Comparative analysis of critical infrastructure and public significance enterprises

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Abstract The relevance of this study is due to the increasing complexity and interdependence of enterprises in terms of critical infrastructure and social importance, which play pivotal roles in ensuring societal well-being, economic stability, and environmental sustainability. As technology evolves and new threats emerge, the need for a comprehensive, regularly updated evaluation becomes imperative. This article aims to identify and disclose the key aspects of a systematic comparative assessment of enterprises in terms of critical infrastructure and social importance. The leading approach to the study employs a combination of general scientific and specialized methods, drawing on modern economic theory and concepts from renowned scholars. This article examines the main aspects of conducting a comparative assessment of the activities of enterprises of critical infrastructure and social importance. The main characteristics of enterprises with critical infrastructure and social importance, which are important in the system of comparative assessment, are determined. General aspects that can be taken into account when evaluating these enterprises are reflected. The stages of comparative assessment of the activities of enterprises of critical infrastructure and public importance are presented, and the challenges and advantages of conducting a comparative assessment of these enterprises are also defined. The materials presented in the article hold practical value for policymakers, businesses, and academics, as they offer insights into improving the efficiency, sustainability, and impact of critical infrastructure and socially important enterprises.

Keywords: analysis, assessment, enterprises of critical infrastructure, public significance enterprises, social importance

1. Introduction

Carrying out a comparative assessment of the activities of enterprises of critical infrastructure and public importance is a complex and multifaceted process that includes a detailed study and analysis of various essential aspects of the work of these enterprises, among which are possible to highlight the following: definition of critical infrastructure, data collection and analysis, risk assessment, evaluation of stability and resilience, evaluation of efficiency and management, recommendations and action plans (Lockhorst & Maydanov, 2023).

Carrying out a comparative assessment of the activities of enterprises of critical infrastructure and public importance aims to achieve several important goals and objectives:

1. Ensuring public safety: Critical infrastructure such as energy, transportation, communications, and other industries provides vital services. Benchmarking helps determine how secure these services are and how they can be made more resilient to potential threats.

2. Minimize risks and threats: This assessment helps identify different types of risks, including physical and cyber threats, that can affect the operation of critical infrastructure enterprises. This makes it possible to develop strategies and measures for their prevention and management.

3. Ensuring resilience and preparedness for crisis situations: The assessment included an analysis of the enterprises' preparedness for emergency situations and the provision of essential services even during crisis situations, such as natural disasters, cyberattacks, or acts of terrorism.

4. Development and investment planning: This assessment helps to determine the needs for the development and modernization of critical infrastructure and to attract investments to improve its condition and operation.

5. International cooperation: In the context of globalization, benchmarking promotes cooperation between countries in the field of critical infrastructure to jointly ensure sustainability and security.

6. Optimizing resources and efficiency: Performance assessment allows for the identification of opportunities to improve efficiency and optimize resource spending in the critical infrastructure sector.

7. Carrying out a comparative assessment is an important tool for ensuring the stability and security of society and the country's economy. Identifying weak points and making informed decisions can increase resilience and readiness for possible crisis situations.
The main problematic issues of achieving a professional comparative assessment of the activities of enterprises of critical infrastructure and social importance are considered in the works of many researchers who, in one way or another, cover this topic. Kucheryavenko (2021), Zamrri et al. (2022), Katkov et al. (2019), and Cadete and Silva (2018) investigate the issue of ensuring the security of enterprises, including critical infrastructure enterprises. Nazarova et al. (2021), Olendy et al. (2023), Nezhyva and Mysiuk (2022) investigated tools for ensuring a reliable information environment at enterprises based on forensic control and audit. Vodianikov (2020) investigates the legal definition of public interest and public importance. Bernier (2014; 2018), Montenegro (2018), Guedhami and Pittman (2011), and Vitomir et al. (2023) examine public and private enterprises and their importance for the development of society and the state. Based on the above information and the work of scientists, a comprehensive study of this topic is relevant and timely.

