MODERN ARCHITECTURE OF THE INFRASTRUCTURE OF UKRAINE AND ITS DEVELOPMENT STRATEGY IN THE POST-WAR PERIOD

ABSTRACT

The main components of the infrastructure are considered: education, housing and communal services, communication, medical, transport, recreation system, ecology, social security, and culture. The infrastructure of the regions was analyzed and the main disproportions of development and the shortcomings of inappropriate distribution and an attempt to use the allocated investments were revealed based on the integral index.

The author’s own definition of the essence of the concept of «infrastructure» is provided. Much attention is paid to the analysis of the development strategy of the financial infrastructure of Ukraine in the pre-war period. It has been proven that at this stage a number of reforms were carried out, which contributed to the stabilization of the banking system, the financial sector, changes in the standards of the corporate sector, an efficient and developed infrastructure of the capital markets and commodity markets, the recovery of credit activity of banks and non-bank financial institutions, an increase in the volume of non-cash transactions, expanding the list of remote financial transactions, protecting the rights of consumers of financial services, increasing competition in the banking and non-banking financial markets. An comparative analysis of the allocation of investments from the state budget for the development of the infrastructure of the USA and Ukraine was carried out. A strategy for the development of Ukraine’s infrastructure is proposed, which will contribute to financial stability.

Keywords: infrastructure, region, infrastructure components, financial stability, innovative development, reform, financial sector, development strategy

JEL Classification: O57, P33, R42

INTRODUCTION

The infrastructure in the economic system is a very important condition for its reproduction. It ensures civilized relations between business entities through its functions. Infrastructure has always been considered an important element of every economic system and reflected the multi-format ideas about oneself. Multi-format is manifested in the creation of common bases with the ability of industrial enterprises to perform their main functions, as well as in the provision of specific services that are provided by the production and economic complex of a special diversified structure, which guarantees the implementation of an uninterrupted and sustainable business process. Infrastructure unites all significant and leading sectors of the country’s economy and provides the state with stabilization, and sustainable, balanced development. If there are deficiencies in the operation of infrastructure facilities, they have a negative impact on the state of the country’s economy. The level of infrastructure development is a litmus test of the state of the state’s economy. The higher this level, the faster and much larger the volume of investment resources arrive: the use of labour potential at enterprises and businesses accelerates, and the standard of living of the country’s population increases. Infrastructure is of great importance for the economic development of regions, and communities and the placement of productive forces. Today, in the context of hostilities in Ukraine, this question is of primary importance.
LITERATURE REVIEW

According to publications and recent scientific studies, the issue of infrastructure development is very important and relevant for both Ukrainian scientists and foreign specialists in economics, the Ministry of Infrastructure of the Economy, the Government of Ukraine, and deputies. The problematic issues of infrastructure formation and its impact on the environment were studied by вітчизняні scientists, namely: Vasiliev O.V. [1], Geets V.M., Seminozhenko V.P. [2]. Also important are the issues of infrastructure formation, taking into account the specifics of budgeting for various models of innovation processes. It is also determined that the use of levers of state support for small and medium-sized enterprises in a dynamic environment allows not only the formation and development of infrastructure that affects all spheres of activity but vice versa. It is these questions that have been studied by scientists Gerasymova V.O., Gorbunova A.V., Shcheblykina I.O. [6], Gudz P.V., Ileva-Naydenova P., Cherep A.V. Oleinikova, L.H. [3], Hasenpusch T.P. [5], Hartmann P.T., Maddaloni A.E., Manganelli S.P. [4], Christidis P., Rivas J. [7].

Infrastructure studies that involve the use of management and marketing functions and principles are significant. We believe that the formation of infrastructure is also possible taking into account the attraction of investment resources in order to implement strategic and tactical innovative projects. These questions were investigated by scientists: Coffelt, Donald, Hendrickson, Chris [8], Edward L. Glaeser, James M. Poterba [9], Fabozzi J., Modigliani E. [10], Khakhanov V.I., Englezis I.P., Lytvyna E.I., Chumachenko, S.V., Guz, O.A., Khakhanova A.V. [11], Kuznyetsova, A., Boiarko, I, Rudevskaya, V. and Maslov, V. [24], Kurmaev P. Yu. [12], Kennedy, G., Adam, Smith [13], Merk O., Saussier S., Staropoli C., Slack E., Kim J. [14], Phelps, Edmund, Bojilov, Raicho, Hoon, Hian, Teck and Zoega Gyff [15], Prokopenko, O.V., Shkola, V.Yu., Degtyarenko, O.O., Makhnusha, S.M. [16].

Infrastructure has a significant impact on the environment and regional security, as well as the development of the urban economy. Infrastructure has a significant impact on the environment and regional security, as well as the development of the urban economy. The question aroused the interest of the following scientists: Rich, Kelly M., Rizzuto, Nicole M., Zieger, Susan [17], Samuelson, Paul A., Nordhaus William D. [18], Singer, P.L. [19], Sung N., Rios M. [20], Yamin, M., Rudolf, R. [21].

