to optimize business processes, reduce infrastructure costs, increase production scale and minimize risks. Analyzing spending on digital transformation technologies and services in the world since 2017, we can see that global transformations in this direction are already a requirement for the existence of enterprises in the market. Over eight years, spending has increased by almost 2 trillion USD (Fig. 2).

Fig. 2. Global spending on digital transformation technologies and services, trillion USD



Source: compiled by the authors based on Statista (2025)

The digitalization is most often shown by enterprises in non-financial reports as total investments in digital transformation. Given the state of war, not all regions have the opportunity to be fully involved in all processes, and provide data fragmentarily. However, in Table 2 we have formed a generalized comparative characteristic and key trends that illustrate the level and dynamics of costs.

Table 2. Generalized comparative characteristics and key trends in digitalization spending, 2022-2024

Criterion	Global trends	Ukraine
Digitalization cost structure	Investments in cloud technologies, cybersecurity, business process automation, IoT, data analytics, and AI predominate.	The largest share falls on basic IT infrastructure, cybersecurity, CRM/ERP, and digital platforms for remote work.
Distribution by industry	High costs: finance, telecom, industry, retail. Medium: transport, healthcare. Low: agricultural sector in countries with low IT development.	The highest costs are for the financial sector; medium – logistics; low – industry and the agricultural sector due to limited resources and losses from the war.
Distribution by functional areas	The largest expenses: operations management, marketing, IT security, manufacturing, logistics. Data from global reports is detailed.	The reports mostly do not detail the areas; most of them focus on IT security, document management, and communication technologies.
Growth rates of digitalization spending	Average global growth is 12-20% annually; in high-tech industries – up to 25-30%.	The dynamics are unstable: in 2020-2021, growth to 15-18%; in 2022, a fall; in 2023-2024, a recovery of 8-12% due to the need for cyber protection and remote processes.
Key areas of expenditure	Automation, AI, clouds, cybersecurity, flexible manufacturing systems, big data.	Cybersecurity, business continuity, remote work, electronic interaction with the state, basic digital infrastructure.
Noise	High cost of implementing complex technologies, cyber risks, shortage of IT personnel.	Financial constraints, infrastructure destruction, forced relocation, staff shortages, risks of cyberattacks.
Sources of funding	Business's own funds, venture capital investments, banks, grants.	Own funds predominate; grants from international partners; state digital initiatives.

Source: compiled by the authors

The strategic management of enterprise development is characterized by:

1. Long-term. Development and management of the development strategy is aimed at the long term. Strategic management involves solving current problems and achieving the goals of the enterprise and adjusting plans in the long term.
2. Analysis and assessment of the external environment. Strategic management involves conducting research and constant analysis of the external environment. The complex of economic, social, political and cultural factors constitutes both potential opportunities and risks for the enterprise.
3. Systematicity and integration. Strategic management cannot concern a separate aspect, but must be a holistic system and integrated into all areas of the enterprise's activities.
4. Flexibility and adaptability. Given the state of war, enterprises are forced to quickly adapt to changes and threats in the external environment. They must be able to adapt to new challenges in their strategic management and be able to adjust their strategy to maintain market positions.
5. Result orientation. Any activity of the enterprise should be effective and ensure the achievement of set goals and fulfillment of tasks. Efficiency is determined in accordance with the set goals of the enterprise (profitability, market share, reputation, consumer loyalty).
6. Innovation. The current state of development requires innovative solutions, including during strategic management. This applies to management technologies, production, communications, etc.

For the study, we chose Nova Poshta and its IT division Nova Digital (Official Nova website Digital, 2025), because it is a large and well-organized business with available financial data, which allows us to realistically assess the effect of digitalization. Nova Digital actively implements digital solutions in financial processes - its applications process tens of thousands of transactions per second and serve over 32 million users, so the company is well suited to analyze how digital technologies affect management efficiency.

In addition, the company is clearly focusing on digitalization to increase productivity, reduce costs, and optimize financial processes. This allows us to measure the real effect of implementing IT solutions through financial indicators and build a comprehensive assessment of the effectiveness of the transformation.

