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RESEARCH ARTICLE

Assessing the Impact of Infrastructure Damage on National Investment Attractiveness During Martial Law

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ABSTRACT

The destruction of infrastructure and industrial facilities, which directly affects the livelihood of society, does not allow businesses to plan their investments confidently. The research aims to assess the destruction of infrastructure during the war and its impact on Ukraine's investment attractiveness. Potential challenges to the project management system and the coordination of domestic and international investments in the post-war period caused by the destruction of infrastructure are outlined. The necessity for the transformation of management structures at the local and regional levels, as well as the improvement of regulatory and legal support for infrastructure functioning under potential military threats, has been identified. The foundations of adequate energy security in integrating into the single European energy space, sustainable energy independence, and the engagement of renewable energy potential have been analysed. The prospects for optimising the state of critical energy infrastructure in Ukraine are considered, including the diversification of supply, the modernisation of the energy system, and improving legislation by European requirements. Directions for developing the investment climate in Ukraine and attracting foreign investors during wartime and post-war periods have been identified. It has been proven that the vulnerability of critical energy infrastructure causes price instability in the energy market, destructive environmental impacts, geopolitical risks, and socio-economic instability, synergistically leading to a decrease in the country's investment attractiveness. Improving strategies and approaches to ensuring infrastructure security during wartime will allow for optimising the investment climate and integrating effective methods to ensure sustainable development during the post-war recovery period.

INTRODUCTION

A full-scale war is the main negative factor affecting Ukraine's investment attractiveness, as confirmed by a survey conducted by the European Business Association (2022) in the first half of 2022. Specifically, the integral index of Ukraine's investment attractiveness for the year's first half decreased from five possible points by 0.56 points to 2.17, the lowest value since 2013. The share of business representatives who assess Ukraine's investment climate as unfavourable increased from 5% to 53% in the first six months of the war (European Business Association, 2022).

The most significant investment risks arise from the unpredictable wartime destruction of infrastructure, primarily critical energy infrastructure. It is currently necessary to stimulate the formation of strategic decisions to increase the stability of the national energy system and position energy security as a critically important area of managerial activity. Assessing the destruction of infrastructure during the war in the context of its impact on the investment climate will allow

identifying bottlenecks in the existing energy and national security paradigm, highlighting vectors for optimising the situation, and identifying reserves for increasing the country's attractiveness for external and internal investments.

LITERATURE REVIEW

In scientific literature, the problem of assessing infrastructure damage due to military actions related to investment policy is quite fragmentarily covered. General approaches are presented in the works of Skryl & Bura (2022), Liu et al. (2022), where scientists consider assessing losses in various types of infrastructure and evaluate the functionality of international organisations and national institutions. Significant contributions have been made by the works of Havrysh et al. (2024), which position the enhancement of the country's investment attractiveness as the foundation for the process of post-war regeneration. Certain theoretical and practical aspects of foreign experience in investment recovery are highlighted in the works of contemporary researchers Balytska & Brovenko (2021), who focus on the analysis of existing measures for infrastructure restoration and the assessment of costs for their development and reconstruction during and after the war.

Some researchers specifically note that Russia's military aggression, which has led to significant destruction of infrastructure facilities, has identified the urgent need for transformation in the legislative field and government management decisions. The problems of investment climate and energy security in Ukraine are being studied by Dudynets (2018) and Kovalenko et al. (2024). Scholars argue that ensuring the overall resilience of the energy system is a stimulating factor for optimising the investment climate during periods of crisis and instability.

Overall, contemporary research prioritises protecting critical infrastructure from war damage as essential for the country's further successful development. However, assessing the impact of large-scale destruction in this field in correlation with the country's investment attractiveness requires investigation under specific conditions, highlighting the relevance of further in-depth scientific examination.

This study assesses the destruction of infrastructure during the war and its impact on Ukraine's investment attractiveness.

