

Optimizing Budgeting and Financial Management for Sustainable Economic Growth and Fiscal Resilience

By Olena Cherniaieva¹, Hanna Mykhalchenko², Olena Ataieva³, Taras Marshalok⁴, Serhii Petrukha⁵

ABSTRACT:

Efficient macro-level budgeting serves as a fundamental instrument for overseeing a nation's economy, fostering sustainable growth and advancing social progress. Fiscal policy plays a crucial role in ensuring the state's financial support for socio-economic development, and its improvement is a priority task for ensuring stability and sustainable development. The purpose of this study is to analyze the effectiveness of budgeting and financial management mechanisms, as well as to develop ways to optimize them to ensure sustainable development. To achieve this goal, various scientific methods were used, including a monographic approach, statistical analysis, the method of expert assessments, and mathematical and statistical modeling. The study defines the theoretical foundations of the budget process, outlines the stages and conditions of its implementation, and analyzes the current challenges of budgeting in the economic and social contexts. The structure, algorithms, and main components of the budgeting system are studied, and the effectiveness of its implementation as a component of financial management is evaluated. The key factors affecting the effectiveness of the budgeting process are identified and the necessity of its optimization to increase the strategic sustainability of public finances is substantiated. The article substantiates the conceptual foundations of applying the budgeting methodology for effective financial management, suggests directions for improving the mechanisms of formation and distribution of budgetary resources, and identifies appropriate tools for implementing these measures. The practical significance of the obtained results lies in their applicability to real processes of optimization of financial management technologies, which will help to increase the efficiency of the state financial policy and ensure sustainable development.

Keywords: financial planning, strategy, financial management, economic effect, budget optimization, taxes.

¹PhD PhD in Economics, Associate Professor, Department of Economics of Enterprises and Management, Bakhmut Educational-Scientific Professional-Pedagogical Institute, V. N. Karazin Kharkiv National University, Kharkiv, Ukraine. ORCID: <https://orcid.org/0000-0003-2339-9416>

² Candidate Doctor of Economic Sciences, Professor, Department of Economics of Enterprises and Management, Bakhmut Educational-Scientific Professional-Pedagogical Institute, V. N. Karazin Kharkiv National University, Kharkiv, Ukraine. ORCID: <https://orcid.org/0000-0003-2616-9499>.

³Candidate Candidate of Economic Sciences, Associate Professor, Department of Economics of Enterprises and Management, Bakhmut Educational-Scientific Professional-Pedagogical Institute, V. N. Karazin Kharkiv National University, Kharkiv, Ukraine. ORCID: <https://orcid.org/0009-0003-4863-1506>

⁴ Doctor of Economic Sciences, Associate Professor, Department of Accounting, Auditing and Taxation, Faculty of Economics and Management, Khmelnytskyi National University, Khmelnytskyi, Ukraine. ORCID: <https://orcid.org/0000-0002-2617-341>

⁵ Ph. D. (Economics), Associate Professor, Docent of the Department of Management in Construction, Kyiv National University of Construction and Architecture, Kyiv, Ukraine. ORCID: <https://orcid.org/0000-0002-8859-07248>.

1. Introduction

In the current context of sustainable development, financial management plays a key role in ensuring economic stability, rational use of resources, and achievement of socio-economic goals. Effective financial management is an important factor for businesses, government agencies, and international organizations, as it contributes to financial stability, risk minimization, and cost optimization (Otoo, 2024). Modern financial management requires coordinated actions between investors, creditors, and managers (Sitinjak, *et.al.*, 2023).

The growing challenges posed by global economic crises, environmental threats, and social change require new approaches to managing financial flows, in particular, within the framework of green economic growth (Lina, 2024). In this context, environmental and socially responsible financing tools, innovative budgeting models, digitalization of financial processes and implementation of ESG principles (environmental, social and corporate governance) are gaining special attention, as evidenced by the UN Sustainable Development Goals (SDG, 2015) and the European Commission in the Strategy for Financing the Transition to a Sustainable Economy (EC, 2022) and publications of scientists (Ziolo, *et al.*, 2020).

Research on ways to improve the efficiency of financial management in the context of sustainable development is necessary to develop strategies that will ensure a balance between economic growth, environmental responsibility and social well-being (Sedovs, *et al.*, 2024). Analyzing current trends and implementing best international practices will help improve financial policy at the level of the state, business and individual enterprises, making this process more adaptive to current challenges (Daraojimba, *et al.*, 2023).

Scientific research shows that optimization of the budget process is a key condition for ensuring stable economic development of the state, efficient allocation of resources and improving the quality of public finances (Hrubliak, *et al.*, 2018; Ismailova, *et al.*, 2024). In today's environment, the budget process faces a number of challenges, such as limited budget resources, rising public debt, instability of macroeconomic indicators, and the need to increase transparency and accountability of the use of funds.

Countries adapt budget reforms to their unique economic structures, cultural characteristics, and institutional frameworks. While there are general best practices, their application often requires consideration of the national context. These include: the OECD recommendations to implement results-based budgeting, which focuses on achieving specific results and cost-effectiveness (OECD, 2019); the use of medium-term budget plans, which aim to improve forecasting and control of public finances (Allen, 2009). Studies show that national culture and institutions have a significant impact on the budgeting process. For example, countries with different cultural values may have different approaches to public finance management (Zarei, *et al.*, 2021). China and Indonesia are examples of such adaptation. Despite borrowing external budget models, these countries have adapted them to their own political and economic realities (Guess, *et.al.*, 2021). Many developed OECD countries are implementing similar reforms, but the results may differ due to institutional and political features (Brookings, 2024). Thus, although there are

general recommendations for budget reforms, their effective implementation depends on taking into account the specifics of each country.

One of the key aspects of the study is to assess the effectiveness of budgeting mechanisms, including the planning, allocation and use of budget funds at the national and local levels (Pilichowski, et al, 2021; Omelchuk et al, 2022). An important task is also to improve approaches to financial management, introduce the program-targeted budgeting method, digitalize the budget process, and increase the role of public control (Bergmann, et al, 2020).