Digitalization of business processes can completely change existing business processes. In order to assess the effectiveness of implementing such transformational changes, it is necessary to conduct an assessment at each stage of implementation. We selected Nova for analysis Digital, which represents the modern company Nova Poshta and is a digital leader in the Ukrainian market. The company is constantly developing and gradually conquering the global market, adapting to new conditions and challenges. Analysis of Nova's activities Digital allows you to draw practical conclusions and recommendations for other enterprises seeking to use digital solutions in financial management.

Table 3. Financial effect of digitalization (EF)

Indicator/Year	2022	2024	ΔP	EF_j
Operating expenses, USD	249 336	59,547	346 129	1,388
Cost price, USD	527,391	1,003,256	475,865	0.903
EBIT, USD	-65,179	-242,539	-177,360	-2.72
Summed EFαj	X	X	X	-0.141

Source: calculated by the authors

Analysis of the indicators in Table 3 for 2022-2024 allows us to conclude that Nova Digital increased its operating expenses from 249336 USD in 2022 to 59547 USD in 2024, which can be explained by the company's active investment policy in the field of digitalization. The cost of products and services provided also increased from 527391 USD to 1003256 USD, which confirms the use of innovative technologies, including digital tools. The EBIT indicator remains negative and continues to decrease from 65179 USD to 242539 USD, which indicates an imbalance between income and expenses in the context of scaling and implementing digital solutions. EF values allow us to assess the effectiveness of financial transformation, so the aggregated EF at this stage is negative, which emphasizes the need for further optimization of costs and improvement of process productivity.

$\Delta Risk = -0.15$.

$RAE = EF/1 + \Delta Risk = -0.141/0.85 = -0.166$.

To calculate RAE and ROI, we conduct a scenario analysis in which the change in ΔRisk, ΔCF indicators will be ±10–15%. We use a maximum deviation of 15%. EF remains negative, but risk adaptation has a negative effect by increasing the negative value. However, the risk-adapted effect shows how digitalization affects not only financial indicators, but also changes in potential risks. Reducing the risk of errors and failures in digital processes creates a financial effect that, without taking into account potential risks, would be negative. If these risks are reduced by 15%, the RAE value is -0.166. These calculations allow us to conclude that at the moment the effect of the implemented digitalization does not yet give a financial result, but is manifested only in an increase in the costs of implementing these technologies, adaptation to risks allows us to reduce the negative impact and increase the stability of financial operations. This indicator emphasizes the importance and effectiveness of digitalization, taking into account risk management, which is important for assessing the acceptability of investment decisions and planning further optimizations.

Table 4. Investment efficiency (NPV, ROI)

Year	$\Delta CF / (1+r)^t$
2022	227,273
2023	206,612
2024	187,829
Sum	621,713
IC	1 250 00
NPV	-628,287

Source: calculated by the authors

Risk-adjusted ROI (λ=0.5, $\Delta Risk$ =-0.15): ROI_{adj} = 64.5%

Table 4 summarizes the financial results of the company's digitalization from 2022 to 2024. The discounted cash flows are 621,713 USD, which is lower than the investment in digital modernization of 1 250,000 USD. Accordingly, the net present value becomes negative −628,287 USD. Which indicates insufficient project effectiveness. To assess effectiveness in the long term, it is important to take into account the risk-adjusted ROI of 64.5%, which indicates a strategically correct decision to invest in technologies that can minimize risks and increase productivity.

Thus, the results obtained allow us to form a more balanced view of the feasibility of digital investments. Even with a negative NPV value, digitalization can create an indirect economic effect in the form of increased stability of operations, improved quality of management decisions and optimization of internal processes. This indicates that the assessment of the digitalization should be comprehensive and take into account risk minimization and speed of operations.

In most cases, digital transformation actually involves the digital adaptation of an enterprise to new conditions. That is why indicators that reflect the level of digital adoption and risk consideration should be among the key ones.

Measuring digital adaptation allows you to increase productivity, efficiency of software use and get a higher return on investment in technology solutions.

Digital transformation is designed to help companies not just implement new tools, but learn to work and thrive in the digital economy. Therefore, digital change programs themselves must be based on modern assessment and monitoring methods that support this goal. The more flexible and attentive to their own processes digital transformation leaders are, in particular in terms of measuring results and adjusting programs, the higher the likelihood of success of their initiatives.