MATERIALS AND METHODS

During the research, several general scientific methods were employed, including analysis and synthesis (to study current theoretical concepts and scientific developments related to the issues of the investment climate in crisis conditions and the assessment of infrastructure destruction due to war, refining the terminological framework, and assessing the impact on socio-economic development); comparison (to systematise conceptual approaches to defining basic concepts and criteria for choosing a practical direction for optimising the investment climate in conditions of instability, identifying related risks and obstacles); and the structural-logical method (to develop proposals for improving the organisational mechanism).

RESULTS

Given the direct dependence of the investment climate on the risk of infrastructure destruction, including critical energy infrastructure, on which virtually every business depends, supporting a favourable investment climate is an important function in crisis conditions of war. International investments are positioned as an effective tool for ensuring the normal functioning of production and the rapid regeneration of infrastructure during the war and post-war period in Ukraine (Markushyn, 2023).

Ukraine's infrastructure is one of the sectors most affected by the amount of damage caused by the war. The destruction of industrial and manufacturing facilities, increased risks for safety and logistics, and especially the destruction of critical energy infrastructure are influential demotivating factors for investment activities. By early January 2024, the assessment of direct damages inflicted on Ukraine's infrastructure by military actions reached almost $155 billion (Figure 1).

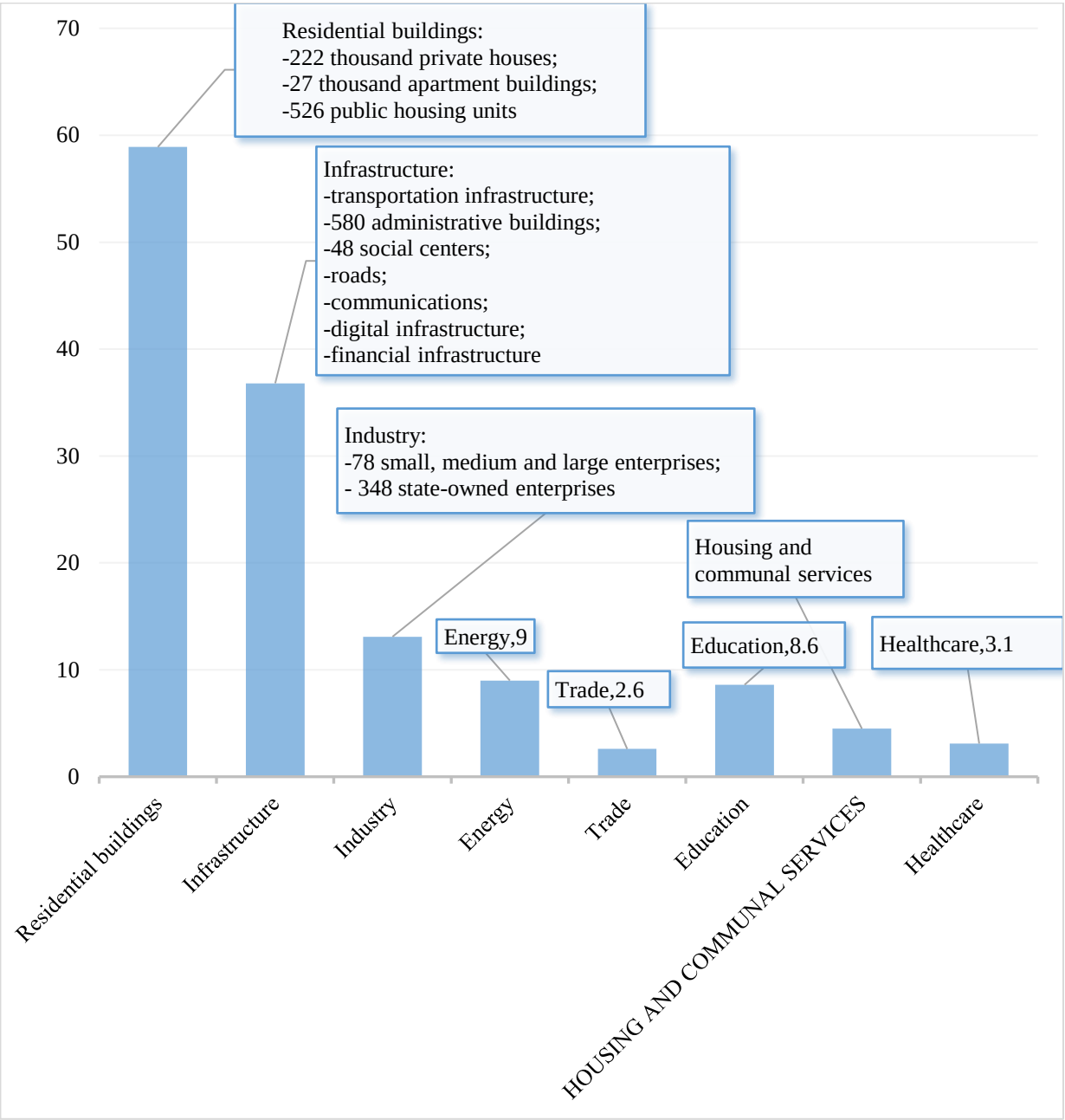

