



SCIENTIFIC OASIS

International Journal of Economic Sciences

Journal homepage: www.ijes-journal.org
eISSN: 1804-9796



Economic Rebuilding Frameworks in Post-War States: Takeaways for Ukraine

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ARTICLE INFO

Article history:

Received 26 May 2025

Received in revised form 17 June 2025

Accepted 12 July 2025

Available online 16 July 2025

Keywords:

Economic growth; Institutional reforms; Sustainability; Foreign investment; Fiscal sustainability.

ABSTRACT

The post-war recovery of Ukraine's economy is increasingly debated among scholars and experts, with key issues including financing sources for reconstruction, investment conditions, institutional barriers, and the effectiveness of monetary and fiscal policies. This article examines the implementation of economic recovery models in post-conflict countries and develops recommendations tailored to Ukraine. Using a descriptive-analytical approach, the study analyses and systematises macroeconomic indicators for 2021–2027 (including forecasts) to assess Ukraine's recovery potential. The findings indicate moderate economic growth, declining inflation, and a reduced key policy rate in 2025, with stronger recovery anticipated in 2026–2027. Budget deficits are expected to be financed by external loans and grants, primarily directed to the defence sector. In this context, the government must prioritize identifying sustainable recovery sources. Continued structural reforms will be essential for building institutional capacity to address post-war economic and social challenges. International experience underscores the need for political stability, institutional strengthening, trade liberalisation, and targeted international aid to support vulnerable sectors. Support funds and external resources must be carefully allocated to Ukraine's most pressing needs. Ensuring political stability through effective security mechanisms is crucial to the long-term reconstruction process. Economic recovery drivers will centre on directing international assistance toward structural weaknesses in Ukraine's economy, promoting innovation, and enabling the return of highly skilled migrants. The practical value of this study lies in its identification of key macroeconomic trends that will shape Ukraine's post-war recovery path and inform the development of a sustainable and effective growth model.

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<https://doi.org/10.31181/ijes1412025196>

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1. Introduction

Academic and expert circles are actively discussing the post-war recovery of Ukraine's economy, searching for the most appropriate and feasible models of economic growth. The issues of international technical and financial assistance and European recovery plans (the Marshall Plan of 1948–1951) are among the most widely discussed in academic circles [1-4]. In this regard, the experience of Germany, Italy, Poland, France, and the United Kingdom, Japan [5], which have implemented recovery plans and ensured the effective use of international assistance, is being considered. The planning of economic recovery in European countries after World War II was aimed at stimulating production, implementing economic stabilization policies, promoting global trade growth, and attracting funds for infrastructure development projects [6]. At the same time, the political, economic, financial, institutional, and socio-demographic conditions that have developed in Ukraine in the context of war are different from those in Europe. The deterioration of the demographic situation due to prolonged population decline, migration, and displacement of persons due to the war has a negative impact on the economic potential for recovery [7]. The issues of economic recovery and modernization require further scientific research.

The discussions on recovery models focus on the issues of attracting investments and their allocation to priority sectors of the economy, stimulating production and entrepreneurship, and institutional factors for ensuring growth. The reconstruction plans discussed by scholars include an overview of financing mechanisms, strategies, directions for further economic development, and a system of international support for reconstruction.

Thus, the presented "Recovery Plan" of Ukraine already proposes a support system for its reconstruction at the expense of European countries. Among the advantages of the Recovery Plan are: reducing the influence of oligarchs on political decisions, institutional modernization, and alignment with EU standards [8; 9]. At the same time, the document overestimates external financing needs for recovery, overestimates economic growth potential, contains shortcomings in the allocation of funding to different sectors, and gaps in financial and industrial policy planning [8]. The recovery plan provides for a decentralized approach to growth, while the experience of European countries points to the importance of creating specialized support institutions and centralized management of modernization and reconstruction processes [8].

This requires a detailed analysis of the macroeconomic conditions during the active hostilities and an assessment of the potential development of the situation after they end. Such an analysis will help to identify the preconditions and challenges for future economic recovery and formulate recommendations for a development model for Ukraine.