Given global trends, many countries are actively reforming their budget systems by introducing modern financial management tools, such as medium-term budget planning, the use of big data analytics in forecasting revenues and expenditures, and improving the efficiency of public procurement. For developing countries, such measures are critically important in the context of ensuring financial sustainability and compliance with international standards of public financial management (Shopina, et al, 2024).

Thus, the study of the problems and prospects of optimizing the budget process is extremely relevant and will help to improve the mechanisms of distribution and use of financial resources, ensuring sustainable socio-economic development.

The purpose of the study is to evaluate the effectiveness of budgeting and financial management mechanisms, as well as to develop approaches to their improvement in order to promote sustainable development.

2. Materials and Methods

In the course of the study, various scientific approaches and methods were used to comprehensively assess the effectiveness of budget processes. The monographic method was used to analyze financial indicators, including expenditures, revenues, and deviations. Statistical analysis helped to identify patterns in budget data. The expert evaluation method was used to analyze the opinions of experts on the effectiveness of budgeting based on their experience. Econometric modeling helped to establish relationships between financial parameters and assess their impact on the effectiveness of the budget process. Mathematical and statistical models were used to forecast the development of the budget system and assess the consequences of various management decisions. The analysis of the dynamics of budgetary indicators allowed us to identify key trends, possible deviations, and peculiarities of financial planning. This study focuses on identifying the factors that affect budget execution by analyzing the relationships between economic and financial indicators. The use of scientific methods ensures the objectivity of the assessment, allows to draw reasonable conclusions about the effectiveness of the budget process and identify ways to improve it.

3. Results

An effective budget defines the basis for the rational formation and use of the organization's financial resources to support the mission, strategic goals and sustainable development. One of the important criteria is that the budget is aligned with the organization's priorities and achieves value for money. Reasonable forecasting of revenues

and expenses will improve financial management, as well as put an end to cost overruns and keep expenses within the budget. Budgeting and forecasting are the main tools of financial planning (Bacia, 2024). The ability to respond to changes in the external environment and internal situations is the reason for such budget flexibility. It also evaluates the effectiveness of the budget by examining the cost of the financed project and program.

The ability to attract investors and maintain their interest from a variety of sources, such as shareholders, partners, government agencies, creditors, and employees, is an important indicator of budget effectiveness. The trust and active participation of these parties contribute to the stability of financial management, improvement of the investment climate and enhancement of the organization's competitiveness. A well-designed budget not only ensures the rational allocation of financial resources, but also provides mechanisms for continuous improvement of planning, execution, and control procedures (Huang, 2019). This includes the introduction of modern budgeting tools, the use of automated accounting and analysis systems, and increased transparency and accountability (Iershova, 2024).

In addition, an effective budget performs an informational function, providing managers, executives, and other decision makers with reliable data to make informed strategic and operational decisions (Shawe, 2023). This allows for timely identification of potential risks, adaptation of financial policies to changes in the market environment, and improvement of the overall management efficiency of the organization.

Budget organizations can have a more holistic view of the budget process, which supports resource control and analysis of results through performance indicators or key performance indicators (KPIs). The main performance indicators include the level of compliance of the budget with strategic goals, the volume of planned activities, the ratio of actual and projected revenues and expenses, and the level of financial discipline. The use of the KPI system allows not only to evaluate the efficiency of spending, but also to identify problematic aspects of financial management. This helps to make timely corrective decisions, optimize budget processes and increase the transparency of financial activities.

Continuous monitoring and analysis of budget performance enables budget organizations to improve financial management, enhance planning and rationally allocate financial resources. The introduction of modern management methods, such as program-targeted budgeting, allows not only to control costs but also to assess their impact on achieving strategic priorities.

Governments around the world are actively integrating key performance indicators (KPIs) into their financial planning to increase transparency, accountability, and efficiency of public spending. Integration of KPIs allows governments to assess the effectiveness of budget spending and direct resources to achieve strategic goals (OECD, 2019). Regular monitoring and publication of KPI performance data provides the public and legislatures with information on the effectiveness of government programs, which helps to build trust and accountability (GovPilot, 2022).

Despite the benefits, integrating KPIs into financial planning faces some challenges. Selecting relevant and measurable KPIs can be difficult, especially for complex or long-term programs (OECD, 2015; Jessee, 2025). Data accuracy, reliability, and timeliness must be guaranteed for objective performance measurement. In some cases,

organizational culture or lack of necessary skills may hinder the effective implementation and use of KPIs. Overall, the integration of KPIs into financial planning is an important tool for improving public financial management and achieving the government's strategic goals.

Particular attention should be paid to the experience of the European Union, whose budget system is one of the most effective in the world due to the application of the principles of effective management, flexibility in the allocation of funds and constant improvement of control mechanisms. In particular, the EU approach is based on a results orientation, which ensures transparency of spending and their focus on achieving socio-economic development (Fig. 1).