The aim of this article is to conduct a systematic study and comparative assessment of various enterprises that play important roles in society and the economy. The main goals of this article are as follows:

- Assessments of the productivity and financial stability of enterprises of critical infrastructure and public importance (determining how efficiently enterprises function and how they can provide services and infrastructure);
- Vulnerability and risk assessment (identification of potential threats and vulnerabilities that may affect businesses, including physical and digital threats);
- Comparing different enterprises to eliminate weaknesses and improve strategies (identifying best practices and providing recommendations to improve the work of enterprises in the field of critical infrastructure and public importance);
- Increasing the level of awareness and preparedness for emergency situations (increasing the level of preparedness of enterprises for various types of dangers and emergency situations, including natural disasters, cyber threats, war, and other events);
- Publishing results for open access and informing stakeholders (providing information and research results so that other researchers, government agencies, regulators, and community organizations can evaluate and use them to improve safety and the development of society and the economy).

2. Methodological Framework

The theoretical basis for the research carried out in the course of this article was the key provisions of modern economic theory and modern concepts of comparative assessment of the activities of enterprises of critical infrastructure and social importance, which are covered in the scientific works of leading scholars worldwide. To achieve the tasks set out in the article, a system of general scientific and special methods of studying processes and phenomena in their interconnection and development was used. To carry out a comparative professional assessment of enterprises of critical infrastructure and public importance, various research methods were used: analysis of financial statements (assessment of the financial stability of enterprises, their profitability, liquidity and other financial indicators), analysis of key performance indicators (assessment of the productivity of enterprises thanks to the use of various key indicators, such as production, sales, costs, profit margin, etc.), benchmarking (comparing different businesses based on various parameters such as size, number of employees, production volumes, market share, etc., which provides important insights into their performance and competitiveness), assessment of compliance with standards and regulations (assessment of the readiness of enterprises for various types of risks, including those inherent in critical infrastructure, methods of assessment of compliance with standards and regulations are used), assessment of risks and vulnerabilities (analysis of potential risks and vulnerabilities of enterprises includes assessment physical and digital threats such as natural disasters, cyber-attacks, war, other security threats), expert surveys (engaging experts in the field of critical infrastructure and public importance to obtain their opinions and assessments can be a useful method for gathering qualitative information), assessing the response to emergency situations (studying the response of enterprises to emergency situations, such as natural disasters, war or acts of terrorism, includes analysis of emergency plans and exercises for their implementation), questionnaires and surveys (collection of data from employees, managers and other interested persons through questionnaires or specially designed questionnaires that provide insights into opinions and beliefs about the companies being evaluated). Moreover, the specifics of the investigated enterprises are taken into account. This article uses conceptualization as an approach that allows achieving the complexity effect of the system of development priorities to be achieved, as the main result of the study. Combining different methods is the most effective approach for obtaining an objective and comprehensive assessment of enterprises of critical infrastructure and public importance.

3. Results and Discussion

Critical infrastructure for enterprises includes organizations that provide production, supply, or provision of services that are vital for the functioning of society and the economy (Fayishenko & Sidielnikov, 2023). These enterprises are of strategic importance and are critical for ensuring the security, health, welfare, and economic development of the country (Strelcová et al., 2015). Critical infrastructure enterprises include energy companies, water supply, transport infrastructure, telecommunications systems, financial institutions, the chemical industry, communication systems and information
technologies, and medical institutions. These businesses often have special requirements for security, backup power, and protection against cyber attacks and other threats, as any disruption to their functioning can have serious consequences for society. Critical infrastructure organizations are usually subject to specific regulations and standards that help ensure the reliability and security of their operations.

Protecting critical infrastructure enterprises from various threats, such as terrorist acts, cyberattacks, natural disasters, or technical failures, is a critical task for ensuring the stability and security of society. States and organizations often pay special attention to the protection of critical infrastructure enterprises by establishing special rules, regulations, and technological measures to ensure their reliability and safety (Gerasymenko & Mazaraki, 2023; Mazaraki & Volosovych, 2023). This may include the physical security of facilities, redundancy of systems, application of encryption and cryptographic protocols, use of backup and recovery systems, monitoring and detection of intrusions, development of emergency plans and training of personnel. Protecting critical infrastructure enterprises requires collaboration between the government, the private sector, and other stakeholders, such as academic institutions and research organizations, to share information, develop standards, and jointly respond to threats.

