

## ENHANCING THE EFFICIENCY OF INFRASTRUCTURE PPP PROJECTS THROUGH LEAN MANAGEMENT TOOLS

MISHENINA G. 

**Mishenina Galina** – Researcher (management department), Klaipėdos Universitetas, Klaipėda, Lithuania.

**E-mail:** [halyna.mishenina@ku.lt](mailto:halyna.mishenina@ku.lt), <https://orcid.org/0000-0003-4366-1864>

**Abstract.** This article analyzes the potential of integrating the principles of lean manufacturing into public-private partnership (PPP) mechanisms in order to improve the quality of infrastructure project development. In the context of limited budgetary resources and the need to achieve the global Sustainable Development Goals (SDGs), the combination of these approaches is considered as a strategic tool to increase the effectiveness of project activities. The methodological basis of the research is based on an integrated approach, including content analysis, factor analysis, SWOT analysis, as well as the use of the case study method. The authors propose a step-by-step conceptual model for implementing lean manufacturing tools such as VSM, JIT, Kaizen and the 5S system at all stages of the PPP lifecycle, from initiation to operation and contract completion.

Special attention is paid to the role of digital transformation (BIM, IoT) and operational monitoring methods, including Gemba traversals and the PDCA cycle. The study identifies key barriers, such as regulatory complexity and managerial inertia, and identifies opportunities for international institutional cooperation. It is concluded that systematic application of lean management not only optimizes costs and deadlines, but also ensures long-term environmental and social sustainability of infrastructure assets. Improving the institutional architecture and developing the competencies of government partners are recognized as necessary conditions for the successful implementation of this interdisciplinary management system.

**Key words:** public-private partnership (PPP), lean manufacturing, sustainable development, infrastructure projects, reconstruction.

### Introduction

Given the lack of budget resources and the growing demand for modern infrastructure, private sector participation in solving social problems has become a strategically important tool. Public-private partnership (PPP) stands out as one of the most effective mechanisms of such interaction. Integrating lean manufacturing principles into the structure of PPP projects can significantly improve the quality and reliability of the assets created, creating a basis for compliance with EU standards and contributing to the achievement of global sustainable development goals. It is expected that the introduction of lean management will be a decisive factor in improving the efficiency of investment projects. In addition, the urgent task of minimizing the environmental impact of infrastructure construction is fully consistent with the lean manufacturing philosophy, which is focused on sustainable development and environmental protection.

### Materials and methods of research

The interdisciplinary nature of this study, which combines management, public administration and socio-economic sciences, made it necessary to choose a hybrid methodology. The theoretical framework was based on content analysis of the scientific literature and the regulatory framework of PPP, while the empirical component was based on the method of case studies to identify practical factors for the effectiveness of infrastructure projects. The use of comparative thematic analysis made it possible to systematize the patterns of implementing the lean production concept, and factor analysis helped to identify hidden variables that affect the results of joint ventures of the state and business. In addition, SWOT analysis was used to structure internal organizational opportunities and external macroeconomic and political challenges that accompany the integration of lean technologies into PPP mechanisms.

### Results and its discussion

Public-private partnerships (PPPs) are firmly established as an effective mechanism for financing and implementing large-scale infrastructure initiatives. The use of synergy between the public and private

sectors makes it possible to achieve better results in the provision of services and the development of public assets compared to independent actions of the parties [1, 2]. At the same time, despite the widespread recognition of the model, academic debates continue regarding methods for evaluating its effectiveness; existing research usually focuses on identifying success factors, rather than directly measuring performance, management theories play a key role in the analysis [3]. Public-private partnership tools are becoming especially in demand in situations of limited institutional capacity, when there is a need for rapid restoration of critical infrastructure facilities [4, 5, 6].