The article aims to study the experience of implementing economic recovery models in post-conflict countries and develop recommendations for their implementation in Ukraine.

The study complements the existing literature by highlighting the practical application of post-war reconstruction models based on a comparative analysis of their components in Germany, Italy, and Poland. The paper examines critical macroeconomic factors and institutional prerequisites for Ukraine's post-war reconstruction and proposes recommendations for developing a model for Ukraine's economic recovery. Unlike previous studies, the article focuses on macroeconomic trends that will determine the capacity and potential of the Ukrainian economy for modernization. In view of this, it is important to substantiate the macroeconomic factors influencing growth and recovery, taking into account the experience of structuring post-war reconstruction models in other countries.

2. Literature review

In European countries, the way industrial policy was developed and implemented after the end of the war in 1945 was determined by the activities of institutions, historical traditions and shared values. Creating a common European market and adapting the United States legislative norms and organisational innovations, which were adopted in Europe, contributed to implementing a new economic growth model – the Marshall Plan. The new development model was based on industry, industrialisation and social welfare [1]. After World War II, the achievement of economic growth and social welfare goals envisaged by the recovery plans in Western Europe was ensured by state intervention in economic processes [2]. This contributed to political unification, integration of new countries, and prioritising human values over economic goals and standards. According to Hitchcock [3], in the historical context, the Marshall Plan was the first step in building common ideas and political, economic, and cultural ties and ensuring European security in cooperation with the United States. Between 1948 and 1951, the United States provided \$13 billion in funding for European countries, which is 2% of US GDP. Reconstruction funding enabled industrial growth from 87% in 1947 to 135% in 1951 [4].

The approaches and principles of practical implementation and the consequences of the Marshall Plan for the European Recovery Programme (ERP) and the Dodge Plan are studied by Borodina and Lyashenko [5]. The main goal of the Marshall Plan for Europe was to stimulate production, implement a policy of stable economic growth, and measures to increase foreign trade [6]. Thus, Pidorycheva [7] studies the experience of European restructuring after World War II, focusing on the analysis of the French re-equipment and modernisation plan called the Monnet Plan. The French experience of recovery in 1946 has a number of similar challenges and problems faced by Ukraine. Thus, the main ones include challenges in the energy, industrial, and agricultural sectors, efficiency and transparency of public administration, and development of state institutions in the context of their reform [8-10].

According to the conclusions and results presented in the article by Eichengreen and Uzan [11], measures to stimulate investment, increase imports, and finance infrastructure modernisation played an important role in the recovery of European countries. Measures to overcome the marketing crisis, which included political instability, shortages of consumer goods, and a possible financial crisis that could lead to a build-up of producer stocks, were also crucial for socio-economic development.

Proposals for implementing the Marshall Plan in Ukraine are outlined in Brenner [12] and relate to the development of effective institutions, urban development measures, especially the organisation of local authorities, and the creation of plans to protect and preserve territories. The scientific publications by Kulikov *et al.*, [13] and Jakupc [14] also consider the possibilities of implementing the Marshall Plan for the post-war reconstruction of Ukraine.

A separate area of research on post-war recovery is the system of international support for economic development mechanisms in practice, enabling factors, and indicators for assessing potential realisation [15]. Scientists study the factors influencing the reconstruction of economic systems after military conflicts in Bosnia and Herzegovina, the development of which was focused on traditional identity [16], economic recovery in African countries after conflicts [17], and infrastructure development after the conflict in Syria [18]. The implementation of the Marshall Plan for post-war reconstruction in Europe is worth highlighting [19]. The consequences of the war in Ukraine can only be equated with the reconstruction of European states in the context of economic recession, migration, and humanitarian crises caused by the Second World War [20].