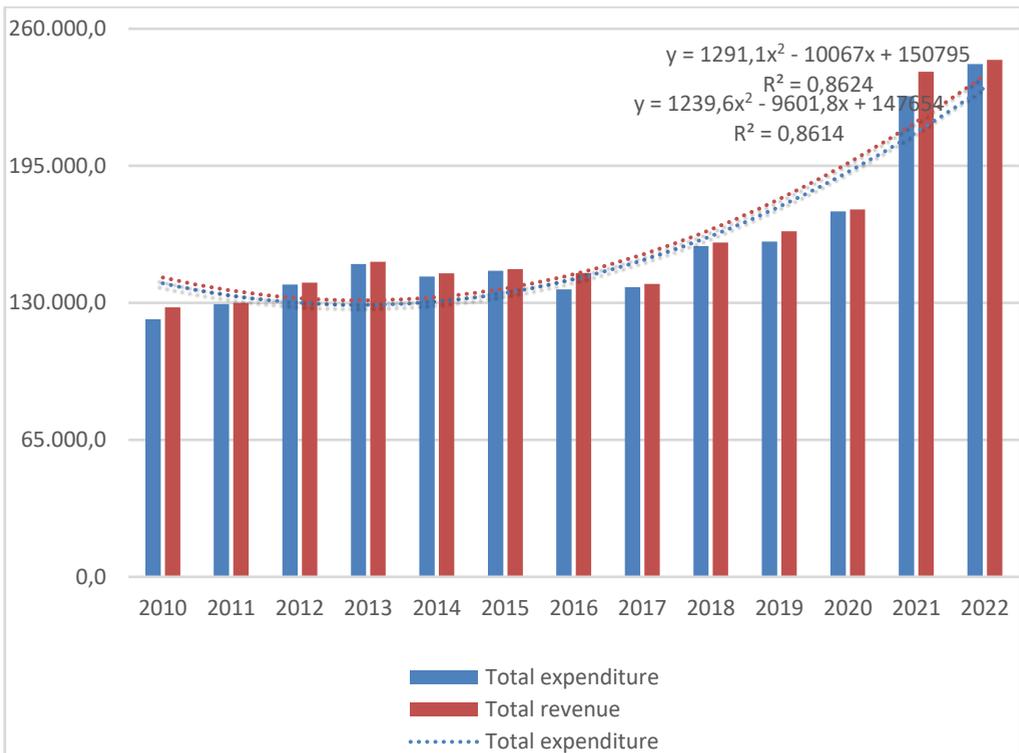


Figure 1. EU Budget Revenue and Expenditure Trends, 2010–2022 (Million euros)
Source: Eurostat (2024a), EUR-Lex (2024), Eurostat (2024b)

Based on official Eurostat data (Eurostat, 2024a, 2024b), the European Union's budget revenues and expenditures have followed a polynomial trend over the past 13 years, with a notable surge in the last two years. This growth is largely attributed to the post-pandemic economic recovery and the escalating Russian military aggression against Ukraine. Ukraine's budgeting system, in turn, mirrors the nation's economic instability (Figure 2).

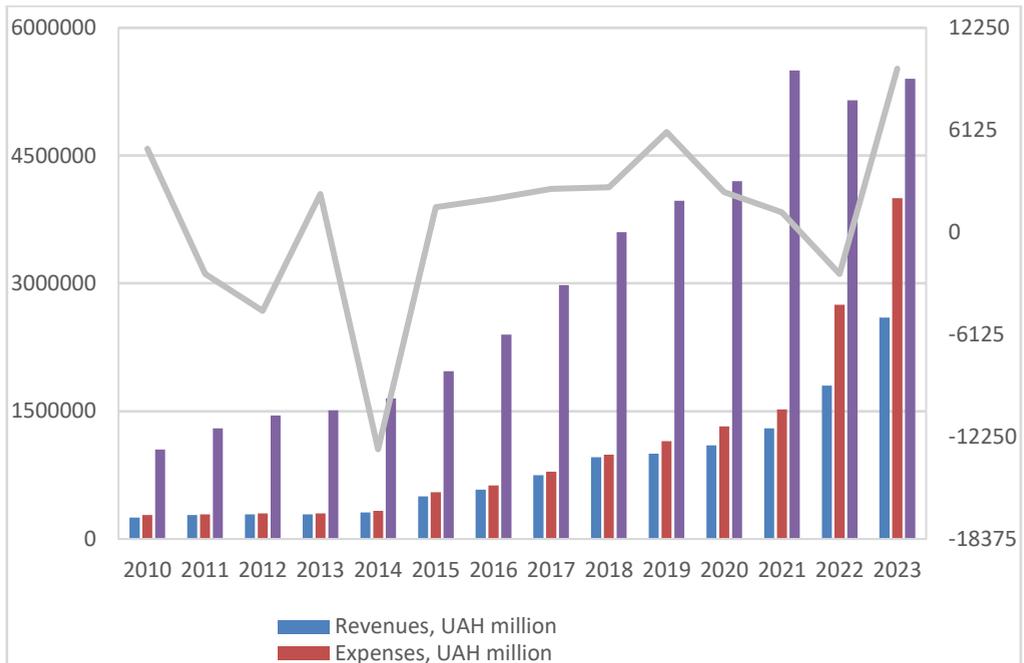


Figure 2. Key Metrics of Ukraine's State Budget, 2010-2023

Source: Minfin (2010-2023)

During the periods of intensified military aggression in 2014 and the full-scale Russian invasion in 2022, Ukraine's balance of payments experienced profound transformations, reflecting the severe economic disruptions caused by armed conflict. These changes were driven by multiple factors, including declining export revenues, shifts in foreign direct investment, fluctuations in currency exchange rates, and the urgent need for increased external financial assistance. To mitigate these economic shocks, Ukraine's government implemented emergency fiscal measures, while the National Bank of Ukraine introduced monetary policies aimed at stabilizing the exchange rate and preventing hyperinflation. Despite these efforts, the war continues to challenge the country's financial stability, requiring ongoing structural adjustments, international support, and long-term recovery strategies to restore sustainable economic growth. Improving the budget expenditure management system and increasing the efficiency of their use is critically important for optimizing financial resources in conditions of their limitation. In wartime, the budget mechanism of socio-economic development must effectively meet the country's priority needs - economic, social and defense. This requires careful planning of expenditures and a thorough analysis of the results of the use of budget funds (Zharikov, 2023).

The financial strategy of governments varies considerably by sector, taking into account specific economic, social and political factors. Two key sectors - healthcare and defense - have significant differences in their approaches to budget planning. In many countries, the healthcare budget consists of public spending, insurance premiums, and private investment. Health care is often financed through multi-year programs, including

health insurance, infrastructure, and research. The COVID-19 pandemic, for example, has shown that funding can be quickly adjusted to meet emergencies (Egeland, 2020).

In EU countries, the system is primarily financed by the state through general taxation or social funds. For example, according to the European Commission, EU budgetary strategies are aimed at equal access and sustainability of the healthcare system. In the United States, a high level of private funding is provided through Medicare, Medicaid, and private insurance. Recent changes include increased federal funding under the Affordable Care Act (ACA) (HHS, 2025).

Defense budget strategies are aimed at long-term financing of large projects, taking into account the geopolitical factor. At the same time, a significant portion of spending is closed for national security reasons. For example, NATO members are obliged to spend about 2% of GDP on defense (NATO, 2024), which forms the structure of the budget (Figure 3).