AIMS AND OBJECTIVES

The purpose of the article is to review the components of the infrastructure, analysis of infrastructure development in the pre-war and modern periods, and the development of infrastructure development strategy in the post-war period. To achieve this goal, the tasks were outlined, namely:

- to consider the main components of infrastructure;
- analyze the infrastructure of the regions and the strategy for the development of Ukraine's financial infrastructure in the pre-war period;
- to provide the author's definition of the essence of the concept of "infrastructure";
- substantiate the feasibility of reforms;
- to conduct a comparative analysis of the allocation of investments from the state budget for the development of infrastructure in the United States and Ukraine;
- to propose a strategy for the development of Ukraine's infrastructure.

METHODS

Having generalized the approaches of scientists to the architecture of the infrastructure of Ukraine, non-formalized and formalized methods have been allocated, and a comparative analysis of the directions of public financing of the United States and Ukraine infrastructure strategies has been carried out.

In the process of scientific research, non-formalized methods were used, which are based on the use of qualitative methods, namely: in-depth interviews; monographic research (observation); and study of the rules, traditions, ceremonies and rituals that have developed in the process of formation of financial infrastructure; study of management practices that have developed during the formation of the US infrastructure; observation of meetings, including interviews.

Formalized (quantitative) methods were also used, which are characterized by the use of various standardized questionnaires, including sociological research (questionnaires, tests, role-playing games, training, sociometry), which made it
possible to assess the current state of the infrastructure of the United States and Ukraine, analyze the degree of Ukraine's infrastructure destroyed by Russia, carry out a preliminary assessment of the financial resources required for reconstruction and develop a model for the development of a financial strategy infrastructure of Ukraine.

The investment attractiveness of regions, communities, and the pace of development of social production depend on the degree of infrastructure development. This issue is always relevant and requires detailed research. Times are changing, infrastructure with its elements is developing and changing, its components are changing, and therefore new research is needed.

RESULTS

Infrastructure is a key and basic element of the country's economic development. It has a close relationship with the state of productive forces and the territorial division of labour, the efficiency of the functioning of material production. The infrastructural architecture of the state's economy depends on the pace of modernization and is the main provider of economic growth. The development of Ukraine's infrastructure architecture depends on the specifics of industries and regions and is accompanied by changes in the production sphere. Infrastructure always concretely affects the efficiency of the existence of economic entities through the participation of production and social services in the creation of consumer value and product price. The component architectures of the infrastructure complex are based on the main elements that will help raise our country to a new, more progressive level of development and carry out modernization and renewal.

Infrastructure as a foundation for development plays a critical role in creating favourable conditions for investment and business, improving the quality of life of citizens and increasing the country's competitiveness in a global context. Infrastructure development contributes to GDP growth, and job creation, and improves the lives of the population.

There are several important challenges on the way to infrastructure development in Ukraine that need to be taken into account: financing, corruption, and environmental aspects.

For large infrastructure projects, significant investment is required. The Government of Ukraine should ensure sustainable financing and attraction of investments from external sources.

One of the main enemies of infrastructure development is corruption. Effective anti-corruption measures and transparency in project implementation are key to successful infrastructure development.

When expanding infrastructure, it is important to consider the environmental impact. Strategies should contribute to the conservation of nature and the reduction of negative environmental impacts.

Infrastructure always causes discussion in economic circles, needs attention and careful analysis, and practical experience. In Ukrainian scientific research and foreign scientific works, many scientific articles by specialists were published, and monographs and textbooks were published, as evidenced by the data in Table 1.

Table 1. Scientific achievements of infrastructure researchers.

<table>
<thead>
<tr>
<th>Researchers</th>
<th>Name of the article, textbook, monograph</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Samuelson P. [18]</td>
<td>Economy</td>
<td>1992</td>
</tr>
<tr>
<td>Knyazevich, A.O. [22]</td>
<td>Management of infrastructural provision of innovative economic development</td>
<td>2018</td>
</tr>
<tr>
<td>Ozhevan M.A. [24]</td>
<td>Philosophical, cultural and political prerequisites for the formation of a convergent society</td>
<td>2017</td>
</tr>
<tr>
<td>Yurinets Z.V. [26]</td>
<td>Prospects for the formation of innovative infrastructure in Ukraine</td>
<td>2018</td>
</tr>
<tr>
<td>Yu. G. Bocharova [25]</td>
<td>Incremental and iterative models of implementation of the strategy for the development of innovative infrastructure of Ukraine in the conditions of global competition</td>
<td>2018</td>
</tr>
<tr>
<td>Yaroslav Zhalillo, Daniyła Oliynyk [27]</td>
<td>Institutional tools for infrastructural development of “Smart” cities and communities</td>
<td>2021</td>
</tr>
</tbody>
</table>
The concept of "infrastructure" was first studied by P. Rosenstein-Rodan and German economists. It defines infrastructure as the conditions of the surrounding social environment necessary for private industry to be able to make the first breakthrough. He refers to the concept of infrastructure not only to highways, dams and railways but also to sewers and other public utilities [29].