Due to the practical effectiveness of the Marshall Plan, it has been used as a mechanism for providing large-scale financial assistance in other countries, including Africa [4]. For African states,

foreign government interventions in reconstruction have not resulted in rapid macroeconomic growth and social welfare [2]. The reasons for the lack of economic growth relate to the ties of African governments with international actors after the end of conflicts and the institutional inability to solve internal problems. The latter factors are important in the context of Ukraine's reconstruction. The state's role in the reconstruction of war-affected regions is highlighted in the studies by Mann and Berry [21], Zenawi [22], which describe the experience of Ethiopia and Rwanda.

Recent publications on post-war reconstruction offer various approaches to rebuilding Ukraine, including the concept of rebuilding "smart cities" based on sustainable development, which is possible through the digitization of governance. Technological innovation combined with socially oriented policies is seen as a factor in a sustainable and adaptive urban ecosystem [23]. Other authors emphasize the need for deep reforms of the public administration sector and the establishment of the rule of law as a prerequisite for post-war growth, supporting the idea of "institutional renewal" based on transparent, accountable government and public participation [24]. Effective institutional support and transparency in resource allocation are prerequisites for long-term economic effects from infrastructure development financing. In particular, Italy was able to implement the Marshall Plan in its post-war reconstruction and achieve such reconstruction effects [25].

The South African experience in implementing a national Reconstruction and Economic Recovery Plan in response to a systemic crisis is fundamentally different. The government's flexible economic policy instruments, focus on domestic demand, and social justice strengthened trust in the state in the post-crisis period [26]. Fiscal instruments for post-war growth, including tax reform and public expenditure management, are important in the context of synergies between tax incentives and social spending to support domestic demand and post-war employment [27].

A number of studies on the reconstruction of Syria emphasize the importance of local recovery and community development, taking into account the local cultural context of post-conflict development [28,29]. The importance of political and cultural factors influencing post-war recovery is noted in a study of the Polish reconstruction experience [30]. The authors also argue that centralized management of economic growth has an impact.

The comprehensive roadmap for Ukraine's recovery presented in the article by Becker *et al.*, [31] covers macro-financial stability, institutional modernization, infrastructure development, and legal reforms. The study by Lemishko *et al.*, [32] complements the strategic vision for Ukraine's post-war development with a focus on critical infrastructure, innovation potential, and human capital development.

In summary, post-war recovery models contain the following structural components of economic growth and modernization: public administration reform and institutional renewal to enhance transparency in resource allocation; economic and fiscal policy instruments to stimulate domestic demand; financing infrastructure development to meet the needs of the national economy; macroeconomic stability and local governance engagement.

2. Methodology

The article uses a descriptive-analytical structure to study macroeconomic indicators and trends in the future economic recovery of Ukraine. Quantitative statistical analysis methods were used to assess trends and dynamics of macroeconomic indicators in Ukraine during wartime, covering pre-war GDP levels for 2020-2024. The main sources of information are statistical data from the State Statistics Service of Ukraine, the Ministry of Finance of Ukraine, and the National Bank of Ukraine. The European Commission's reports for the period 2023-2024 served as an additional source for assessing the total amount of macro-financial assistance to Ukraine.

To this end, the article analyses the KSE Institute's macroeconomic indicators [33] for 2021–2027, identifying key growth factors and recovery challenges. A content analysis of scientific publications on recovery models in post-conflict countries was conducted to identify the main components of recovery models in post-conflict countries whose experience is similar to Ukraine's. The Google Scholar database was used to conduct the content analysis. The publications were searched using keywords for the period 1990–2024. The third stage of the study is devoted to developing recommendations for a potential model of economic reconstruction and development of Ukraine after the war. At this stage, proposals for a growth model and the main factors that can stimulate or hinder economic recovery after the war are discussed.

