

ACCOUNTING AND ANALYTICAL EVALUATION OF INVESTMENT RESOURCES FOR CRITICAL INFRASTRUCTURE

The article examines the term «critical infrastructure». The need for formation of a critical infrastructure concept as an integral system managing of socio-economic balanced national development is substantiated. It is important to systematically identify its elements at concept formation stages for critical infrastructure, namely: state management systems, entities, production resources. The purpose of this research is factors influencing generalization economic benefit assessment for production assets as the important economic CI subjects potential on the international and domestic practice basis of the economic activity development. Managerial accounting is proposed by centers of responsibility in this work: centers of responsibility for basic indicators of the CI subject financial activity; by a comprehensive assessment of both administration and economic processes effectiveness (on the basis of financial and non-financial indicators). The positive role of analytical assessment for the EB reflection depending on asset liquidity and systematic assessment review during production assets accounting reasonably.

Keywords: critical infrastructure; investment resources; managerial accounting; subject; financial activity; economic benefit.

Problem statement. The term «critical infrastructure» (CI) has entered scientific circulation since the mid-1990s. Today we do not have a clear definition of the critical infrastructure content and composition in international practice, unfortunately. At the same time, the object list lack an and category of their subjects creates a real obstacle for national security measures effective implementation.

The critical infrastructure concept as an integral system of managing the priority of socio-economic balanced national development is being actively discussed at state levels. It is important to systematically and reasonably identify its elements at concept formation stages for critical infrastructure, namely: state management systems, business entities, production resources. A comprehensive

vision of Ukrainian economic security in conditions of martial law dictates the need for the accounting and analytical system formation for systematic monitoring, control, preservation and modernization of specified concept institutions.

The criteria combination for ensuring economic efficiency and CI integration with socio-economic balanced national development programs led to the term «entrepreneurial ecosystem» appearance as a set of production resources involved in the performance of socially important economic and environmental tasks. The definition arose as a result of actualizing the socio-economic problems solution on the basis of benefits maximizing and negative minimizing consequences of one's activity [1].

The opinion is quite interesting in the CI formation context about the social role generalization of subjects through the social component assessment of the entrepreneurial activity added value, which is aimed at ensuring:

management results integration with relevant region programs and plans in order to improve both the quality of life and achieve economic progress;

systematic control over adverse consequences reduction of such activities;

provision of scientific and applied support for the critical infrastructure system;

the regional/state social multiplier implementation for entrepreneurship;

economic support of estimated performance economic activity indicators for implementing socio-economic and ecological business balance programs [2].

Investment critical infrastructure subjects support requires a justification of the investment resources assessment that are aimed at its development. In turn, the financial accountability (respectively, the controllability) of such investment resources depends on the economic benefit determining objectivity that society hopes to receive from CI entities functioning.

The economic essence of «economic benefit» concept as financial and management tools for economic activity management domestic and foreign scientists studied in works, such as : Z.-M. V. Zadorozhnyi, V. V. Yasishena [3], A. A. Kostyakova [4], L. O. Ukrainian [5], O. V. Fomin [6], R. S. Aquino, M. Lyuk, G. A. Shanzel [1], A. R. Anderson [7], S. A. Zara and M. Wright [9]. The effective critical infrastructure functioning in martial law conditions requires objective calculations of its financial and resource support in our country today. This determines economic

benefit assessment for investment resources, ensuring its rationality and reliability.

Formulating the article goals. The purpose of the study is to generalize factors influencing the assessment of the economic benefit of production assets as the basis of the economic potential of CI subjects on the basis of international and domestic practice of the economic activity development, taking into account requirements to the socio-economic and ecological balance of management; substantiation of methodological and organizational approaches to variable forms identification of such benefit and its assessment.

The main research material. Management decisions effectiveness regarding operational and strategic management at any level is considered in the reliability plane of production resources assessment, their expected economic utility. The «economic benefit» concept means the declared initial asset value mostly today, revaluation of which on the reporting date is tied to economic factors (free market).

Ukraine has been under martial law for a long time at present, which in terms of influence mechanisms on economic activity is equated to force majeure. This complements the meaning of the «economic benefit» concept significantly: the assets assessment requires a systematic review taking into account their use; the professional judgment role in determining such an assessment significantly increases, since the absence of an active market, in addition to economic and financial indicators, necessitates non-financial (qualitative) indicators use, which generally increases the accounting information reliability.