Samuelson P. focused his point of view on costs, namely: the government bears public expenditures for the implementation of important projects to increase "public auxiliary capital" (roads, schools, hospitals, dams for power plants and river dredging, construction of railways, improvement and preservation of soil), which is a prerequisite for economic growth and development of the country. The state's participation in such projects is either associated with the creation of intangible benefits from which monetary gains cannot be expected, or these projects are unattractive to investors due to their long payback period, or their scale is very large for private capital markets [18].

Pisenti A. focused his point of view on a set of conditions that ". The classical capital investments demanded of the state by capitalism must have as their object "public works," that is, the creation of the complex of conditions that are now called "infrastructure" in the world (road network, vehicles, land management, financial and credit institutions, and so on). These works reduce the overhead costs of capitalist enterprises, i.e. improve the economic environment in which they operate, facilitating the process of capital turnover..." [30].

Novikova V.I. believes that infrastructure is the material and technical base necessary for the functioning of the specialized (sectoral) system itself, without which it is impossible to produce specific products (goods or services) to meet specific needs as the end result of the functioning of the system itself [31, 32].

The encyclopedia provides a broad understanding of this economic category and states that infrastructure is a complex of sectors of the national economy (spheres of material and non-material production) that serve industry and agriculture [33].

Klymko G.N., Nesterenko V.P., Kanishchenko L.O. offer their definition: infrastructure is a set of industries and activities specialized in specific actions of systems in a broad sense, which directly provide the conditions and processes of the main system, having a subordinate, auxiliary nature in relation to it and which serve production (production infrastructure – transport, communications, roads, power lines, etc.) and the population (social infrastructure – a complex of health care institutions, trade, etc.) [34].

Scientist B. R. Brunets provides the following definition: infrastructure is a single integral system, which is based on the function of ensuring the production and non-production spheres of human activity in order to achieve the maximum possible economic effect, taking into account the moral and spiritual benefits of the population, health care and ensuring conditions for the protection and reproduction of the environment [35].

Therefore, having studied the genesis and points of view of foreign and domestic scientists, we consider it appropriate to provide the author's definition of the essence of the concept of "infrastructure". In our opinion, infrastructure is a special system of institutions that includes elements and main types that ensure the functioning of the country's complex of industries based on the use of digital and innovative technologies and contribute to the sustainable development of the economic system as a whole.

The main components of infrastructure development include education, housing and communal services, communication; medicine, transport, recreation system, ecology, social welfare, and culture. They are the basis of an important system for the further development of regions and the country. The regional infrastructure provides the basis for people's livelihood, as well as the livelihood of the complex of production and industrial enterprises and the region itself. Regional infrastructure contributes to increasing the level of information space, solving scientific and technical problems, and helps to optimize intra-regional economic ties, which positively affects the increase in labour productivity and the standard of living of the country's population.

According to the studies of leading specialists, the main problems of the infrastructure of the regions exist in the transport industry, namely the unsatisfactory condition of roads and low-quality pavement, high moral and physical wear and tear of the material and technical base, imperfect tariff policy, the impossibility of updating the rolling stock of cars, and this has a very significant impact on the entire infrastructure, as the infrastructure is a powerful chain that connects the entire economic system of the state. The research was conducted based on the analysis of the current state of the main components of the infrastructure complex of Ukraine: transport, communication, ecology, recreational component, housing and communal economy, education, medicine, social security, and cultural component. An integral index of the infrastructure development dynamics of each region of Ukraine was calculated. Let's consider the integral index of the dynamics of infrastructure development of Ukraine by region in Table 2 [36]. As evidenced by the data in the table, 2, the Kirovohrad
Oblast takes the first place, the Ternopil Oblast takes the second place, and the Chernivtsi Oblast takes the third place, that is, the state of the infrastructure components of these regions and social security is better than that of other regions.

The infrastructure of the regions of Ukraine in modern conditions is characterized by certain disproportions in its development but has a uniform state. A complex problem is being tracked, which contains a lot of prerequisites. The main drawback is the inappropriate distribution and way of using available investments. Financial sector reform was implemented to improve the infrastructure situation.