4. Results and Discussion

The decline in production activity, the economic downturn since the beginning of 2022, and the growing need for funding in the security and defense sectors and the social sphere amid rising unemployment have led to an increase in the budget deficit. According to the State Statistics Service, GDP amounted to UAH 5,450.849 billion in 2021, declining to UAH 5,239.114 billion in 2022 (-4%). In 2023, production volumes are estimated at UAH 6,627.961 billion (+27% compared to 2022 in actual prices), and in 2024 at UAH 7,658.659 billion (+16% compared to 2023 in actual prices). At the same time, real GDP growth is estimated at -28.8% in 2022, in particular due to rising inflation, which reached 21.7% [33-35]. The ratio of the state budget deficit to Ukraine's GDP was -7.27% in 2021, rising to -15.50% in 2022 and to a critical level of -25.52% in 2023. Since the beginning of the war, Ukraine has accumulated a significant amount of public debt in 2022–2024. The ratio of public and publicly guaranteed debt to GDP was 63.29% in 2021, 74.77% in 2022, increasing to 105.35% in 2023, of which 71% is external debt [36]. Despite the increase in public debt to UAH 6,980.96 billion in 2024, its ratio to GDP decreased to 91% thanks to increased production volumes.

According to the Kyiv Institute of Economics [37], economic growth is estimated at 3.6% in 2025, 6.1% in 2026, and 6.5% in 2027. Despite the growth, the budget balance of USD 37.5bn will require significant financing. The budget deficit is estimated at -17.9% of GDP. Grants and loans from foreign countries will play a crucial role in covering the budget deficit in 2025-2027, reaching USD 92.5 billion, of which USD 74.6 billion will be loans.

The increase in inflation in 2022-2024 due to rising electricity prices, industrial producer prices, and growth in nominal and real wages led to a change in the NBU's monetary policy. Inflation will continue to rise, which will require a tighter monetary policy. Signs of inflation expectations of economic agents and trends have led to an increase in the exchange rate to UAH 40.2/USD in 2024, with the potential to rise to UAH 42.7/USD in 2025. These trends will change the central bank's key policy rate in the first half of 2025 to 15%, which has been raised since the beginning of the war Russia to Ukraine to 19.6% in 2022 and 20.3% in 2023 (Table 1).

Table 1
Forecasts of key macroeconomic indicators of Ukraine for 2025-2027

Indicator	2021	2022	2023	2024	2025	2026	2027
Real GDP growth rate, %	3.4	-28.8	5.3	3.9	3.6	6.1	6.5
Nominal GDP, UAH billion	5.451	5.239	6.538	7.635	8.954	10.280	11.673

Table 1
Continued

Indicator	2021	2022	2023	2024	2025	2026	2027
Budget balance, billion USD	-7.1	-28.4	-37.9	-31.9	-37.5	-16.9	-11.5
Grants from foreign countries, USD billion	0.9	17.5	14.1	13.1	4.7	6.6	6.6
Borrowings from foreign countries, USD billion	2.3	17.4	30.7	28.3	40.7	19.3	14.6
Inflation, %	9.8	21.7	11.2	7.0	12.1	8.1	6.2
Exchange rate, UAH/USD (average)	27.3	32.3	36.6	40.2	42.7	45.9	46.4
Discount rate, % (average)	9.7	19.6	20.3	14.0	13.1	12.1	10.9
The current account of the balance of payments, USD bn	-3.9	8.0	-9.6	-13.2	-25.9	-19.4	-23.4
Change in international reserves, USD bn	2.5	-2.3	11.4	2.9	4.6	3.6	3.4
Unemployment, %.	9.9	20.6	18.2	14.3	13.1	12.1	10.9
Nominal wage, UAH (average)	13.973	14.846	17.417	21.177	23.748	26.322	29.098

Source: KSE Institute [37]

Financial support from partner countries was aimed at covering the state budget deficit. The new €50 billion aid package from the Group of Seven under the Extraordinary Revenue Acceleration Loans for Ukraine (ERA) lending mechanism will significantly strengthen macro-financial stability by financing the budget until 2027. At the same time, the loan will be repaid from immobilized Russian assets through the Ukraine Loan Cooperation Mechanism (ULCM) [38]. However, Ukraine will continue to depend on external financing, which creates significant financial risks.

In contrast, financing for reconstruction, estimated at USD 0.5 trillion, looks less favourable, in particular due to the lack of investment in economic recovery. Accordingly, the government's measures in 2025 should aim to find sources of financing for future growth.