Among determining criteria for classifying various objects, systems and networks as critical infrastructure are their extreme importance for the safe and sustainable everyday life of our country today. According to the Law of Ukraine «On Critical Infrastructure», CI includes business entities that is provided: energy supply, energy resources and fuel; communication and telecommunication networks; financial sector; food and drinking water delivery organization; health care; transport; rescue system; state administration operations continuity; production, transportation, chemical and radioactive substances storage and use, including pipelines for hazardous substances [9].

Referring to the United States experience in this area, we note that the list of sectors included in the country's national CI is more detailed because including 16 items. In addition to national legislation, the CI includes: the chemical sector; critical production; dams and other

hyrotechnical structures; emergency assistance services for the population, response to emergency situations; agriculture; nuclear reactors and materials; sewage systems, etc.

The normative regulation process of critical infrastructure has been started in Ukraine. Normative and legal documents necessary for forming a list objects of critical infrastructure have been adopted. However, this process continues quite slowly due to the bureaucratic mechanism and the «great desire» of many structures to get on this list, unfortunately. The status of «objects of critical infrastructure» implies certain regulation of financial and economic activities, increased attention.

Financial monitoring of CI is designed in order to provide a systemic vision of the functioning, preservation and the resource potential reproduction of CI economic subjects, and not only their classification and issues of control.

The state of war in Ukraine clearly indicated the CI protection system weakness, unfortunately: the inability to systemic integrated approach provide for the critical infrastructure protection from both physical and cyber threats, the current regulatory and legal framework weakness, which makes it impossible to create sufficient opportunities for effective procedures introduction, interaction and information exchange mechanisms between systems. As a result, we have an unified state system absence for the critical infrastructure protection that is based on existing national protection systems, security and crisis response [10].

The accounting and analytical information of managerial accounting is used quite successfully in the issues of forming the information base for economic activity management today.

Art. 8 of the Law of Ukraine «On Accounting and Financial Reporting in Ukraine» states that «the enterprise independently develops the system and forms of intra-economic (management) accounting, reporting and economic operations control». Modern management accounting is not purely accounting, but an effective information base for optimizing economic activity, expanding administrative influence in the most problematic (urgent) issues terms. The concepts and management accounting functions have gone beyond the classical internal accounting today.

Managerial accounting for CI entities as a making operational and strategic decisions tool should be considered comprehensively in two directions, namely as monitoring both optimal production resources use and effective economic activity administration as a whole.

Taking into account variability indicators regarding the CI security assessment, the need for both operational and strategic administration of such subjects, considering international practice, it is advisable to talk about the organization of management accounting by responsibility centers on following stages:

- by monitoring centers of responsibility of financial and economic activity basic indicators for the CI subject;
- by a comprehensive assessment (on the basis of both financial and non-financial indicators) for the financial and economic processes administration effectiveness.

If we talk about centers of responsibility, it is worth noting: in the international management accounting practice the creation of centers of costs / expenses, investments, income and profit prevails.

It is advisable to consider following centers of responsibility for CI subjects alternatively (Figure).

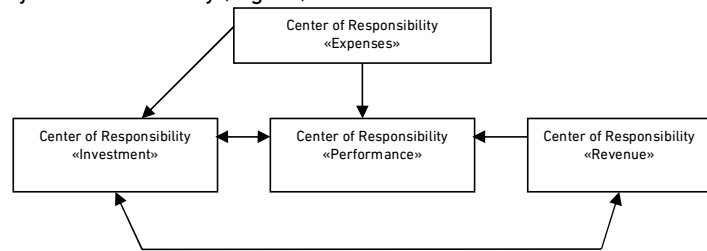


Figure. Information communication between responsibility centers for CI subjects

Center of Responsibility «Expenses»: is a subdivision (economic accounting or analytical) of the CI subject, the manager (responsible person) of which is responsible for expenses, that are accounted by accrual principles and provided for in the estimate.

Center of Responsibility «Investment»: is a subdivision (economic accounting or analytical) of the CI subject, the manager (responsible person) of which is responsible for the received investment resources use (own or borrowed). The objects of accounting, control and analysis are invested assets, such as target funding and target donates.

Center of Responsibility «Revenue» – revenues from the sale of products, goods (works, services) that are monitored within the center framework.

Center of Responsibility «Performance»: division, the manager (responsible person) of which is responsible for the proven / planned financial and nonfinancial performance indicators implementation.

The basic use of funds by IC entities is the provision of rational target costs (financed expenses). At the same time, both characteristic operational costs and specific ones (related to the economic security maintenance) are subject for the analytical reflection.