<table>
<thead>
<tr>
<th>No</th>
<th>Region</th>
<th>Index value</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vinnytsia</td>
<td>1.09005</td>
<td>11</td>
</tr>
<tr>
<td>2</td>
<td>Volynsk</td>
<td>1.084612</td>
<td>12</td>
</tr>
<tr>
<td>3</td>
<td>Dnipropetrovsk</td>
<td>1.07230</td>
<td>13</td>
</tr>
<tr>
<td>4</td>
<td>Zhytomyr</td>
<td>1.14059</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Zakarpattia</td>
<td>1.01799</td>
<td>20</td>
</tr>
<tr>
<td>6</td>
<td>Zaporizhzhia</td>
<td>1.05312</td>
<td>16</td>
</tr>
<tr>
<td>7</td>
<td>Ivano-Frankivsk</td>
<td>1.00291</td>
<td>21</td>
</tr>
<tr>
<td>8</td>
<td>Kyivska</td>
<td>1.05103</td>
<td>17</td>
</tr>
<tr>
<td>9</td>
<td>Kirovohradsk</td>
<td>1.242830686</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>Lviv</td>
<td>1.05797</td>
<td>15</td>
</tr>
<tr>
<td>11</td>
<td>Mykolayivska</td>
<td>1.1067</td>
<td>9</td>
</tr>
<tr>
<td>12</td>
<td>Odesa</td>
<td>0.97895</td>
<td>22</td>
</tr>
<tr>
<td>13</td>
<td>Poltava</td>
<td>1.0954</td>
<td>10</td>
</tr>
<tr>
<td>14</td>
<td>Rivne</td>
<td>1.05899</td>
<td>14</td>
</tr>
<tr>
<td>15</td>
<td>Sumy</td>
<td>1.0449</td>
<td>18</td>
</tr>
<tr>
<td>16</td>
<td>Ternopilsk</td>
<td>1.2276</td>
<td>2</td>
</tr>
<tr>
<td>17</td>
<td>Kharkivska</td>
<td>1.1191</td>
<td>7</td>
</tr>
<tr>
<td>18</td>
<td>Khersonsk</td>
<td>1.1169</td>
<td>8</td>
</tr>
<tr>
<td>19</td>
<td>Khmelnytska</td>
<td>1.0410</td>
<td>19</td>
</tr>
<tr>
<td>20</td>
<td>Cherkassy</td>
<td>1.13483</td>
<td>5</td>
</tr>
<tr>
<td>21</td>
<td>Chernivtsi</td>
<td>1.1487</td>
<td>3</td>
</tr>
<tr>
<td>22</td>
<td>Chernihivska</td>
<td>1.1259</td>
<td>6</td>
</tr>
</tbody>
</table>

In Ukraine, the financial sector reform of 2014–2019 contributed to macro-financial stabilization and strengthening of the ability of regulators and financial market participants to resist crisis phenomena. The reform defined in the Comprehensive Program for the Development of the Financial Sector of Ukraine until 2020, approved by the financial sector regulators, was aimed at overcoming systemic problems in the financial sector and building a full-fledged competitive market environment according to the standards of the European Union. The main directions of this strategy were as follows: ensuring the stability of the financial sector, building the institutional capacity of regulators, and protecting the rights of consumers and investors in the financial sector [37]. Such directions of the strategy had a great impact on the country’s infrastructure. This confirmation is contained in Figure 1 [36].
Strategy for the development of the financial infrastructure of Ukraine

<table>
<thead>
<tr>
<th>Monetary policy reform</th>
<th>Restoration of credit activity of banks and non-bank financial institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stabilization of the banking system</td>
<td>Protection of creditors' rights, cleaning and transparency of the stock market</td>
</tr>
<tr>
<td>Liberalization of currency regulation</td>
<td>Effective and developed infrastructure of capital markets and organizational commodity markets</td>
</tr>
<tr>
<td>Reform of the financial sector</td>
<td>Legislative changes in the direction of bringing the regulatory environment closer to international standards</td>
</tr>
<tr>
<td>Reform of the banking sector</td>
<td>Improvement of conditions of use of electronic signature</td>
</tr>
<tr>
<td>New approaches to banking supervision</td>
<td>Introduction of a system of collection and processing of reporting, information in new formats through electronic channels</td>
</tr>
<tr>
<td>Increasing the institutional capacity of the FGVFD</td>
<td>Growth in the volume of non-cash transactions</td>
</tr>
<tr>
<td>Improving the regulation of non-bank financial services markets</td>
<td>Expansion of the list of remote financial transactions</td>
</tr>
<tr>
<td>Change in standards of corporate governance</td>
<td>Increasing competition in the banking and non-banking financial market</td>
</tr>
<tr>
<td>Strengthening the protection of investors' rights</td>
<td></td>
</tr>
<tr>
<td>Protection of the rights of consumers of financial services</td>
<td></td>
</tr>
<tr>
<td>Implementation of financial literacy</td>
<td></td>
</tr>
</tbody>
</table>

Figure 1. Financial infrastructure development strategy of Ukraine 2014-2019. (Source: [36])

The reform of the financial sector of Ukraine increased the stability of the banking system, introduced a new liberal currency regulation, increased the investment capacity of the FGVFO, financial stability and transparency of banks. The National Financial Services Committee has provided measures to improve the regulation of non-bank financial services markets. The standards of corporate governance were changed and the protection of investors' rights was strengthened. The stock market has been cleared and transparent, as well as the conditions for the use of electronic signatures have been improved, and a system for collecting and processing reports and information in new formats through electronic channels has been introduced. With the development of new technologies, competition is growing in the banking and non-banking segments of the financial market.