Figure 1: Assessment of Infrastructure Damage by Sector, as of April 2024, UAH billion

Source: systematised, summarised and grouped by data (State Statistics Service of Ukraine, 2024)

A comparative analysis of the investment climate before and after the start of the war in Ukraine convincingly demonstrates a negative trend. Previously, during 2021, the volume of foreign direct investment amounted to USD 6.7 billion, GDP was USD 200 billion, and the share of exports increased by 34.7% compared to 2020. All this contributed to active socio-economic growth and optimising the country's investment climate. However, after the Russian invasion and the start of the full-scale war, the net inflow of foreign direct investment for the eight months of 2022 was estimated at USD 47 million (for comparison, net inflows for the eight months of 2021 amounted to USD 4.4 billion). The net inflow of equity capital for the eight months of 2022 amounted to USD 215 million (for the same period in 2021, it was USD 585 million). As the statistics of the external sector of economic activity presented in Fig. 2 show, the investment sphere has undergone a significant destructive impact: for example, the net inflow of foreign direct investment in August 2022 is estimated at USD 116 million, while in August 2021, it was USD 892 million (Figure 2).

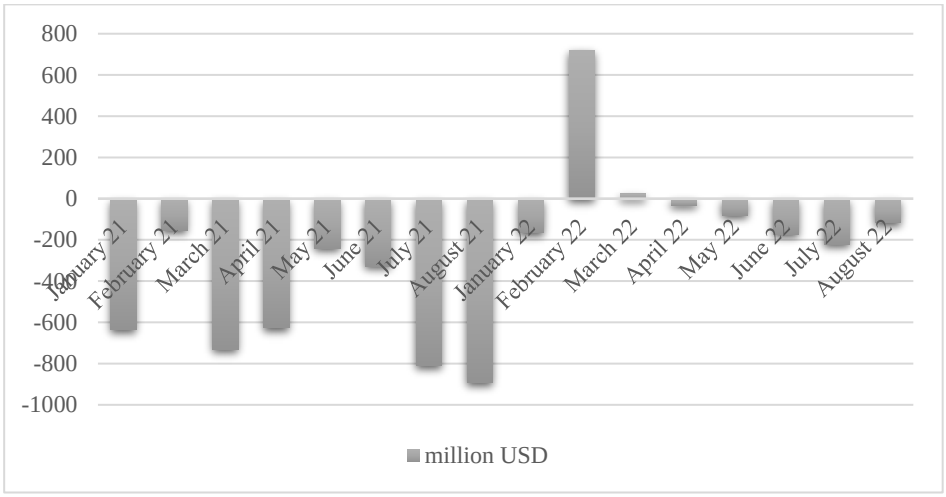

Figure 2: Direct Investments (Balance), USD million

Source: systematised by the author based on (National Bank of Ukraine, 2022)

According to information on portfolio investments, the consolidated balance of trade between residents and non-residents in January-August 2022 was positive (USD 1325 million) as opposed to the corresponding period of the previous year (USD -2769 million) (Figure 3).