Financial indicators of responsibility centers may have following classification in the managerial accounting system:

- operational expenses: related to record keeping, preparation and submission of reports to state bodies; development of a measures plan to protect the critical infrastructure; maintaining the passport of critical infrastructure objects, etc.;
- capital expenditures for fixed assets purchases, equipment, devices, etc.;
- calculation and payment of taxes, fees (monitoring of tax obligations fulfillment);
- wages expenses for working people;
- expenses related to the administration of state supervision measures;
- expenses for production stocks, supplies, etc.

As for the comprehensive assessment administration of economic activity effectiveness for CI subjects, within the framework of managerial accounting, it is necessary to carry out a comprehensive assessment of implementation effectiveness for both operational and prospective management measures, in particular:

- prevention of situations economic – potential development blocking for CI subjects;
- resource provision regime implementation in accordance with production technology needs;
- logistic optimization of high technologies transfer;
- useful communications establishment for Ukraine under international long-term cooperation projects;
- promotion of effective (transparent, professional) management in order to key positions of the CI subject, etc.

The resource potential assessment for each subject is estimates of the available assets summarized on the economic benefit (EB) basis. Important in this context is the international strategic management accounting practice, the analytical level of which identifies economic benefit depending on the its receipt period:

- utility potential: the economic benefit assessment of assets that the enterprise plans to use in order to ensure economic operations that will lead to such a benefit receipt (for example, a license for a certain type of activity, an object of production fixed assets, etc.);
- future economic benefit: the economic benefit assessment of assets

that is expected to become highly liquid in following accounting periods (for example, commodity receivables);

- realized economic benefit: the economic benefit assessment of assets, confirmed by actual funds receipts or other highly liquid assets [4; 6].

In practice, entities carry out a documentary EB assessment at following stages:

1) receipt of production assets on the balance sheet (acquisition, creation, free receipt, exchange): determines the economic benefit at acquired assets original cost (fair or historical cost);

2) in the process of preserving received assets in accordance with their intended purpose: by monitoring and adjusting the economic benefit asset assessment at their posting time;

3) when selling/writing off assets as a result of sale, exchange for other assets: the economic benefit is substantiated at the sale net value level (at the level of expected cash flow, other types of compensation).

If the benefit economic component is formed on documented costs basis for the asset acquisition. Then the social component requires more attention when justifying professional judgment regarding its assessment. As well as social benefits are provided, according to the IPSASB, where a social risk has occurred (for example, a person has become unemployed or reached retirement age).

At the same time, social risks do not provide for the obligation fulfillment by the beneficiary, in particular, in terms of returning such payments. Therefore, when obligations fulfilling (regarding the recognition and measurement of social benefits) it is necessary to take into account corresponding amounts for such transactions financial support [11].

In order to take into account the social benefit asset value for the CI subject (the use of which is expected to enable social programs implementation), it is important to find out how necessary: such identification of the social benefit component is; whether the relevant social program legal support is valid; what is acceptable level of risk and its effective implementation, etc.

Both public sector entities and private enterprises can be included in the CI system. If for domestic enterprises, accounting standards define economic benefit as the basic assessing both income and expenses criterion, then for public sector entities it is also the *utility potential*, which represents «existing and potential opportunities that the public sector entity will receive from assets use that do not directly generate cash inflows in order to achieve the set goal or meet needs»

[12].

Utility potential and potential economic benefit are not identical in the economic sense. If we have asset effect on sales revenue (for example, production fixed assets depreciation) the utility potential is obvious. In turn, the potential economic benefit assessment is possible based on use results of asset in sales/exchange operations on payment or exchange terms.

The entrepreneurial ecosystem subject takes into account so-called «mixed value assessment» components in the added value, that is created by him as means of forming financial, social and environmental value for society and the economy. «Mixed value» involves compromises between both commercial and social aspects. Therefore, business sustainability is actualized, which directly depends on favorable taxation regimes and other state support forms. The such a value assessment determines the appropriate level achievement of analytical accounting, which is quite acceptable in the format of managerial accounting: an accounting analytical display system of operations by calculated indicators elements of balance and measures for their administrative support [13; 14].

Conclusions and further research prospects. The internal audit and control financial and economic activity processes within the framework of Ukrainian «critical infrastructure» system are issues of currently strategic operational resolution. Self-sufficient and protected from political emotions critical infrastructure of our country enables balanced and progressive development taking into account both internal and global adverse challenges (that is a crucial issue of our sovereignty protecting today).

Successful functional critical infrastructure implementation is conditioned by state support tools, such as motivational both tax and budget subsidies (benefits) for business entities that are classified by legislation as CI. Effective information tools in the administrative field of critical infrastructure could be accounting and analytical information of the managerial accounting for such subjects.