But there are also disadvantages, namely: certain currency restrictions remain, lending to increase economic growth remains insignificant; lending to the real sector by banking institutions is restrained by insufficient protection of creditors' rights and the problem of non-performing loans. A significant share of the public sector limits competition in the market of banking services. During the war the demand for goods and services decreased in the country, there was a significant loss of customers and markets, and the growth in the cost of goods and services quickly gained momentum; Small and medium-sized businesses have exhausted current assets and savings. All of these problems have a negative impact on the state of the financial infrastructure.

The infrastructure of the capital market and organizational commodity markets remains inefficient and underdeveloped. The volumes of operations with shares and bonds of enterprises are very low, which indicates the instability of the country's financial system. Infrastructure plays a critical role in today's economic system. It creates conditions for economic growth,
improving the quality of life of citizens and attracting investment. Investments in infrastructure development are given with a view to the future, and it is an investment in a successful and sustainable society.

For the development of the country’s infrastructure, state investments in the economy are allocated from the state budget, for this we will compare two infrastructures: American and Ukrainian infrastructure. Let's consider in more detail the inflow of funds for the development of USA infrastructure.

American infrastructure attracts USD 2 trillion of public investment in the economy and contributes to the creation of 18 million new jobs in the United States. Important elements of the plan are the development of the use of electric vehicles, the transition to the use of clean energy, the development of high-speed Internet, and increased access to clean drinking water.

The Jobs for America plan, adopted in 2021, include the following areas of government funding until 2035:

- repair of roads, bridges, and improvement of infrastructure – USD 621 billion;
- provision of high-speed Internet for every American - USD 100 billion; (100% of the US territory will be covered by high-speed Internet);
- the development of the use of electric vehicles and the transition to the use of clean energy - USD 174 billion;
- improvement of water supply - USD 111 billion;
- modernization of energy networks and the transition to clean energy - USD 100 billion;
- for the development of scientific and research work - USD 180 billion;
- for the development of industry - USD 300 billion [30].

The directions of state financing of the US infrastructure are presented in Figure 2.

About 132 billion hryvnias were allocated to the development of Ukrainian infrastructure for 2022 р., UAH 100 billion for the development of the workforce; the regions were to receive the following support from the state budget:

- development of road infrastructure - UAH 668 billion;
- of these, UAH 24.6 billion is for important public roads, streets and roads of communal property in rural areas;
- regional development - UAH 27.5 billion;
- infrastructure development (social protection, housing construction) - UAH 9.6 billion;
- rural development: UAH 7.1 billion (including support for agricultural producers) UAH 4.4 billion;
- development of the educational sector - UAH 6.8 billion;
- development of the healthcare sector - UAH 5.4 billion;
- other areas of regional development (including ASCs): UAH 3.3 billion;
- development of transport infrastructure: UAH 2.5 billion;

Figure 2. The directions of public funding for the "Jobs for America" plan. (Source: created by the authors on the basis of [37])
- development of the cultural sector - UAH 1.9 billion;
- development of sports infrastructure: UAH 900 million;
- for labour force development - 100 billion dollars [37].

The directions of state financing of Ukraine's infrastructure are shown in Figure 3 [38].

![Figure 3. Funds for the development of Ukrainian infrastructure. (Source: created by the authors on the basis of [38])](image)

According to the analysis of allocated investments in the infrastructure of the USA, they are very powerful, the state invests quite a lot of money in the development of its infrastructure and takes care of its citizens. Ukraine is a young state, therefore its investments from the budget are not so significant, the country’s infrastructure is being destroyed by the war with Russia.

In Ukraine, regional development planning was carried out on the basis of European experience and practices, which contributed to the convergence of European and Ukrainian legislation for regions and their development. In the future, this provided a good opportunity for the regions of Ukraine to very quickly adapt to European rules during the integration of the Ukrainian state into the EU. The Government of Ukraine is improving infrastructure development strategies to overcome these challenges and ensure sustainable growth of the country. This includes attracting investment, introducing modern technologies, fighting corruption, and ensuring efficient use of resources. It is planned to expand and modernize transport infrastructure, develop renewable energy sources, improve the quality of utilities and many other measures.

According to this, the State Development Strategy for the period from 2022 until 2027 was developed, which became the main document of the state regional policy of Ukraine and meets European requirements [39, 40]. The strategy acts as a coherent and planning document, contains clear territorial dimensions, is based on the state regional policy, and is aimed at achieving three strategic goals that are of great importance for the country and regions. The strategy singled out certain types of functional areas where the latest innovative products and development technologies can be applied. For this, a new legislative framework was developed in this strategy, but due to the war with Russia, it was not adopted.