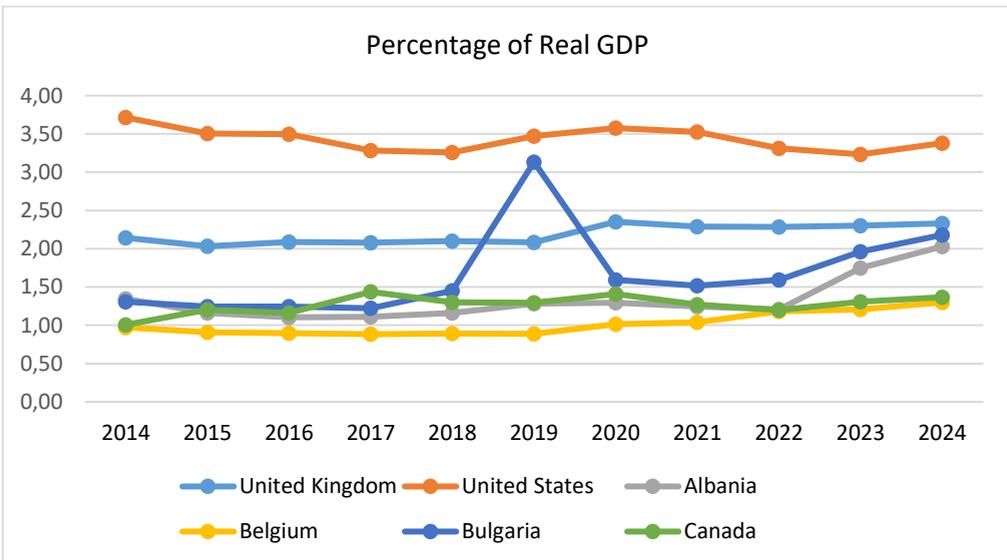


Figure 3. Defense spending in various NATO member states (2010-2024), Percentage of Real GDP
 Source: (NATO, 2024)

China has a strategic approach with long-term investments in technology, including artificial intelligence, cybersecurity, and hypersonic weapons (SIPRI, 2023).

Consequently, budgetary strategies vary significantly by sector. Healthcare requires flexible and crisis funding, while defense is based on long-term investments and geopolitical priorities. Each country and sector has unique characteristics that influence its budgetary policy.

Improving budgeting and financial management mechanisms is a key factor in ensuring the country's sustainable development, as it contributes to financial stability and efficient use of resources. Analysis of the relationship between budget indicators demonstrates a significant impact of public debt on economic equilibrium, which confirms the need for a balanced approach to the formation of revenues and expenditures.

Correlation analysis indicates a close relationship between public debt and budget parameters, in particular revenues (98.1%), expenditures (96.3%), gross domestic product (90.1%) and balance of payments (47.9%) (Table 1). This emphasizes the importance of rational financial planning to ensure economic sustainability and long-term development.

Table 1: Matrix of correlation analysis of the impact of the State Budget of Ukraine on the formation of public debt, 2010-2023.

	Public debt, UAH mln (Y)	Revenues, UAH mln (X ₁)	Budget expenditures, UAH mln (X ₂)	Balance of payments, USD (X ₃)	GDP, UAH mln (X ₄)
Public debt, UAH mln (Y)	1				
Revenues, UAH mln (X ₁)	0.98127	1			
Budget expenditures, UAH mln (X ₂)	0.96327	0.98821	1		
Balance of payments, mln USD (X ₃)	0.47937	0.49660	0.44307	1	
GDP, UAH mln (X ₄)	0.90139	0.90014	0.83561	0.47937	1

Source: own calculations based on data Consolidated Budget of Ukraine (2011-2023); Gross domestic product (2002-2022); Balance of payments of Ukraine (1998-2023).

Governments play a key role in economic and social management through budgetary policies, resource allocation, economic growth promotion, stabilization, regulation, and public service provision. State intervention addresses market failures, wealth distribution, and access to essential services like healthcare and education. Effective budgeting prioritizes expenditures to balance immediate needs with long-term investments in infrastructure, innovation, and sustainability. Governments stimulate economic growth by fostering business development and investing in human capital. Stabilization policies help manage inflation, economic fluctuations, and financial stability, while regulatory oversight ensures fair competition and consumer protection. Public services, including transportation and utilities, enhance societal well-being. In a rapidly evolving global landscape, governments must adopt sustainable fiscal policies, leverage financial innovations, and strengthen international cooperation to address climate change, digital transformation, and geopolitical risks, ensuring long-term, inclusive development (Figure 4).