The post-war growth of the Ukrainian economy cannot be ensured without attracting external financial resources and investments. During the period 2022-2023, European countries provided comprehensive financial support to the Ukrainian government, combining grants, concessional loans, guarantees, and budget support to stabilize the economic situation (€11.6 billion in grants and loans in 2022, €19.5 billion in short-term assistance, mainly in the form of concessional loans in 2023) [39]. In February 2024, EU member states agreed to provide €54 billion in financing until 2027 for modernization, reconstruction, and recovery [40]. In October 2024, a new macro-financial assistance package worth €18 billion was approved to repay €45 billion in loans previously received [39]. The EU-Ukraine loan cooperation mechanism provides for the immobilization of Russian sovereign assets

for EU loan repayments, under which €7 billion has already been disbursed. In total, Ukraine has received €162 billion in aid from the EU since the start of the war [40].

At the same time, Ukraine cannot rely solely on external sources of financing for reconstruction. The National Revenue Strategy until 2030, presented by the Ministry of Finance of Ukraine on December 27, 2023, No. 1218-r, provides for strengthening fiscal capacity, further reforms of the tax and customs systems, including digitalization, and the creation of incentives for post-war recovery. The reforms will include minimizing the interference of tax and customs authorities in business activities, improving tax administration, anti-corruption measures, introducing tax risk management, and implementing electronic business audits [41].

According to Kocherov *et al.*, [42], the success of post-war reconstruction depends on the efficiency of the economic system and its ability to attract investment to create the preconditions for development. Despite the continuation of the war, the Ukrainian economy began to recover in 2023–2024, indicating resilience and the ability to grow quickly. According to the State Statistics Service of Ukraine, in 2023, nominal GDP amounted to UAH 6,627.96 billion, growing in 2024 to UAH 7,658.66 billion [34-35]. According to the National Bank of Ukraine, real GDP growth was 2.9% in 2024 [43]. The growth was driven by high domestic demand and real wage growth, business adaptability to the conditions of war, central bank support for macrofinancial stability, and soft fiscal policy. At the same time, shelling of energy infrastructure continued, significantly worsening the security situation. This resilience was primarily a result of institutional changes and public administration reforms that improved the efficiency of accumulation and distribution of financial resources and the overall quality of management of the country's financial system, including the banking sector.

According to Lemishko *et al.*, [44], in the medium term, Ukraine's recovery strategy should be based on attracting funds from foreign donors in the form of grants, free financing, and charitable assistance, which should be directed to the agricultural sector. To modernise the economy in the long term, the authors identify foreign capital and foreign direct investment as sources of financing [26]. Tunisia's experience shows the positive impact of foreign direct investment in manufacturing and services on employment, which is a critical factor for socio-economic stabilization in the post-conflict period of development [45]. It should be noted that in the Ukrainian context, it is important to ensure the inflow of foreign capital into priority sectors of the economy (critical energy infrastructure, defense industry).

This position is not sufficiently justified in the context of the analysed macroeconomic trends in 2021–2024 and growth forecasts for 2025–2027. Direct investment in Ukraine amounted to \$4,484.7 million in 2023, decreasing to \$3,328.9 million in 2024 [46]. This indicates a deterioration in Ukraine's investment attractiveness due to growing uncertainty about the end of the war. As a result, the volume of reinvestment of investors' income decreased by almost 30% in 2024. At the same time, foreign investment in the agricultural sector, ICT, and wholesale trade decreased significantly, while investment in industry, finance, and insurance increased.

Our analysis shows that with an inevitable increase in the discount rate, attracting investment to Ukraine will become more complex. From June 2022, the discount rate rose from 10% to 25%, gradually falling to 16% in October 2023 and 13.5% in April 2024. Since March 2025, the discount rate has risen to 15.5% [47] (National Bank of Ukraine, n.d.). The difficulties are primarily related to the shelling of energy infrastructure and lower demand for credit resources compared to pre-war levels. In addition, the rising cost of borrowing capital will also be an obstacle to increasing domestic investment at least through 2025. A significant increase in investment can be expected in 2026–2027.