In the Ukrainian state in 2014-2021, a lot of decentralization measures and a new state-regional policy were carried out, which helped to balance the development of Ukrainian territorial communities and regions, to create thousands of horizontal connections between communities and regions. However, there were no effective instruments for coordinating the sectoral policies of ministers in the regions, and the implementation of the State Strategy for Regional Development and regional development strategies had very limited financial resources. Only in 2014, the issue of forming the cohesion of the Ukrainian space began to take on the characteristics of state policy [41].
The architecture of Ukraine's infrastructure was disrupted by Russia's open aggression against Ukraine. The total war destroyed Ukrainian cities and villages, destroyed infrastructure in communities and regions, and led to the migration of millions of forcibly displaced people. In the terrible conditions of the war, the activities of local self-government bodies of territorial communities, as well as the selfless assistance of communities, regions, and volunteers to the most affected cities and villages proved the correctness of the previous policy in the areas of decentralization and regional development. With the outbreak of hostilities in the country, there was a significant decrease in the population, and the outflow of qualified personnel abroad, which contributed to the reduction of financial institutions in the banking, insurance sectors, leasing companies, CII, and credit unions.

During the war, Russia destroyed a lot of infrastructure facilities, as shown in Table 3.

Table 3. Infrastructure of Ukraine destroyed by Russia, preliminary assessment. (Source: [42, 43])

<table>
<thead>
<tr>
<th>Infrastructure objects</th>
<th>Volume, units/km</th>
<th>Total losses, million USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential buildings, million square meters</td>
<td>33.7</td>
<td>29,665</td>
</tr>
<tr>
<td>Roads, thousand km</td>
<td>23.8</td>
<td>29,761</td>
</tr>
<tr>
<td>Assets of enterprises, units</td>
<td>195</td>
<td>9,979</td>
</tr>
<tr>
<td>Civil airports, units</td>
<td>11</td>
<td>6817</td>
</tr>
<tr>
<td>Railway infrastructure and rolling stock</td>
<td>n/a</td>
<td>3,572</td>
</tr>
<tr>
<td>Healthcare institutions</td>
<td>231</td>
<td>1,803</td>
</tr>
<tr>
<td>Bridges and bridge crossings</td>
<td>295</td>
<td>1,646</td>
</tr>
<tr>
<td>Passenger cars, thousand units</td>
<td>89.5</td>
<td>1,358</td>
</tr>
<tr>
<td>Institutions of secondary and higher education</td>
<td>940</td>
<td>1,202</td>
</tr>
<tr>
<td>Land fund, thousand ha</td>
<td>4.2</td>
<td>873</td>
</tr>
<tr>
<td>Ports and port infrastructure</td>
<td>2</td>
<td>622</td>
</tr>
<tr>
<td>Administrative buildings</td>
<td>82</td>
<td>449</td>
</tr>
<tr>
<td>Military airfields</td>
<td>11</td>
<td>429</td>
</tr>
<tr>
<td>Kindergartens</td>
<td>543</td>
<td>421</td>
</tr>
<tr>
<td>Religious buildings</td>
<td>97</td>
<td>332</td>
</tr>
<tr>
<td>Aircraft An-225 &quot;Mriya&quot;</td>
<td>1</td>
<td>300</td>
</tr>
<tr>
<td>Shopping centres</td>
<td>24</td>
<td>315</td>
</tr>
<tr>
<td>Warehouse infrastructure</td>
<td>151</td>
<td>247</td>
</tr>
<tr>
<td>Cultural buildings</td>
<td>144</td>
<td>236</td>
</tr>
<tr>
<td>Other</td>
<td>-</td>
<td>1,891</td>
</tr>
</tbody>
</table>

During the hostilities, Russia destroyed (Table 3) and continues to destroy thousands of infrastructure objects that are very important for large regional centres and towns and forces, as well as for their development, namely: residential buildings, social infrastructure objects, bridge crossings, airports, roads, railways tracks, private residential buildings. Before the large-scale war, Ukraine was a powerful transit state through which international transport corridors passed. In today's realities, everything is lost, and this negatively affects the development of most of the territory of Ukraine, and significantly reduces the economic opportunities for the development of regions and their infrastructure. Industrial cities and regions of Ukraine suffer from great destruction. The deindustrialization of cities and regions that created Ukraine's industrial potential is taking place in the territory of Ukraine. This situation has a negative impact now and will have an impact in the future on the placement of the product potential of the food forces on the territory of the country. The possibility of people returning or not returning to these regions and industrial cities will depend on this.

In our opinion, in order to rebuild our country, it is necessary to develop a new model of the financial infrastructure development strategy presented in Figure 4.
Therefore, in the conditions of the continuation of the war, it is already necessary to plan the restoration of our territories, and this will create conditions for the return of refugees and will contribute to the restoration of the national, regional and local economy. The priority stage of recovery is the framework of the main cities - Kyiv, Lviv, Kharkiv, Dnipro, and Odesa. Here, first of all, it is necessary to restore the communications of the Kyiv community, restore the runways and equipment of Kyiv airports, carry out the restoration of bridges, clear and repair roads and international routes, logistics centres around Kyiv, help in the restoration of territorial communities and their parts that were bombed and destruction from hostilities.