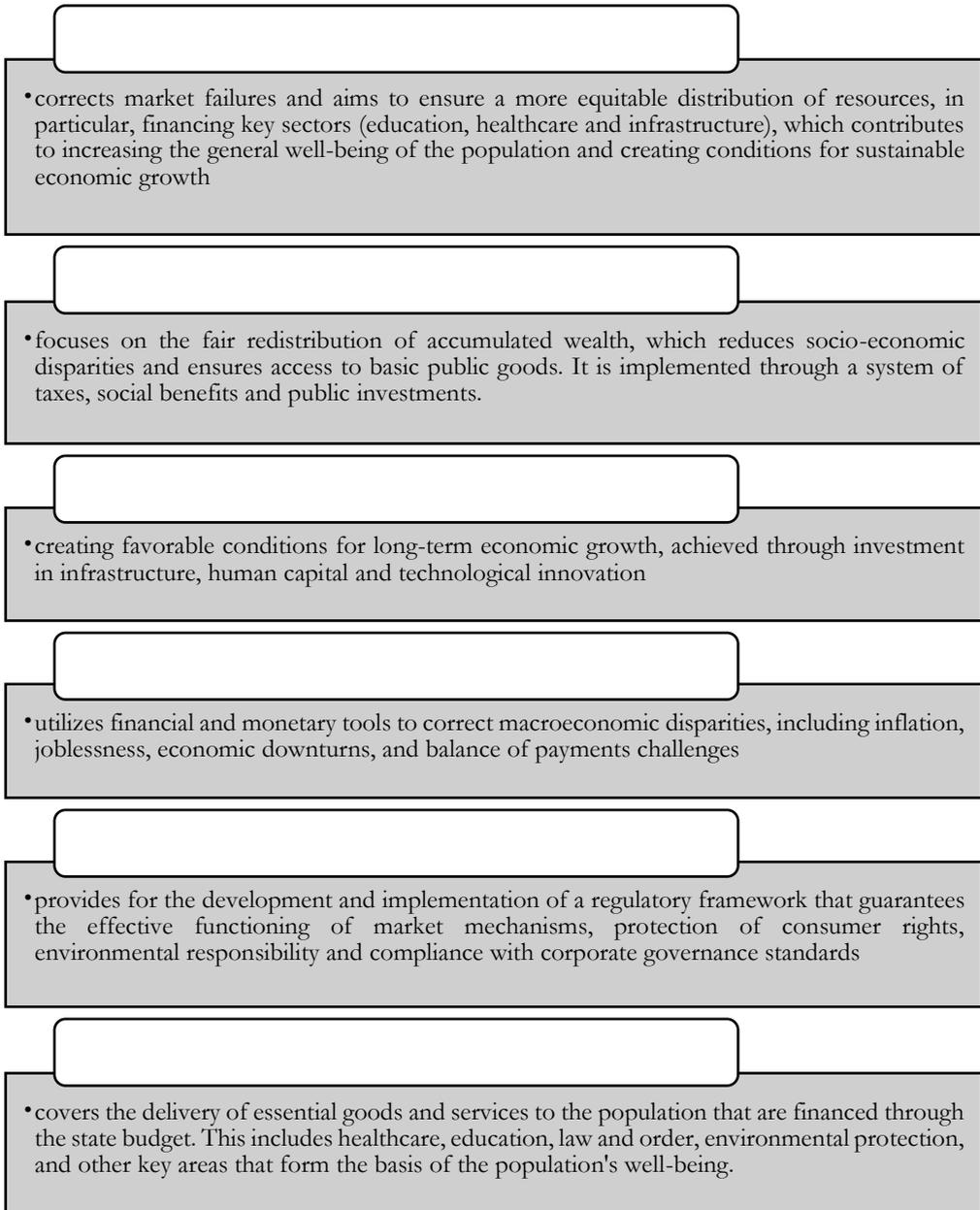


Figure 4. Functions of fiscal responsibility of governments to ensure sustainable development of society

Source: compiled by the authors

Thus, the government's fiscal policy is a comprehensive tool to support socio-economic development, reduce inequality, and ensure long-term financial stability.

The European Union performs a limited number of government functions, and only a few of them have a direct impact on the budget. The bulk of budget transfers are

aimed at implementing agricultural and regional policies that define the key areas of EU activity - resource allocation and redistribution.

At the same time, the development function is also clearly visible. The main purpose of financial transfers is to redistribute funds that come mainly from more economically developed regions to less developed ones or from consumers and taxpayers to the agricultural sector. At the same time, most of the political mechanisms associated with redistribution remain unchanged.

Tax systems in developed countries are complex and progressive, with different rates for individuals and legal entities. They collect taxes efficiently through automation and transparency. Developing countries have less progressive systems, with an emphasis on indirect taxes, which leads to an unequal tax burden due to high consumption rates. Difficulties in tax collection are caused by the high level of informal economy and poor digitalization (OECD, 2025). Tax revenues of developed economies finance social services, which ensures a high quality of life. In developing countries, funding for social services is limited. Developed countries have international agreements on the avoidance of double taxation, which facilitates business and investment. Developing countries face difficulties in implementing such agreements, which leads to capital flight (Banks *et al.*, 2024). The role of taxation in developed countries is focused on ensuring social security and economic growth, while in developing countries, the main problems are inefficient tax collection and a high level of informal economy (Mengden, 2024).

In addition to supporting regional development, the EU invests in development through funding research, the construction of the Trans-European Transport Network, and improving human capital through education programs. With the deepening integration of the single market, the EU's regulatory role gains significance, yet its influence on budgetary expenditure remains limited. The responsibility for economic stabilization primarily lies with national governments, except for monetary policy, which falls under a broader framework. Enhancing the effectiveness of stabilization mechanisms is crucial for fostering more sustainable and dynamic economic growth across Europe. This requires coordinated fiscal policies, improved crisis response strategies, and greater adaptability to external economic shocks to ensure long-term stability and resilience (Filip *and al.*, 2025). However, Member States do not consider the possibility of giving the EU budget a stabilisation role in the future. However, cohesion between Member States is necessary to strengthen the socio-economic and territorial component of sustainable development, i.e. programmes that promote convergence and prevent divergences are needed (Kengyel, 2025).

Therefore, stimulating economic growth in Europe will require closer coordination of economic policies between Member States, possibly involving specific initiatives at EU level (EM, 2017). At the same time, due to the limited size of the European Union budget, its capacity for macroeconomic stabilisation is extremely limited.

The presence of an effective institutional environment for budget planning plays a key role in ensuring macroeconomic balance, contributing to the socio-economic development of the country and achieving medium-term social goals (Chugunov & Liubchak, 2023; Kolawole, 2023; Savaşaneril; 2024). The war in Ukraine poses serious challenges, in particular for the financial system and the institutional budget environment,

which requires the adaptation of management mechanisms and increasing their efficiency (Gasarov, *et al*, 2024).

In 2022, the European Union (EU) budget amounted to €245 billion, which is equal to about 1% of EU GDP and 2% of total public spending in the region. Despite its relatively small scale in relation to the economy, the EU budget is subject to rigorous parliamentary, political, and audit scrutiny (Downes, Moretti, Nico, 2017).

In recent years, additional funding has been needed due to unforeseen crisis events that were not taken into account when developing the EU's long-term budget for 2021-2027. Since the beginning of 2021, budget implementation has been complicated by the COVID-19 pandemic and its consequences. In response, the EU and its member states mobilized a total of €3.7 trillion, of which the EU budget allocated €70 billion for direct assistance to citizens and businesses, as well as to support non-EU countries in dealing with the crisis (EP, 2023).