We share Pustovoi's [48] opinion that there is no direct link between the use of international aid and the accelerated post-war recovery of developing countries. Studies since the 1960s have shown

that aid has accelerated economic growth in countries that have implemented effective trade, monetary, and fiscal policies and have established the rule of law. In the context of Ukraine, the independence of the NBU's actions and changes in monetary policy in response to changes in macroeconomic indicators can positively impact growth. As the experience of conducting monetary policy under martial law shows, the central bank of Ukraine managed to ensure the stability of the banking sector, resume lending to the economy, and maintain international reserves. An overview of the banking sector as of May 2025 shows that the net loan portfolio of banks grew by 28.4% compared to May 2024. Positive changes were the result of increased lending to the agricultural sector, wholesale trade, construction, and machine-building enterprises. The profitability of the banking sector is ensured by a high level of operational efficiency [49]. During 2020-2024, the central bank increased its international reserves, which amounted to \$29,133 million in 2020, \$30,941 million in 2021, \$28,494 million in 2022, and \$40,514 million in 2023 [46].

In addition, the NBU is gradually planning currency liberalisation and measures to restore lending after the war. The lending development strategy aims to eliminate limited and uneven access to loans and restore the stable functioning of the credit market as one of the main mechanisms for financing economic recovery. First and foremost, the NBU plans to lend to priority sectors of the economy and adapt credit risk assessment mechanisms to the conditions of martial law (critical energy infrastructure, defense, agriculture, and manufacturing) [50].

In the context of a study of the use of international assistance [51], it is proposed to focus the limited amount of support to Ukraine on restoring enterprises capable of starting production and selling high-tech products in international markets. This position is well-founded and can be one of the mechanisms of post-war recovery. According to empirical calculations, channelling international assistance to expand exports of high-tech goods would create favourable conditions in Ukraine to increase the post-war annual growth rate of commodity output to 10% and reduce the period for recovery to the 2021 level from 12 years to 6 years [51].

According to Pidorycheva [7], Ukraine's recovery should begin with a structural transformation and transition from an agrarian and raw material economy to an industrial and innovative type, achieved by creating a modern high-tech digital Industry 4.0. Instead, Kindzerskyi [51] identifies the problems of economic policy in pre-war development that led to the country's technological lag and the economy's weaknesses in the war. This position is more reasonable and realistic. It should be noted that the technological lag of the Ukrainian economy is associated with the lengthy transition to a market economy and a post-industrial system. Primary industries account for 11.12% of the national economy, secondary industries for 15.01%, and tertiary industries for 60.62%. In other words, the most innovative sectors (ICT, education, finance, and other important service sectors) are lagging behind in development (Table 2). Despite the growth in production in the information and telecommunications sector from UAH 209.39 billion in 2020 to UAH 264.73 billion in 2023, UAH 309.35 billion in 2024, its share in the economy decreased from 5% in 2020 to 4% in 2024.

Table 2

Sectoral structure of Ukraine's national economy in 2020-2024, billion UAH

	2020	2021	2022	2023	2024	Deviation 2024-2020 (+/-)	Growth rate, %
Gross Domestic Product (GDP)	4222.03	5450.85	5239.11	6627.96	7658.66	3436.63	81.40%
Primary Sector	586.20	944.52	679.03	784.04	851.79	265.59	45.31%