To restore infrastructure in the post-war period, it is necessary to take the following measures: restore destroyed areas, carry out effective project management, maintain partnerships with foreign investors, continue cooperation with international organizations, and promote the sustainability and sustainability of environmental systems. Ukraine should actively attract investments from other countries and international organizations to finance infrastructure projects.

It is important to ensure effective management of infrastructure projects, including control over budgets, deadlines and quality of implementation.

Ukraine has significant potential for infrastructure development in the post-war period, and this is an important aspect of the stabilization and further development of the country. Providing modern, resilient infrastructure will help improve the quality of life of citizens and make Ukraine more competitive in the international market.
One of the main goals is to restore infrastructure in areas affected by the war. This includes the rehabilitation of roads, bridges, residential buildings, communications, and energy infrastructure. Ukraine cooperates with international organizations, such as the European Union, to ensure modern infrastructure standards. All infrastructure solutions should be aimed at creating resilient and sustainable systems that can operate in the face of climate change and other challenges.

It is necessary to rebuild destroyed housing, social infrastructure (schools, cultural centres, medical institutions, universities, shopping centres) and others. At the current stage, it is very important to reorient the gas supply to the electricity industry, priority must be given to nuclear and green energy. According to this, the "National Council for the Recovery of Ukraine from the Consequences of the War" was created by the Decree of the President of Ukraine dated April 21, 2022. Based on this decree, a plan of measures for the post-war recovery and development of Ukraine was developed, which includes the following components: recovery and development of transport, medical, industrial, social, communal infrastructure and housing, energy infrastructure, communications, military infrastructure and the military-industrial complex, structural modernization and restart of the economy, measures to overcome unemployment, support families with children, vulnerable population groups; persons who found themselves in difficult life circumstances as a result of the war, restoration and preservation of cultural heritage objects.

The proposed model of the financial infrastructure development strategy will strengthen the financial stability of Ukraine's economy, revitalize the country's macroeconomic development, contribute to the innovative development of the latest and digital technologies, ensure the effective development of financial markets, and increase the level of financial inclusion of the population.

In recent years, Ukraine has been actively working to improve its infrastructure in order to attract investment and support economic development. Possible directions for infrastructure development in Ukraine in 2023 include:

- transport infrastructure: improvement of the road network, expansion and modernization of the railway system, development of seaports and airports. This will help improve transport links within the country and on international routes;
- energy infrastructure: improving energy efficiency, developing renewable energy sources, and modernizing energy infrastructure to ensure a sustainable and reliable energy supply;
- communication infrastructure: introduction of modern information technologies and high-speed Internet connections to improve access to information and support the development of the digital economy;
- housing infrastructure: development and modernization of the residential sector with an emphasis on environmental efficiency and housing affordability for the population;
- social infrastructure: development of education, health care and cultural institutions that will improve the quality of life of citizens and contribute to the development of human capital.

Despite the challenges, Ukraine is one of the world leaders in infrastructure development. Successful implementation of infrastructure projects will help attract investment, create new jobs and improve the quality of life of the population.

Infrastructure development in Ukraine is a key task for creating a prosperous society and improving the quality of life of citizens. The road to achieving this goal can be challenging but with the right strategies, effective governance, and international cooperation. Ukraine has every chance of success in the development of its infrastructure.

**DISCUSSION**

Having considered all the points of view of economists, we agree with the views on the concept of “infrastructure” of such scientists as P. Samuelson, V.I. Novikova, and G.N. Klymenko. V.P. Nesterenko.

The American scientist P. Samuelson [18] notes that infrastructure is the capital of public support, namely: roads, railways, schools, hospitals, and dams for power plants. We agree with this, but we believe that infrastructure includes a more extensive system of institutions that includes all sectors of the economy.

Interpretation of the authors V.I. Novikova [31, 32], G.N. Klymenko. V.P. Nesterenko [34] is reduced to the definition of infrastructure as the basis and their material basis for the development of other industries. We agree with this interpretation in part, since we believe that infrastructure can cover not only the material but also the non-productive sphere.