At the same time, the digitalization result depends not only on the very fact of introducing technologies, but also on the scale and directions in which changes are made. In the future, it is advisable to consider the general goals that organizations usually set for themselves within the framework of digital transformation, because they form the basis for choosing appropriate indicators and methods for measuring efficiency. We propose to use an integral index to assess digital transformations (Table 5).

Table 5. ICTE Integral Index

Component	Normalized value	Weight	Contribution
ICF	0.7	0.25	0.175
EF	0.3	0.35	0.105
ROI	0.645	0.25	0.161
1- Risk	0.85	0.15	0.1275
ICTE	—	—	0.5685

Source: calculated by the authors

Assessment of the effectiveness of digital transformation of financial processes taking into account digital maturity, financial effect, investment return and risk. After taking into account the weighting factors, the integral index ICTE ≈ 0.57 was obtained. This value indicates that the company has already reached an average level of digitalization efficiency. There is progress in productivity and risk management, but there is still a need to optimize costs and increase operational efficiency. Using the integral indicator makes it possible to assess the current state of Nova's digital transformation Digital and helps to evaluate the achieved effect.

Table 6. Dynamics of financial indicators and integrated indicators of digitalization efficiency Nova Digital, 2022–2024

Indicator	2022	2023	2024	Change 2024 to 2023, %	Change 2024 to 2022, %
Income, thousand USD	711.55	1091.77	1356.19	+24.2	+90.6
Cost price, thousand USD	527.4	787.37	1003.26	+27.4	+90.2
Gross profit, thousand USD	184.6	304.41	625.93	+15.9	+91.6
Operating expenses, thousand USD	249.34	430.52	595.47	+38.3	+138.8
EBIT, thousand USD	- 65.18	- 126.11	- 242.54	- 92.4	- 271.9
EF (financial effect)	- 0.141	- 0.147	-0.166	-12.9	-17.7
ΔRisk	0.00	0.05	0.08	+60.0	+8
RAE	-0.141	-0.140	-0.154	-10.0	-9.2
ROI	0.65	0.68	0.64	-5.9	-1.5
NPV, thousand USD	- 209.39	- 262.81	- 156.12	+40.6	-25.5
IRR, %	11.2	12.5	13.0	+4.0	+16.1
ICF (digital maturity)	0.42	0.48	0.55	+14.6	+31.0
ICTE (Integral Index)	0.51	0.55	0.57	+3.6	+11.8

Source: calculated by the authors

Table 6 shows the comprehensive dynamics of Nova 's financial indicators. Digital for 2022–2024 and allows us to assess the effect of digitalization of financial processes. The growth of revenue from 711,550 USD in 2022 to 1,356,190 USD in 2024 is accompanied by a proportional increase in cost, reflecting the scaling of activities and the active implementation of digital solutions. Gross profit also shows positive dynamics, although operating expenses grow faster, leading to negative EBIT in all three years. Calculations of the financial effect (EF) show a negative result due to significant investments and increased costs, but the inclusion of the risk-adjusted effect (RAE) allows us to assess the real impact of digitalization, taking into account the increase in risks of digital processes, which are estimated through ΔRisk.

Risk-adjusted ROI demonstrates stable profitability of digitalization projects, even with increasing operational risks, and NPV and IRR reflect the financial attractiveness of investments in digital solutions in a three-year perspective, emphasizing the strategic nature of these investments. Digital maturity indicators (ICF) are growing year after year, indicating increased integration and efficiency of financial processes through automation, optimization and development of team competencies. The ICTE integral index, which combines digital maturity, financial effect, risk and investment return, also demonstrates stable growth, confirming the positive impact of digitalization on the comprehensive effectiveness of the company's financial management. Comparisons with previous years allow you to quickly assess the growth rates of indicators and trends, which clearly illustrates the progress of digital transformation and its impact on Nova's strategic development Digital / Nova Poshta.

Unlike standard forecasting models that work with fixed input data, the Monte Carlo method is based on a large number of possible scenarios. Instead of a single set of values, it uses a range of possible options, specifying variables in the form of probability distributions (normal, uniform, etc.) if there is uncertainty about them. During the simulation, the system recalculates the results many times. Due to this approach, the Monte Carlo method is well suited for long-term forecasts (Table 7).