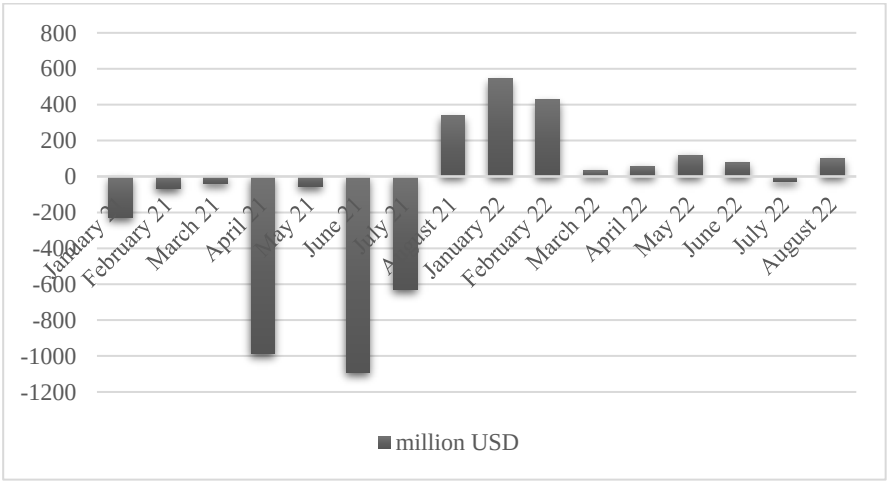

Figure 3: Portfolio Investments (Balance), USD million

Source: systematised by the author based on (National Bank of Ukraine, 2022)

As convincingly demonstrated by the practical experience of foreign countries, private investments are essential for supporting business during periods of crisis and uncertainty. Against the backdrop of war risks, the issue of guaranteeing returns arises; therefore, to promote the development of the country's investment attractiveness and ensure appropriate functional conditions for the investment process, the state must intensify activities to introduce relevant legal changes.

A significant decision in the framework of optimising the investment climate in Ukraine was the ratification of the Convention on the Recognition and Enforcement of Foreign Judgments by the Law of Ukraine “On the Ratification of the Convention on the Recognition and Enforcement of Foreign Judgments in Civil or Commercial Matters” from 01.07.2022 No. 2342-XI. The main goal of such measures is to create the most favourable investment environment for the socio-economic recovery of Ukraine. It is seen as necessary to expand the areas of investment planning with significant investment volumes, particularly in electronic communications, operations in producing energy-efficient building materials, climate equipment, and critical communication systems equipment, especially in the energy sector. A competent management policy in this direction will promote investment activation for large and medium-sized enterprises.

Stimulating the optimal investment climate in the national space should be implemented through active financial stimulation. To support investment policy, in synergy with the restoration of critical infrastructure, the priority of management activities in this area should be the formation of the

National Fund for Structural Transformation of the Economy (Law of Ukraine "On State Support of Investment Projects with Significant Investments in Ukraine", 2020; Investments in Ukraine and economic recovery), based on:

1) a program to support industrial investment projects;

2) interest-free lending for projects related to the construction, regeneration, or modernisation of enterprises that ensure the functioning of critical infrastructure;

3) a program for compensating interest on investment loans;

4) financial support for technology transfer and industrial park activities to increase the country's national and energy security.

Developing an industrial park network is an innovative solution for the fastest and most effective infrastructure recovery, which, in synergy with optimal investment management policy, forms a powerful potential for post-war recovery (Suprun & Yatsenko, 2022). The outlined strategy will contribute to the rapid regeneration of production and its relocation. Creating an industrial park network will attract domestic and foreign investments, providing opportunities to expand the value-creation chain in Ukraine. Overall, this outcome will promote price stability and increase the share of capital investments, significantly boosting budget revenues and optimising macroeconomic indicators, particularly GDP growth. As a result, an intensification of European integration processes and forming a favourable investment climate in Ukraine is expected.