Therefore, we believe that when forming strategic vectors of infrastructure development in the post-war period, it is important to take into account the current state, problems of infrastructure architecture during the Russian-Ukrainian war and the branched components of this system.
CONCLUSIONS

Elements of the scientific novelty of this study are the generalization of the Ukrainian experience of the development of modern infrastructure in the pre-war and post-war periods based on a systemic approach in various life situations. This approach provided an opportunity to analyze the mechanism of practical allocation of investments from the state budget to infrastructure, to compare two existing systems of allocation of funds. On the basis of this analysis, the main priorities for the recovery of funds were formed. Based on this analysis, the main priorities for the restoration and development of Ukraine's infrastructure in the post-war period were formed. The developed infrastructure development model will help the Ukrainian infrastructure to rebuild its territories; improve social and communal infrastructure, speed up access to information resources; will support the development of modern communication systems and increase the volume of cargo flows of all types of transport; will equip logistics platforms. Such measures will contribute to the awakening of an effective catalyst for the modernization of the economy of the country and its regions. We considered the interdependence of the financial strategies of the country's infrastructure, and carried out a comparative analysis of the allocation of investments in the infrastructures of states, but did not consider the main types of infrastructure and their elements, which will contribute to further scientific research.

ADDITIONAL INFORMATION

AUTHOR CONTRIBUTIONS

Conceptualization: Oleksandr Cherep, Lydmila Oleynikova, Elena Androsova, Liliya Bexhter, Olga Korotaieva
Data curation: Oleksandr Cherep, Lydmila Oleynikova, Elena Androsova, Liliya Bexhter, Olga Korotaieva
Formal Analysis: Oleksandr Cherep, Lydmila Oleynikova, Elena Androsova, Liliya Bexhter, Olga Korotaieva
Methodology: Oleksandr Cherep, Lydmila Oleynikova, Elena Androsova, Liliya Bexhter, Olga Korotaieva
Software: Oleksandr Cherep, Lydmila Oleynikova
Resources: Oleksandr Cherep, Lydmila Oleynikova, Elena Androsova
Supervision: Oleksandr Cherep, Lydmila Oleynikova
Validation: Oleksandr Cherep, Lydmila Oleynikova, Elena Androsova
Investigation: Oleksandr Cherep, Lydmila Oleynikova, Elena Androsova, Liliya Bexhter, Olga Korotaieva
Visualization: Oleksandr Cherep, Lydmila Oleynikova
Project administration: Oleksandr Cherep, Lydmila Oleynikova, Elena Androsova
Funding acquisition: Oleksandr Cherep, Lydmila Oleynikova, Elena Androsova, Liliya Bexhter, Olga Korotaieva
Writing – review & editing: Oleksandr Cherep, Lydmila Oleynikova
Writing – original draft: Oleksandr Cherep, Lydmila Oleynikova, Elena Androsova, Liliya Bexhter, Olga Korotaieva

REFERENCES

1. Vasiliev, O.V. (2007). Methodology and practice of infrastructural support for the functioning and development of the regions of Ukraine: monograph. Kharkiv: KhNAMG. https://eprints.khnam.edu.ua/4655/1/%D0%BC%D0%BE%D0%BD%D0%BE%D0%B3%D1%80%D0%B0%D1%84%D0%B8%D1%8F_%D0%B8%D1%82%D0%BE%D0%B3%D0%92%D0%B0%D1%81%D0%B8%D0%B8%D1%8C%D0%B5%D0%B2.pdf


44. On April 21, 2022, the Decree of the President of Ukraine No. 266/2022 on the establishment of the "National Council for the Recovery of Ukraine from the Consequences of the War".

https://www.president.gov.ua/documents/2662022-42225

Олейнікова Л., Череп О., Андросова О., Бехтер Л., Коротаєва О.

СУЧАСНА АРХІТЕКТУРА ІНФРАСТРУКТУРИ УКРАЇНИ ТА СТРАТЕГІЯ ЇЇ РОЗВИТКУ В ПІСЛЯВОЄННИЙ ПЕРІОД

Розглянуто основні складові інфраструктури: освіта, житлово-комунальне господарство, зв'язок, медицина, транспорт, рекреаційна система, екологія, соціальне забезпечення, культура. Проаналізовано інфраструктуру регіонів і виявлено основні диспропорції розвитку та недоліки невідповідного розподілу й спробу використання виділених інвестицій на основі інтеграційного індексу. Надано авторське визначення сутності поняття «інфраструктура». Велику увагу приділено аналізу стратегії розвитку фінансової інфраструктури України в довоєнний період. Доведено, що на цьому етапі було проведено низку реформ, які сприяли стабілізації банківської системи, фінансового сектора; зміні стандартів корпоративного сектора, ефективній та розвиненій інфраструктурі ринків капіталу й товарних ринків, відновленню кредитної активності банків та небанківських фінансових установ, зростанню обсягу безготівкових операцій, розширенню переліку дистанційних фінансових операцій, захисту прав споживачів фінансових послуг, зростанню конкуренції на банківському й небанківському фінансових ринках. Проведено порівняльний аналіз виділення з держбюджету інвестицій на розвиток інфраструктури США та України. Запропоновано стратегію розвитку інфраструктури України, що буде сприяти фінансовій стабільність.

Ключові слова: інфраструктура, регіон, складові інфраструктури, фінансова стабільність, інноваційний розвиток, реформа, фінансовий сектор, стратегія розвитку

JEL Класифікація: O57, P33, R42