In addition to protecting critical infrastructure enterprises from threats, it is important to have incident recovery mechanisms in place. This means developing contingency plans and backup strategies that allow critical infrastructure businesses to quickly restore operations after a problem occurs (Jhangiani & Kennis, 2021). These plans may include the location of backup systems and power sources, the creation of copies of data, the use of redundant networks and communication channels, and the establishment of mechanisms for rapid recovery of operations. The development of new technologies, such as the Internet of Things, cloud computing, and artificial intelligence, introduces new challenges and opportunities for the protection of critical infrastructure enterprises. On the one hand, these technologies can improve system monitoring and management; on the other hand, they can become new attack vectors or lead to increased security risks (Sukhonos, 2020). Critical infrastructure enterprises should actively monitor new trends in cybersecurity and participate in relevant initiatives and joint projects. They should collaborate with research organizations, software manufacturers, and other actors to share information about emerging threats and best practices.

An enterprise of social importance is a commercial organization that directs its activities to achieve certain social or environmental goals, along with financial profitability. Enterprises of social importance work to solve social problems, improve people’s quality of life, and protect the environment or other public tasks (Zhadan et al., 2023).

One of the key features of enterprises of public importance is their social or environmental mandate. They define goals that go beyond simply generating profits and directing their activities to achieve those goals. This may include working with socially vulnerable groups, reducing environmental impact, and improving the quality of education or access to health.

Public enterprises can take many forms, including corporations, cooperatives, foundations, limited liability companies, etc. They operate on the basis of commercial principles but with increased responsibility for society and the environment. Enterprises of public importance can have long-term social and economic value. They can create jobs for vulnerable groups, contribute to the development of the local economy, and maintain the sustainability of social programs and services. However, the success of a public enterprise depends on effective management, maintaining financial sustainability, and understanding its social mission. They must adhere to transparent standards of reporting and openness and engage with stakeholders and the public.

Recently, enterprises of social importance have been gaining increasing popularity as society demands a more active role in solving social problems (Korneyev et al., 2022a, 2022b). This leads to the development of new business models that combine profitable activities with the creation of social value. In general, enterprises of public importance act as important agents of change in society. They combine economic activity with strategic social impact, promoting sustainable development, inclusiveness, and a balanced distribution of benefits in society.

Enterprises of public importance can also influence other aspects of public life, including political, cultural, and ethical development. They can promote democracy, transparency, and ethical entrepreneurship by incorporating the values of social responsibility into their strategy and practice. Enterprises of public importance can act as agents of change that stimulate positive transformations in society and business.

Successful enterprises of social importance can also contribute to the scaling of their social activities and the introduction of innovative approaches to solving social problems. They can attract attention and resources to develop their projects and initiatives, including funding from investors, grants, and foundations (Kalyuzhna, 2023). One of the challenges for enterprises of public importance is ensuring a balance between social mission and financial sustainability. They must develop effective business models and strategies that allow them to provide social value and attract sufficient resources to support their activities.

The growing interest in enterprises of social importance is also pushing for the development of investment instruments aimed at financing socially responsible projects. The development of social investment funds, social bonds, and other financial instruments helps to attract capital for the development of enterprises of social importance and the spread of their social impact (Funko et al., 2023; Zubko & Danchenko, 2023).
Assessing the performance of critical infrastructure and public importance enterprises is an important task, as they play a key role in society and have a significant impact on people, the economy, and the environment. Different criteria and indicators can be used to evaluate their activity. General aspects that can be taken into account when evaluating these enterprises are shown in Figure 1.

![Diagram showing general aspects]

**Figure 1** General aspects that can be considered when evaluating these enterprises.  
*Source:* developed by the authors

Additional aspects when evaluating the activities of enterprises of critical infrastructure and social importance (Makohn, 2023) are as follows: innovations and technological development; interaction with interested parties; corporate culture and ethics; investment in development; quality management systems and standards.

For critical infrastructure businesses, such as those for electricity, transport, and water supply, the assessment may include an analysis of their ability to ensure continuous operation, redundancy, and recoverability. For enterprises of public importance, such as social services, charities, and health care organizations, the evaluation may include an assessment of service quality, accessibility, impact on quality of life, and social inclusion. It is important to ensure transparency and openness of data related to the activities of these enterprises so that the assessment is objective and reliable (Kyrychenko et al., 2022; Maksymenko & Derkach, 2023). Publishing social responsibility and sustainability reports can help stakeholders assess a company’s contribution to society and trust its operations.