It is worth noting that, to attract the attention of potential foreign investors, Ukraine has formed and implemented an initiative to create a unique electronic platform called Advantage Ukraine. Currently, this platform serves as a kind of investment hub, accumulating over 500 investment projects in promising sectors of the economy (Investing in Ukraine and Economic Recovery, 2024). In the future, maximum attention should be focused on forming high-tech military-industrial parks and attracting investments in constructing military factories. Integrating European and global military technologies will stimulate innovation, while defence clusters will promote industrial development (Makrushyn, 2023). These trends will increase national and energy security and maintain the country's investment attractiveness.

Moreover, Ukraine has significant potential for renewable energy and could become a stable supplier to Europe. To attract investments as quickly and extensively as possible, Ukraine should deepen the deregulation processes, resume privatisation, and create conditions for prompt investment.

DISCUSSION

Several contemporary authors, including Thaler and Hofmann (2022), Okhrimenko and Popov (2022), Shevchenko and Kukurudz (2024), study the impact of wartime crisis conditions on the dynamics of investment indicators. Lobunets and Honchar (2022) focus on the peculiarities of business investment during the war, Mykytenko (2023) explores aspects of post-war recovery and the development of critical infrastructure in Ukraine, and Shpatakova et al. (2023) analyse the prospects for the restoration of critical infrastructure in the de-occupied territories of Ukraine.

Authors Dankevych et al. (2023), while analysing economic, food, and environmental security in the context of Ukraine's post-war reconstruction, pay attention to global experience and identify the priority impact of financial instruments in investment policy. Researchers note the qualitative dynamics of economic development efficiency in crisis conditions regarding investment risk assessment and innovative financial technologies. Continuing this, Drachuk and Cheiliakh (2023) highlight the directions for forming a shared vision of Ukraine's "green" recovery, where investment processes play a prominent role.

It is worth paying attention to the scientific developments of foreign scientists Esposito, Dicorato (2020), Guarini et al. (2021), De Rosa et al. (2022), Paravantis and Kontoulis (2020), which correlate with the domestic theory of prioritising investment processes in the system of economic transformations against the backdrop of war. Most of them consider investment tools to be the key to successfully restoring the national economy during periods of crisis and instability, and they place particular emphasis on the need to ensure the security of critical energy infrastructure as the foundation of business operations.

Despite significant achievements by scientists, increasing Ukraine's investment attractiveness during the war and its prospective post-war recovery is seen as one of today's most pressing economic problems. Finding ways to optimise the situation requires active scientific research.

CONCLUSION

The vulnerability of critical energy infrastructure causes price instability in the energy market, destructive impacts on the environment, geopolitical risks, and socio-economic instability, which synergistically leads to a decrease in the country's investment attractiveness. The research results convincingly show that any investment in the national economic system during wartime and post-war recovery effectively stimulates socio-economic development. Investments are currently positioned as the primary tool for structural and qualitative transformations of the economy. During the war, Ukraine demonstrates coordinated interaction between institutions at various levels, aimed at comprehensive support for all economic activity during periods of instability and crisis.

The development of adequate energy security in the direction of integration into the single European energy space, sustainable energy independence, and the utilisation of renewable energy potential will allow for the optimisation of the state of critical energy infrastructure in Ukraine, diversification of supply, modernisation of the energy system, and improvement of legislation by European requirements. Improving strategies and approaches to ensuring infrastructure security during wartime will optimise the investment climate and integrate effective methods for sustainable development during the post-war recovery period.

Author Contributions

V. B.: Conceptualization, Methodology, Resources, Formal analysis, Writing – Original draft, Writing – Review & Editing.

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