Table 2
Continued

	2020	2021	2022	2023	2024	Deviation 2024-2020 (+/-)	Growth rate, %
Share of primary sector industries, %	13.88%	17.33%	12.96%	11.83%	11.12%	-	-2.76%
Agriculture, forestry, and fishing	393.08	593.37	449.15	500.54	544.62	151.54	38.55%
Mining and quarrying	193.12	351.15	229.88	283.50	307.17	114.05	59.06%
Secondary Sector	685.06	910.93	713.73	981.56	1149.90	464.84	67.85%
Share of secondary sector industries, %	16.23%	16.71%	13.62%	14.81%	15.01%	-	-1.21%
Manufacturing	426.48	560.53	398.36	550.96	644.19	217.71	51.05%
Electricity, gas, steam, and air conditioning supply	122.88	180.94	229.91	308.94	358.50	235.62	191.75%
Water supply; sewerage, waste management	16.26	19.14	16.16	17.78	18.75	2.49	15.33%
Construction	119.44	150.31	69.30	103.88	128.45	9.01	7.54%
Tertiary Sector	2355.47	2829.29	3233.44	4057.10	4642.37	2286.90	97.09%
Share of tertiary sector industries, %	55.79%	51.91%	61.72%	61.21%	60.62%	-	4.83%

Source: calculated by the author [33-35].

A rapid transition to an industrial innovation economy is impossible for several reasons. First, the curricula for training highly skilled personnel in higher education must be updated and modernised. As Fritsch *et al.*, [52] argue, radical higher education system reforms take a long time, hindering innovation in the country. In addition, the financial incentives for teaching staff at Ukrainian universities should be reconsidered.

Secondly, the migration of highly qualified personnel due to the war has exacerbated the problem of human resource shortages that could be involved in innovative activities. According to the Centre for Economic Strategy (CES) [53] (2023), at the end of June 2023, 5.6–6.7 million Ukrainians were abroad due to the war. According to Becker *et al.*, [31], the mass influx of refugee students, researchers, and other workers with high levels of human capital could become a factor in improving

relations between Ukraine and the EU in the field of research and development. The project for the return of forced migrants from abroad to Ukraine, including the goal of involving them in the defense sector, does not contain details on incentives and encouragement for citizens to return [54]. The National Institute for Strategic Studies of Ukraine (2024) notes the need to develop a return and repatriation strategy and the importance of integrated planning and strong institutional cooperation between the Ukrainian government and foreign states [55].

Thirdly, Ukraine still faces problems with state support for innovative activities of enterprises, and mechanisms for technology and innovation transfer between the state, the private sector and research institutions are not developed. This can hinder the return of highly skilled migrants from abroad and requires the state to review the conditions for their involvement in innovation. According to the State Statistics Service of Ukraine, the share of expenditure on research and development amounted to 0.37%, of which 0.22% was business expenditure and 0.12% was government expenditure. Overall, only 0.14% of GDP was allocated to finance R&D from the state budget in 2024 (0.16% in 2021) (Table 3).

Table 3

Dynamics of expenditure on research and development in Ukraine's gross domestic product in 2021-2024, %

Indicator	2021	2022	2023	2024	Deviation, 2024 (+/-)	2021-
Share of intramural R&D expenditure in GDP	0.38	0.33	0.32	0.37	-0.01	
business enterprises	0.21	0.18	0.19	0.22	0.01	
Government	0.14	0.12	0.11	0.12	-0.02	
higher education	0.03	0.03	0.02	0.03	0.00	
Share of expenditures on research and development at the expense of the state budget funds in GDP	0.16	0.21	0.12	0.14	-0.02	

Source: [56]

Modern post-war recovery should be based not only on traditional industrial investments, but also on the development of digital platforms that allow for the rapid mobilization of financial, human, and material resources. In particular, Popescu [57] notes that digital economy platforms can provide flexible employment and promote economic growth, provided that an effective regulatory framework is in place. It should be noted that digital platforms are also important in ensuring transparency and accountability in the use of financial and other assistance from partner countries, donors, and international organizations.

Important for Ukraine's recovery is the experience of Germany in post-war reconstruction, which managed to ensure growth thanks to the political foundations and political stability of the Marshall Plan and the US participation in the establishment of the new order [58]. An important aspect of this strategy was marginalising communist parties and creating a Western alliance to curb Soviet expansion. Thanks to American assistance, the shortage of raw materials was eliminated, and funds were invested in solving industrial bottlenecks. In return, Germany had to ensure trade liberalisation. The resources of the auxiliary funds were used to finance public investment projects. Therefore, there was no need to cut social welfare [58]. Thus, political and institutional factors play an important role in reviving economic growth. In addition, it is important to consider the productivity of production factors in Ukraine's recovery. According to the findings, West Germany became a leader

in industrial productivity even before the reforms of 1948 [59]. Innovation is an important factor in capitalist West Germany's growth, which was characterised by a point-like nature in socialist East Germany (Table 4) [24].