An important aspect of assessment is also the ability of enterprises to improve their activities based on feedback and learning from mistakes. This includes the ability to accept responsibility for mistakes and shortcomings, implement corrective actions, and continuously improve one’s practices to achieve better results. Assessing the performance of enterprises of critical infrastructure and public importance should be an ongoing process, as they operate in a constantly changing environment. This requires establishing a monitoring system, updating evaluation criteria, and adapting to the changing needs of society. Evaluating the activities of enterprises of critical infrastructure and public importance is a complex task that requires the involvement of experts, the use of objective criteria, and a balanced approach (Myachin & Yudina, 2021). This approach will contribute to ensuring high standards of activity for these enterprises, improving their impact on society, and achieving sustainable development.

In light of the growing complexity and dependence on enterprises with critical infrastructure and public importance, assessing their activities is becoming increasingly important. It contributes to the sustainable functioning of society, the development of the economy, and the provision of people’s needs. Effective evaluation can become a mechanism for the continuous improvement of these enterprises, ensuring their compliance with societal needs and promoting sustainable development. The score reflects the effectiveness of risk management and emergency response. Businesses of critical infrastructure and public importance must have adequate emergency plans and the ability to respond effectively to them. Assessing the performance of enterprises of critical infrastructure and public importance can contribute to attracting financial resources and support from the public. If enterprises demonstrate high quality of work, efficiency, and social responsibility, this can increase the trust of the public and investors and contribute to the attraction of financial resources for further development and support of their activities (Reed, 2023).

Assessment of the activities of enterprises of critical infrastructure and social importance is an integral part of sustainable development. This approach helps to ensure the efficient use of resources, preserve the environment, ensure the safety and reliability of infrastructure, improve the quality of life of citizens, and promote the balance between economic, social, and environmental aspects. The evaluation of the activities of enterprises of critical infrastructure and social importance should be regular and permanent (Stupp, 2023). Societal needs, technological requirements, and other factors change over time, so it is important to update and adapt assessments to reflect the current situation and challenges.
The evaluation of the activities of enterprises with critical infrastructure and social importance is highly important for ensuring sustainable development, safety, and welfare. It helps to identify the strengths and weaknesses of enterprises, to develop strategies for further improvement and to contribute to the improvement of their activities to achieve more sustainable and efficient development. The process of comparative assessment of the activities of enterprises of critical infrastructure and social importance may include the stages shown in Figure 2. A professional comparative assessment of the activities of enterprises of critical infrastructure and public importance has a number of challenges:

1. Data consolidation. Evaluation requires the collection and analysis of large amounts of data from various sources. This may include financial statements, statistical data, social reports, and other sources of information. It is important to ensure the quality and reliability of the data, as well as their consistency for comparison and analysis.

2. Definition of criteria. Setting up the right criteria for evaluation can be a difficult task. It is important to choose those criteria that reflect the main aspects of the activities of enterprises with critical infrastructure and social importance, taking into account their specificity and context (Figure 2).

**Figure 2** Stages of comparative assessment of the activities of enterprises of critical infrastructure and social importance.

*Source:* developed by the authors
3. Regulatory framework. The lack of a single regulatory framework and standards for assessment can create challenges. The existence of generally accepted standards and evaluation methods helps ensure the comparability of the results.

4. Specifics of the enterprise. It is important to take into account the context and specificity of each enterprise, as they can perform different functions and have an impact on different areas of society. These factors must be taken into account when attempting to obtain objective results.

5. Participation of interested parties. It is important to involve stakeholders, including businesses, government bodies, community organizations, and the public, in the assessment process. This helps to ensure broad support, take into account different perspectives, and ensure the legitimacy and acceptance of evaluation results.

6. Use of results. A clear mechanism for using the assessment results is important. The assessment should serve as a basis for decision-making, the development of strategies, and recommendations for enterprises with critical infrastructure and public importance.

A professional comparative assessment of the activities of enterprises of critical infrastructure and public importance is an important tool for ensuring high efficiency, sustainability, and impact (Trusova & Hryukivska, 2021; Sumets et al., 2022). It contributes to the development of sustainable infrastructure, ensures safety and reliability, increases public trust, and contributes to the sustainable development of society as a whole:

1. Comparison with best practices. The evaluation allows comparison of the activities of enterprises with the best practices in the sector. This approach provides an opportunity to identify weaknesses and improve processes to achieve high standards of efficiency and effectiveness.