Table 7. Analysis of the Monte Carlo scenario for Nova Digital

Indicator	2022	2023	2024	Min		Average	Max
ICTE	0.51	0.55	0.57	0.49		0.57	0.62
ROI	0.65	0.68	0.64	0.60		0.65	0.71
NPV, thousand USD	- 209.39	- 262.81	- 156.12	- 275		- 217.75	- 130

Source: calculated by the authors

The analysis of possible fluctuations in key performance indicators of the digitalization of financial processes at Nova was conducted. Digital when changing cash flows and risk levels within ±10–15%. For this, the integral ICTE index, risk-adjusted ROI and NPV were simulated for three years, which made it possible to assess the sustainability of digital solutions under different scenarios. The minimum values reflect the worst possible outcome under adverse changes in operating costs and risks, the maximum - the potentially best outcome. The data demonstrate that even under adverse conditions and the onset of a worse situation, ICTE maintains a positive trend, and ROI remains at the level, which confirms the strategic feasibility of investments in digitalization processes. NPV fluctuations also emphasize the feasibility projects digitalization.

Nova financial performance analysis Digital for 2022–2024 and calculations of the digitalization effect (EF), risk-adjusted effect (RAE), ROI, NPV/IRR and the integral ICTE index demonstrate the complex impact of digital investments on the financial stability and strategic development of the company. Despite the temporarily negative EBIT and negative NPV due to large one-time investments, the increase in digital maturity (ICF), stable risk-adjusted ROI and gradual growth of ICTE indicate the long-term effectiveness and feasibility of digitalizing financial processes. Monte Carlo scenario analysis showed that even with fluctuations in key parameters within ±10–15%, ICTE and ROI remain at a stable level, and

NPV does not go beyond the predicted range, which emphasizes the stability and reliability of digital projects. The dynamics of changes in indicators in 2024 compared to previous years clearly demonstrates the progress of digital transformation, increased productivity and efficiency of financial management. The results obtained allow the company's management to make informed strategic decisions regarding further investments in digitalization and provide a comprehensive assessment of the impact of digital solutions on Nova's operational and financial activities.

Conclusions

Summing up the analysis, it is worth emphasizing that assessing the effectiveness of digital transformation has ceased to be an auxiliary element and has actually become a necessity. There are many approaches to determining the effectiveness of financial management in the field of digitalization. The ability to measure one's own digital progress is a necessary technical tool, a strategic advantage that determines the success of such a transformation. Analysis of the effectiveness of the digital solutions involved makes it possible to timely adjust activities, identify ineffective solutions and continue successful practices. However, those enterprises that implement digital solutions without systematic and constant analysis, control and evaluation in order to make changes in a timely manner do not get a positive result and may suffer financial losses. Any innovative solutions require financing, and fragmented innovations without a strategic vision of the transformation of their own activities cannot become an effective tool for strengthening competitiveness and increasing profitability.

Considered example of analysis of digitalization of financial mechanisms Nova Digital demonstrated a comprehensive approach that makes it possible to assess the effect through performance indicators, costs associated with potential risks, and strategic forecasts.

Using an integrated indicator of the effectiveness of digital transformation, comparing results in dynamics makes it possible to make informed, effective management decisions. Taking into account the global dynamics of spending in the field of digital innovations and the nationwide trend towards digitalization, modern enterprises must be participants in such changes, which will allow them to maintain and strengthen market positions.

Businesses can adapt Nova's approach Digital taking into account their own needs, assessing digital maturity, the economic effect of projects and their investment attractiveness. research should be aimed not at an immediate result, but at studying the long-term impact of digitalization on financial stability and strategic flexibility, the risks arising from the use of new technologies, the effectiveness of specific solutions and scenario modeling of their impact.

At the same time, it is necessary to recognize that the existing methods of assessing the digitalization of enterprises ignore a number of critically important parameters: information security, the quality of the IT department's work, the integrity of the organizational architecture, the emergence of new risks. Therefore, to assess the level of digitalization, a comprehensive multidimensional approach should be used, combining the macro level (state, infrastructure, institutional factors) and the micro level (internal efficiency, technologies, risks, staff readiness). Only the combination of these dimensions provides a realistic and practically useful assessment of digital transformation and allows enterprises to remain competitive in an environment of constant technological change.

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