Further challenges arose in 2022 as a result of Russia's full-scale military invasion of Ukraine, which increased financial pressure. In total, the EU and its member states provided €72 billion in financial, military, and humanitarian aid to Ukraine. The war has caused inflation to rise, which has reduced the real purchasing power of financial resources, creating additional challenges for budget planning and the stability of EU economic policy.

The European Union's budget for 2021-2027 was initially set at €1.8 trillion under the Multiannual Financial Framework (MFF) and the Next Generation EU (NGEU) temporary recovery instrument. However, these financial resources proved to be insufficient due to accelerated utilization caused by unforeseen crises, including the global pandemic, Russia's war against Ukraine, and the economic consequences of the UK's exit from the EU (EPRS, 2023). In particular, the €10.5 billion reserve fund earmarked for special measures for the period 2021-2024 has almost completely depleted. In this regard, the European Parliament has repeatedly called for an urgent and significant revision of the EU budget to ensure financial sustainability. In June 2023, the EU budget was updated.

In 2024, the maximum amount of the Multiannual Financial Framework (MFF) for commitments is EUR 185.96 billion, which corresponds to 1.05% of the EU's gross national income (GNI). At the same time, the maximum allowable limit of the MFF for disbursements is EUR 170.54 billion, or 0.96% of GNI.

EU Council Decision 2020/2053 of December 14, 2020 on the Own Resources Framework (ORD 2020) entered into force on June 1, 2021, but its provisions apply retroactively from January 1, 2021. According to this decision, the upper limit of own resources for payments is limited to 2.0% of the aggregate GNI of Member States. At the same time, 0.60 percentage points of this limit is a temporary increase aimed solely at covering financial obligations incurred under the European Union's Recovery Instrument (EP, 2023).

Thus, the financial resources margin for 2024, defined as the difference between the maximum IFF disbursement limit and the upper limit of the own resources for payments, is €183.4 billion, equivalent to 1.04% of EU GNI.

During the financial period 2021-2027, there has been a significant reduction in the percentage difference between the ceiling of the multiannual financial framework (MFF) for payments and the maximum allowable amount of own resources for payments, especially in 2022. The main factor behind this reduction was the significant financial

burden associated with the emergency allocation of financial assistance to Ukraine to overcome the consequences of full-scale Russian military aggression. The war has caused an unprecedented economic and humanitarian challenge for the European Union, which forced it to quickly adapt its budgetary policy and reconsider its funding priorities. Financial support to Ukraine included not only macro-financial assistance, but also humanitarian, military and social programs. In particular, a significant part of the funds was directed to supporting Ukraine's economic stability, assisting internally displaced persons, restoring critical infrastructure, and ensuring energy security. As a result, in 2022 The EU's financial capacity has been put under significant strain, leading to a sharp reduction in the margin between the ceiling of the IFF for disbursements and the ceiling of the own resources for payments (Figure 5). This situation underlines the importance of the flexibility of the European budget in times of crisis and the need for constant monitoring and revision of the financial framework to respond effectively to unforeseen challenges.

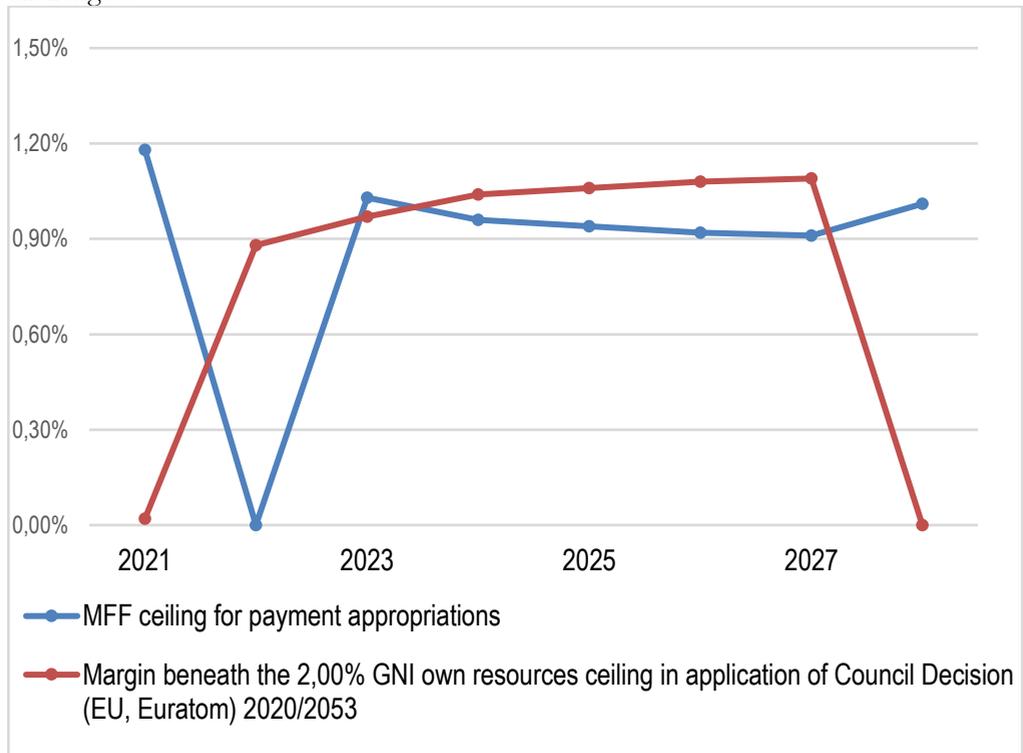


Figure 5. Restrictions on payment appropriations and EU budget own resources, % of GNI
Source: (European Commission, 2024)

The budgeting mechanism is a comprehensive system of processes and procedures that governs the planning, development, approval, execution, and control of the budget. It plays a key role in financial management and strategic planning, ensuring the efficient allocation and use of resources to achieve the set goals (Bouckaert and Reeth, 1996; Putra, 2021). Effective budgeting contributes to financial sustainability, increases the

transparency of financial management, and allows for timely adjustment of budget priorities in line with changes in the economic environment. The budget development process begins with the definition of the strategic objectives of the country or organization, which is the basis for the formation of financial plans. A balanced budget should not only reflect current financial capabilities, but also include measures to achieve long-term social and economic results. This requires clear interaction between the authorities, public institutions, and stakeholders, which helps to increase accountability for budget decisions.