2. Stimulation of improvements. Evaluation can serve as an incentive for enterprises to constantly improve their activities. The assessment results can highlight areas where there is potential for development and inspire businesses to implement new initiatives and practices.

3. Investment attraction. The assessment can increase investment interest in enterprises of critical infrastructure and public importance. A high score in an assessment can contribute to the attraction of financial resources and attractiveness to potential investors.

4. Determination of priorities. The assessment helps determine priorities for businesses and government agencies. These points point to those aspects that have the greatest impact on society and require special attention, such as safety, sustainability, and environmental responsibility.

5. Increasing public confidence. The assessment can increase public confidence in critical infrastructure and public importance enterprises. It helps create transparency regarding the activities of enterprises, their impact on society, and the degree of compliance with norms and standards.

6. Ensuring stability and reliability. The assessment helps enterprises with critical infrastructure and public importance ensure stable and reliable operation. It identifies potential risks and problems that may affect the uninterrupted operation of the infrastructure and helps to take measures to prevent or minimize them.

7. Stimulation of innovations. The assessment contributes to stimulating innovation in enterprises with critical infrastructure and public importance. The assessment results can help identify gaps in innovation processes and offer recommendations for implementing new technologies and practices that increase productivity and sustainability.

8. Risk management. The assessment helps to identify and manage the risks associated with the activities of enterprises of critical infrastructure and public importance. This includes identifying potential threats, analyzing vulnerabilities, and developing contingency plans to help prepare for and mitigate adverse events.

9. Increasing public confidence. The assessment helps critical infrastructure and public importance enterprises maintain and increase public trust. It makes it possible to transparently assess their activities, impact on the environment, social responsibility, and ethical practices. This contributes to strengthening relations with the public and maintaining social legitimacy.

10. Development of strategies and policies. Assessment is an important tool for developing strategies and policies for managing enterprises with critical infrastructure and public importance. It provides important information and an analytical base for decision-making, development planning, and improvement of operations.

11. Improving interaction with regulators. The assessment helps to improve the interaction of critical infrastructure and public-importance enterprises with regulators and government bodies. The results of the assessment can be used as a basis for dialog and cooperation aimed at improving the regulatory framework and effective regulation.

4. Final Considerations

A professional comparative assessment of the activities of enterprises of critical infrastructure and public importance plays an important role in ensuring the sustainability, safety, and development of these enterprises. It helps identify potential for improvement, manage risks, and increase their effectiveness, contributing to the development of sustainable and safe infrastructure for society. A professional comparative assessment of the activities of enterprises of critical infrastructure and public importance in Ukraine is a comprehensive tool that contributes to ensuring the safety, efficiency, and sustainability of...
these enterprises. It allows you to assess the current state, identify problematic aspects, and find ways for further development and improvement, which contributes to sustainable development and improving the quality of life of citizens.

The first thing worth noting is the variety of critical infrastructures and enterprises of public importance. They cover various sectors, including energy, transport, water supply, healthcare, and many others. Each of these sectors has its own unique challenges and characteristics that require an individual approach to assessment and management. The second important aspect is the definition of standards and regulations. Assessment of critical infrastructure and public importance should be based on clearly defined standards and regulations that define minimum requirements for safety and sustainability. Given the rapid development of technology and new types of threats, these standards must be constantly adapted and updated. The third aspect is increasing emergency preparedness. Critical infrastructures and enterprises of public importance must be prepared for unpredictable events such as natural disasters, man-made accidents, and cyberattacks.

An in-depth analysis of emergency preparedness, including the effectiveness of action plans and backup systems, is a necessary element of professional assessment. Next, an important issue is transparency and public access to information. Information on the assessment of critical infrastructures and enterprises of public importance should be available to the general public and interested parties. This promotes open dialog and increases accountability for safety and sustainability. All these aspects are important for achieving the main goal – ensuring the reliability and safety of critical infrastructures and enterprises of public importance. A professional assessment helps identify vulnerabilities, improve emergency preparedness, and improve security.

Ethical considerations

Not applicable.

Conflict of Interest

The authors declare no conflicts of interest.

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