In his scientific works, A. E. Shevchenko carries out a comprehensive study of the process of forming strategic partnerships in the field of public-private partnership, considering it both in the international and in the Ukrainian context. The author notes the significant role of PPP mechanisms in the system of administrative and legal regulation, emphasizing their importance as a tool to stimulate economic development and restore infrastructure facilities.

The results of modern research indicate a significant potential for integrating the principles of lean manufacturing into public-private partnership projects to achieve Sustainable Development Goals. The use of lean approaches helps to increase the effectiveness of projects by eliminating redundant operations and allocating resources more efficiently [7]. In the construction industry, PPP projects are considered as an important platform for ensuring sustainable development, where the application of the concept of lean manufacturing makes it possible to increase the value of assets created while reducing the irrational use of natural and financial resources [8]. The practice of implementing lean manufacturing tools in construction projects demonstrates their positive impact on labour productivity and overall efficiency by eliminating operations that do not create additional value [9].

This approach is an important factor in ensuring the long-term sustainability of projects and complies with the principles of responsible investment [10]. At the same time, the effective integration of lean practices into PPP projects involves the establishment of flexible and coordinated interaction between all stakeholders [11]. The use of lean management tools also contributes to the improvement of procurement processes, which are traditionally considered as one of the most problematic links in the implementation of infrastructure projects [12, 13].

Thus, the theoretical basis of this study is formed on the basis of the synergy of the lean manufacturing concept and the mechanisms of public-private partnership. The PPP model assumes the establishment of long-term contractual relations providing for the distribution of risks and responsibilities between participants at the stages of design, construction and operation of infrastructure facilities [14, 15]. The inclusion of lean manufacturing principles in this system contributes not only to improving operational efficiency, but also contributes to achieving Sustainable Development Goals by ensuring a balance of economic, social and environmental interests [16, 8].

The integrated application of lean manufacturing and public-private partnership approaches forms the basis for the sustainable development of regions and contributes to bringing the practice of implementing infrastructure projects in line with international management standards [17, 18]. This strategy is aimed at attracting investment, stimulating innovation, and ensuring that reconstruction projects are optimally aligned with the needs of local communities (Figure 1).

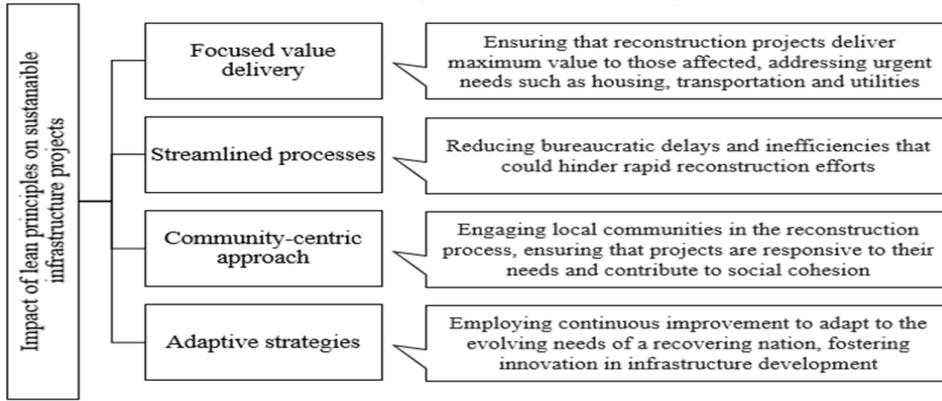


Figure 1. The impact of lean manufacturing methods on the implementation of infrastructure projects based on the principles of sustainable development

PPP mechanisms are inherently aligned with the lean manufacturing philosophy, which focuses on maximizing value throughout the asset's life cycle. Integrating lean approach into PPP projects allows combining long-term investment incentives, multi-disciplinary teams, and risk-sharing systems with advanced management technologies. This synthesis guarantees the creation of high-quality, sustainable infrastructure for future generations.

The use of special lean manufacturing tools, such as value flow mapping (VSM), operational standardization, and Just-in-Time (JIT), allows you to optimize each stage of PPP implementation. This not only accelerates the restoration and construction processes, but also guarantees maximum public utility of infrastructure assets.