Managerial accounting is proposed by centers of responsibility in this work: centers of responsibility for basic financial and economic activity indicators of the CI subject; by a comprehensive assessment of both administration and economic processes effectiveness (on the financial and non-financial indicators basis).

Accounting and management information reliability management focus on specific performance tasks and functions for critical infrastructure, that is depended on the economic benefit rational CI entities assets determination, which determines needs of analytical

asset assessment EB (depending reflection on their liquidity) as well as a systematic assessment revision during balance sheet accounting period of production assets.

1. Aquino, R. S., Lück, M., & Schänzel, H. A. (2018). A conceptual framework of tourism social entrepreneurship for sustainable community development. *Journal of Hospitality and Tourism Management*, 37, 23–32. DOI: 10.1016/j.jhtm.2018.09.001. (accessed: 04.08.2022). 2. Zahra Sh. A., Wright, M. Understanding the Social Role of Entrepreneurship. *Journal of Management Studies*. 2016. Vol. 53 (4), 610–629. URL: <https://doi.org/10.1111/joms.12149> (accessed: 01.08.2022). 3. Zadorozhnyi Z.-M., Yasysheva V. Intangible Assets as an Accounting and Management Object. *Marketing and Management of Innovations*. 2019. Issue 1. URL: <https://doi.org/10.21272/mmi.2019.1-10>. (accessed: 01.08.2022). 4. Костякова А. А. Стратегічний управлінський облік: сутність та поняття. *Причорноморські економічні студії*. 2019. Вип. 39 (2). С. 99–102. URL: http://bses.in.ua/journals/2019/39_2_2019/21.pdf. (дата звернення: 18.07.2022). 5. Українська Л. О. Людський капітал корпорації: сучасні особливості формування. *Економічна теорія і право*. 2018. № 2 (33). URL: <https://doi.org/10.31359/2411-5584-2018-33-2-42>. URL: <https://http://econtlaw.nlu.edu.ua/2018/04/16/%D0%BB%D1%8E%D0%B4%D1%81/>. (дата звернення: 11.06.2022). 6. Фоміна О. В. Управлінський облік у торгівлі: монографія / Київ. нац. торг.-екон. ун-т. Київ, 2016. 468 с. URL: <https://knute.edu.ua/file/MjExMzA=/624a6d7d9a739851810eef1d42fb84ce.pdf>. (дата звернення: 16.05. 2022). 7. Anderson A. R. Conceptualising Entrepreneurship as Economic “Explanation” and the Consequent Loss of “Understanding”. *International Journal of Business and Globalisation*. 2015. Vol. 14 (2), 145–157. URL: <http://www.inderscience.com/link.php?id=67432> (text/html). (accessed: 06.06.2022). 8. Zahra Sh. A., Wright M. Understanding the Social Role of Entrepreneurship. *Journal of Management Studies*. 2016. Vol. 53 (4), 610–629. URL: <https://doi.org/10.1111/joms.12149>; <https://doi.org/10.1111/joms.12149> (accessed: 04.05.2022). 9. The Law of Ukraine “On critical infrastructure”. URL: <https://zakon.rada.gov.ua/laws/show/1882-20#Text> (accessed: 06.04.2022). 10. Солопова І. В. Правові умови захисту об’єктів критичної інфраструктури в Україні. DOI: <https://doi.org/10.32850/sulj.2021.2.20> (дата звернення: 01.05.2022). 11. International Public Sector Accounting Standards Board (IPSASB) 42 Summary – Social Benefits. URL: <https://www.ifac.org/system/files/publications/files/IPSAS-42-Social-Benefits-At-a-Glance.pdf> (accessed: 11.07.2022). 12. National public sector accounting standards 121 “Fixed assets”: Order of the Ministry of Finance of Ukraine dated 24.12.2010 No 1629. URL: <http://www.minfin.gov.ua/control/uk> (accessed: 11.07.2022). 13. Coman D. M., Coman M. D., Boca (Rakos) I. F. Managerial accounting – a source of information for an efficient management in SME. *Procedia – Social and Behavioral Sciences*. 2012. Vol. 62, 521–525. URL: <https://doi.org/10.1016/j.sbspro.2012.09.085>. (accessed: 16.04.2022). 14. Neil’s Brock Copenhagen Business College. Kultorvet 2, Copenhagen K, Denmark, 2008. 250 p.