To ensure effective control over budget execution, a matrix of key indicators is used to systematically track deviations between planned and actual results (Sands, et al, 2012). Regular monitoring of financial indicators allows for prompt detection of discrepancies, assessment of their causes and development of corrective measures. Based on the data obtained, management decisions are made to optimize budget expenditures, improve financial planning mechanisms and formulate the budget for the next year. The budget management mechanism is a dynamic process that requires constant analysis, adaptation and improvement to ensure the rational use of resources and achieve strategic goals. It includes a set of tools and methods that contribute to the effective planning, execution and control of financial resources within the budget of an organization or state. The main stages of budget management include: analysis of revenues, expenses and financial liabilities; identification of weaknesses in the use of budget funds; identification of opportunities for improvement aimed at optimizing costs, increasing the effectiveness of budget programs and implementing more flexible financial strategies.

Improving the budgetary mechanism contributes to increased transparency, accountability, and financial stability, which is especially important in times of economic instability and limited resources.

4. Discussion

To guarantee the optimal effectiveness of budgeting and financial management systems, it is essential to continually assess and refine these mechanisms, it is necessary to implement adaptive strategies that take into account the dynamics of economic growth, sustainable development and rational redistribution of budget funds. In the current context of global challenges, including climate change, social inequality and economic instability, budget policy should be aimed not only at short-term stability, but also at long-term financial and environmental sustainability. The integration of sustainable development principles into the budget process involves: prioritizing spending on “green” investments, renewable energy and environmental initiatives; fair distribution of resources to reduce inequality and support vulnerable groups of the population; support for innovation, digitalization and the development of a “green” economy to ensure competitiveness.

Scientific studies by a number of scholars confirm the importance of adaptive budget planning in conditions of economic turbulence. emphasize the significant impact of economic and political uncertainty on the expansion of the budget deficit (Ndou, *et al*, 2023), which emphasizes the need for flexible management of public finances. Scholars emphasize the importance of long-term strategic planning that takes into account environmental and social challenges (Tampubolon *et al*, 2024). Research shows that

effective budget policy in the context of sustainable development should be based on a balanced approach to resource allocation, integration of environmental and social factors into financial planning, as well as constant analysis and adaptation to new challenges.

Recent studies reaffirm that budgetary policy is a crucial instrument in safeguarding Ukraine's economic security both during wartime and throughout the post-war recovery phase, ensuring financial stability and sustainable development. It not only contributes to the stable functioning of the state in the face of military challenges, but also forms the basis for future economic recovery and sustainable development.

There is an opinion that the budget strategy should be oriented towards long-term sustainable development goals and European integration processes (Radionov, 2023). This involves harmonizing Ukraine's financial policy with the principles of the European Union, in particular through the introduction of environmentally responsible financing, digitalization of the budget process, and expansion of social programs.

Scholars emphasize the need for adaptive transformation of local budgets in response to the challenges of wartime. In particular, they focus on the following aspects: the need to quickly respond to changing circumstances, reallocate resources in accordance with the urgent needs of communities and ensure effective financing of critical areas; providing financial support to internally displaced persons, veterans, as well as implementing psychological rehabilitation and employment programs; investing in renewable energy, energy-efficient technologies and environmentally responsible infrastructure as the basis for future economic growth; strengthening the autonomy of local budgets, which will contribute to the faster recovery of regions and the sustainable development of local communities (Lobodina, et al, 2024; Yeryomenko, 2023).

Thus, Ukraine's modern budget policy in the war and post-war period should be based on the principles of sustainable development. This involves not only effective management of public finances in times of crisis, but also strategic planning of economic growth, taking into account environmental, social, and institutional factors.

Artificial intelligence (AI) offers great opportunities for improving public finance, but its use is accompanied by certain risks and ethical issues (Figure 6).

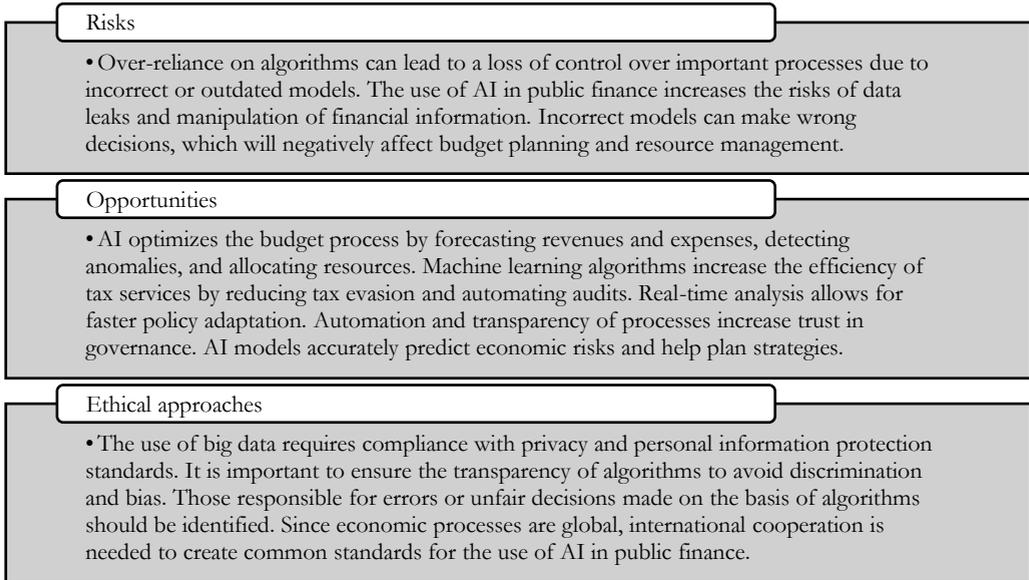


Figure 6. Potential risks, opportunities and ethical approaches to the use of artificial intelligence in predictive budgeting
Source: compiled by the authors

The use of artificial intelligence in public finance can be a powerful tool for improving management efficiency, optimizing budget processes, and ensuring economic stability. However, in order to achieve a positive effect, it is necessary to take into account the risks associated with security, algorithmic errors, and ethical challenges, as well as to develop control mechanisms and international cooperation to minimize negative consequences (Adelakun, 2023).