Table 4

Summary of post-war recovery and modernization models of different countries

Country	Volume of Reconstruction / Recovery / Modernization Funding	Success Factors / Reasons for Failure
Germany	2 trillion euros, including 300 billion euros allocated for the modernization of infrastructure in Eastern Germany	Support for political stability and institutions, promotion of production, trade liberalization, financing of public investment projects, emphasis on social welfare support, and fostering income convergence among the population.
Italy	Grant funding during the period 1948–1952	The success of reconstruction depended on local governance and the provinces' capacity to modernize infrastructure as a factor in increasing agricultural production, attracting investments, expanding the number of industrial enterprises, and developing the service sector.
Poland	EU funding amounting to 160 billion euros during the period 2003–2017	EU accession, combined with political, economic, and financial-investment integration, significantly contributed to Poland's successful development and the effective utilization of EU financial instruments following accession.

Eastern European countries lagged far behind in economic reconstruction due to low levels of investment in inefficient centrally planned economies [60]. According to Jackson [61], from 1945 to 1973, Western Europe was undergoing reconstruction, while Eastern Europe faced numerous challenges. This is due to European integration processes and differences in the accession of Western and Eastern European countries to the EU. The example of Poland shows how accession to the EU in 2004 contributed to economic growth and the effective use of financial support instruments from the Union.

5. Conclusions

Despite the economic downturn in 2022, the Ukrainian economy showed slight growth in 2023–2024, driven by international financial assistance, domestic consumer demand, real wage growth, and business adaptation to martial law. With the support of stability achieved through comprehensive assistance from EU partner countries, the growth of public debt, a decline in direct investment due to the deteriorating security situation, and restrictions on lending remain problematic areas. It is clear that EU international financial assistance will remain a critical factor in Ukraine's economic recovery (grants, concessional loans, guarantees, new EU financial initiatives). External support cannot guarantee Ukraine's full post-war reconstruction. At the same time, strengthening financial capacity and tax and customs reforms will help mobilize domestic sources to cover public spending. The policy of restoring domestic lending, despite the increase in the discount rate, will make it possible to cover the financial needs of priority sectors of the national economy in the coming years. The predominance of the secondary and tertiary sectors in the sectoral structure of the national economy demonstrates a slow transition to a post-industrial system. Ukraine's technological backwardness and low levels of state support for innovation are slowing down

structural transformations and economic growth. In the context of growing uncertainty about the end of the war, Ukraine's economic recovery model should be based on systemic tax reforms to reduce the administrative burden on business, targeting international financial assistance to priority needs and high value-added sectors (processing, defense industry), as well as financing critical infrastructure. Foreign experience in recovery confirms the importance of infrastructure investment and development in promoting increased production, investment, and innovative development. Further research should focus on developing a model for Ukraine's economic reconstruction, considering geopolitical, institutional, innovation, investment and other growth factors.

Author Contributions

Conceptualization, Nina Petrukha and Nataliia Fedirko; methodology, Nina Petrukha; software, Iryna Piatnychuk; validation, Nina Petrukha and Nataliia Fedirko; formal analysis, Nataliia Fedirko; investigation, Pavlo Lyashenko; resources, Dmytro Plakhotnii; data curation, Iryna Piatnychuk; writing—original draft preparation, Pavlo Lyashenko; writing—review and editing, Dmytro Plakhotnii; visualization, Pavlo Lyashenko; supervision, Nataliia Fedirko; project administration, Dmytro Plakhotnii. All authors have read and agreed to the published version of the manuscript.

Funding

This research received no external funding.

Data Availability Statement

All data generated or analysed during this study are included in this article.

Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgement

This research was not funded by any grant.

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