REFERENCES:

1. Aquino, R. S., Lück, M., & Schänzel, H. A. (2018). A conceptual framework of tourism social entrepreneurship for sustainable community development. *Journal of Hospitality and Tourism Management*, 37, 23–32. DOI: 10.1016/j.jhtm.2018.09.001. (accessed:

04.08.2022). 2. Zahra Sh. A., Wright, M. Understanding the Social Role of Entrepreneurship. *Journal of Management Studies*. 2016. Vol. 53 (4), 610–629. URL: <https://doi.org/10.1111/joms.12149> (accessed: 01.08.2022). 3. Zadorozhnyi Z.-M., Yasysheva V. Intangible Assets as an Accounting and Management Object. *Marketing and Management of Innovations*. 2019. Issue 1. URL: <https://doi.org/10.21272/mmi.2019.1-10>. (accessed: 01.08.2022). 4. Kostyakova A. A. Stratehichnyi upravlinskyi oblik: sutnist ta poniattia. *Prychornomorski ekonomichni studii*. 2019. Vyp. 39 (2). S. 99–102. URL: http://bses.in.ua/journals/2019/39_2_2019/21.pdf. (data zvernennia: 18.07.2022). 5. Ukrainka L. O. Liudskiy kapital korporatsii: suchasni osoblyvosti formuvannia. *Ekonomichna teoriia i pravo*. 2018. № 2 (33). URL: <https://doi.org/10.31359/2411-5584-2018-33-2-42>. URL: <https://http://econtlaw.nlu.edu.ua/2018/04/16/%D0%BB%D1%8E%D0%B4%D1%81/>. (data zvernennia: 11.06.2022). 6. Fomina O. V. Upravlinskyi oblik u torhivli : monohrafiia / Kyiv. nats. torh.-ekon. un-t. Kyiv, 2016. 468 s. URL: <https://knute.edu.ua/file/MjExMzA=/624a6d7d9a739851810eef1d42fb84ce.pdf>. (data zvernennia: 16.05. 2022). 7. Anderson A. R. Conceptualising Entrepreneurship as Economic “Explanation” and the Consequent Loss of “Understanding”. *International Journal of Business and Globalisation*. 2015. Vol. 14 (2), 145–157. URL: <http://www.inderscience.com/link.php?id=67432> (text/html). (accessed: 06.06.2022). 8. Zahra Sh. A., Wright M. Understanding the Social Role of Entrepreneurship. *Journal of Management Studies*. 2016. Vol. 53 (4), 610–629. URL: <https://doi.org/10.1111/joms.12149>; <https://doi.org/10.1111/joms.12149> (accessed: 04.05.2022). 9. The Law of Ukraine “On critical infrastructure”. URL: <https://zakon.rada.gov.ua/laws/show/1882-20#Text> (accessed: 06.04.2022).

Левицька С. О. [1; ORCID ID: 0000-0002-4739-0486],

д.е.н., професор,

Осадча О. О. [1; ORCID ID:0000-0003-1314-3281],

д.е.н., професор

¹Національний університет водного господарства та природокористування, м. Рівне

ОБЛІКОВО-АНАЛІТИЧНА ОЦІНКА ІНВЕСТИЦІЙНИХ РЕСУРСІВ КРИТИЧНОЇ ІНФРАСТРУКТУРИ

У статті досліджується термін «критична інфраструктура». Обґрунтовано необхідність формування концепції критичної інфраструктури. На етапах формування концепції критичної інфраструктури важливо системно ідентифікувати її елементи, а саме: державні системи управління, суб’єкти господарської діяльності, виробничі ресурси. Метою даного дослідження є узагальнення факторів, що впливають на оцінку економічної вигоди інвестиційних ресурсів критичної інфраструктури. Розкрито доцільність аналітичного обліку такої економічної вигоди з огляду на її ліквідність: потенціал корисності, майбутня економічна вигода, реалізована економічна вигода. Для суб’єкта критичної інфраструктури важливою є оцінка у створеній ним

доданій вартості складових так званої «змішаної цінності»: елементів формування фінансової, соціальної та екологічної цінності для суспільства й економіки, що передбачає компроміси між комерційними та соціальними аспектами. У роботі запропоновано управлінський облік за центрами відповідальності в розрізі: центрів відповідальності за основні показники фінансової діяльності суб'єкта КІ; комплексної оцінки ефективності як управлінських, так і економічних процесів (на основі як фінансових, так і нефінансових показників). Обґрунтовано позитивну роль аналітичної оцінки для відображення ЕВ залежно від ліквідності активів та систематичного перегляду оцінки в період обліку виробничих фондів.

Ключові слова: критична інфраструктура; інвестиційні ресурси; управлінський облік; суб'єкт; фінансова діяльність; економічна вигода.

Отримано: 08 вересня 2022 р.
Прорецензовано: 13 вересня 2022 р.
Прийнято до друку: 30 вересня 2022 р.