Currently, more and more research is aimed at studying the impact of open budgeting on reducing corruption, emphasizing the importance of transparency in financial processes for building sustainable and effective governance (Bolgov, 2023). Scientists indicate that improving budgeting and financial management mechanisms should be focused on reducing the consequences of corrupt practices and preventing their recurrence in the future, which is important for ensuring social justice and sustainable development (Nakpodia, *et al*, 2024).

Modern scholars outline the main requirements for effective fiscal policy aimed at accelerating socio-economic development in conditions of sustainable growth. A well-thought-out budgeting concept can significantly stimulate economic growth, as well as activate social processes that will contribute to the achievement of social equality, environmental stability and economic sustainability (Shalashna, 2023). These conclusions align with the findings of other studies confirming the importance of sustainable financial mechanisms for achieving long-term development goals.

Scholars emphasize that the optimization of the budgeting and financial management system should focus on effectively measuring the effectiveness of spending within the budget (Sánchez-Bayón, *et al*, 2023). New approaches to structuring budgets are needed to adapt to the dynamic processes of globalization and economic integration,

which pose new demands for sustainable development. In particular, this includes the integration of environmental and social parameters into the assessment of the effectiveness of budget spending.

The conclusions of scholarly studies coincide with the results of the current analysis, which emphasizes the importance of optimizing budget mechanisms and management systems to increase their impact on the formation of a new paradigm of strategic management focused on sustainable development. The identified conceptual principles are priority areas for optimizing budget policy, which should contribute to more equitable and sustainable economic development. As a result of the generalization, we will outline the main stages of implementing the formation of the budget mechanism (Table 2).

Table 2: Stages of implementation of the formation of a budget mechanism to ensure sustainable development

Stage	Ways of implementation
Analysis of socio-economic needs and priorities	Study of internal and external factors that influence a country's economy (globalization, technological change, climate change, political situation, etc.)
Identification of social problems	Identifying the most critical issues that require funding to achieve sustainable development, such as poverty, education, health, environmental issues
	Establishing clear sustainable development goals that must be achieved through budget allocations (e.g., achieving the UN Sustainable Development Goals)
Strategic planning and forecasting	Budget forecasting for several years ahead, taking into account changes in the national and global economy, as well as possible crisis situations
	Integration of sustainable development principles
	Assessing budget performance based on achieving sustainable social, environmental, and economic goals
Budget formation and approval	Income and expense planning
	Implementation of the principles of transparency and citizen participation in the budget formation process (open consultations, public hearings), which increases the legitimacy and support for the budget
	Using mechanisms that provide financing for environmental initiatives and social projects, such as green bonds or financing through international organizations
Budget execution and monitoring	Prompt implementation of budget allocations in specific areas, with a view to ensuring sustainable development
Evaluation of results and improvement of mechanisms	Conducting regular cost-effectiveness assessments, taking into account sustainable economic, social and environmental outcomes.
	Improving performance-based budgeting mechanisms, including strengthening institutional capacity and strengthening oversight

Stage	Ways of implementation
Conditions for implementing a budget mechanism for sustainable development	Adapting to new challenges
	Availability of political support for the implementation of sustainable development strategies and budget reforms at all levels of government.
	Active participation of citizens in budget planning and monitoring processes
	Engaging global financial institutions like the World Bank and the International Monetary Fund, along with nations experienced in sustainable development, to facilitate funding and share best practices
	Using modern technologies and tools to improve budget management efficiency, such as electronic budgeting, using big data to analyze cost effectiveness

Source: compiled by the authors

Despite the extensive body of current research on budgeting, most studies primarily concentrate on its theoretical aspects, detailing conventional methodologies and financial management algorithms. However, there is a considerable gap in the exploration of practical frameworks and innovative tools aimed at enhancing the efficiency of budgeting and financial management systems. This shortfall underscores the need for more applied research that bridges theory and practice, focusing on the development and implementation of effective optimization strategies. This requires a deeper analysis and development of practical tools for the effective implementation of these concepts.

5. Conclusion

A comprehensive analysis of the theoretical foundations of the budgetary mechanism allowed to determine the stages of its implementation and the conditions for its implementation in the current economic and social realities. Particular attention was paid to the study of the essence of budgeting, algorithms and key components of the budget system mechanism, as well as practical aspects of implementing the budgeting methodology as a component of the financial management policy.

The main factors influencing the efficiency of the budgeting process are identified, and the conceptual framework for applying the budgeting methodology to ensure effective financial management is defined. In particular, the study has shown that the quality of budget execution largely depends on the existing parameters and standards for implementing the budgeting methodology. To achieve the expected socio-economic effect, effective control over the budget execution process is necessary.

One of the main challenges and risks arising from the implementation of the budgeting methodology is the shift of financial responsibility and the inconsistency of algorithms and forms of budgeting. In order to achieve positive results from improving budgeting mechanisms, it is important to correctly identify the centers of responsibility, clearly delegate relevant management powers to them, and ensure an appropriate level of coordination between different parts of the budget process.

A strategy that combines flexibility with strict fiscal discipline is optimal for ensuring the sustainable development of society. Flexibility allows governments to respond quickly to economic shocks and adapt policies to changing conditions, while strict budgetary control helps to avoid excessive deficits and inflation. It is important to take into account the specifics of the economic cycle, internal conditions, and external challenges to find a balance that will ensure stability and sustainable economic development.

Thus, the results of the study confirm the need to optimize the organizational mechanism of the current budget system in order to strengthen the overall management paradigm of strategic development. This involves providing the process with key tools to achieve a positive socio-economic effect, in particular in the context of sustainable development and European integration processes.

The proposed directions for improving the budgeting mechanism are an integral part of the innovative paradigm of financial management aimed at improving the efficiency of budget policy. Their implementation can significantly improve budget policy in the context of globalization, in particular in the context of sustainable development and European integration processes. For further scientific reflection and implementation, practical testing of methods for improving the budgeting and financial management system is necessary, especially in the context of the prospects for Ukraine's post-war recovery.

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