Below is a detailed breakdown of the implementation of lean manufacturing principles at various stages of the implementation of a PPP infrastructure project.

Stage 1. Initiating a partnership and developing a proposal. At the stage of preparing the concept note and feasibility study (feasibility study), it is advisable to use the Just-in-Time (JIT) approach. This ensures that important information is delivered in an optimal time frame while eliminating data redundancy. Visual management tools, such as roadmaps, facilitate transparent monitoring of all stages of proposal formulation.

Stage 2. The analysis of the effectiveness of a PPP project is carried out using the Value Stream Mapping (VSM) method, which allows to identify and eliminate institutional and procedural obstacles. The use of this approach helps optimize analytical processes and ensures the reliability and efficiency of the conclusions obtained. The kaizen principle (continuous improvement) provides for continuous adaptation and refinement of the evaluation methodology.

Stage 3. Decision making and tender preparation. Standardization of processes in the development of tender documentation minimizes the risk of errors and reduces the time spent on approvals. The workspace and organization of information flows at this stage can be managed using the 5S system (Sort, Tidy, Highlight, Standardize, Maintain), which instils discipline in the preparation of competitive procedures.

Stage 4. Bidding process. Lean manufacturing tools are designed to minimize the loss of resources and time when forming tender committees, publishing notifications, and evaluating bids. Using the JIT method allows you to effectively manage the flow of incoming offers, providing prompt and objective expert evaluation.

Stage 5. Approval of results and conclusion of contracts. To visualize and control the stages of agreement approval and completion, a Kanban system has been implemented, which increases the transparency of interaction between public and private partners. The use of Poka-yoke (error protection)

mechanisms at the stage of legal registration of the contract minimizes the risk of incorrect wording and technical shortcomings in the final documentation.

A SWOT analysis was used in this study to comprehensively assess the prospects for implementing lean manufacturing principles into public-private partnership (PPP) mechanisms. The choice of this tool is due to its ability to provide a holistic consideration of both internal organizational factors and external macroeconomic conditions that affect the effectiveness of integrating lean manufacturing into PPP projects. The effectiveness of using SWOT analysis in strategic planning and management of complex organizational systems is confirmed by the results of the study [19].

This method allows us to compare the operational advantages of lean manufacturing with the potential risks and barriers arising from differences in the interests of public and private partners, limited resources or the instability of the macroeconomic environment. In this context, the results of the study [3] emphasize that identifying key success factors is the most important stage in analysing the effectiveness of PPP projects, which makes SWOT analysis an appropriate starting point for such a study. From our point of view, SWOT analysis is a universal and understandable tool for interaction between stakeholders from different sectors of the economy. Its application promotes coordinated management decision-making and allows for a clearer definition of both the most promising and the most risky areas of application of the principles of lean manufacturing in infrastructure construction. In addition, the results of such an analysis form the basis for subsequent more detailed studies, including cost-benefit analysis, as well as stakeholder mapping.

The methodological basis for building the SWOT matrix was a comprehensive analysis of scientific publications, industry reports, regulatory legal acts and secondary data on existing models of public-private partnership. The evaluation results demonstrated that the synergy of lean manufacturing principles and PPP mechanisms can significantly improve the quality of infrastructure project implementation by increasing operational efficiency, more rational risk allocation and stimulating innovation [8, 9]. At the same time, the practical realization of this potential is still limited by a number of systemic problems and challenges (Table 1).

Despite the high potential for integrating the principles of lean manufacturing into public-private partnership (PPP) infrastructure projects, their practical implementation requires solving a number of systemic problems. The effectiveness of PPP programs is largely determined by the level of development of the country's institutional environment and the ability of project participants to build flexible and adaptive management models.

Regulatory constraints, political instability, and lack of practical experience in applying lean management tools remain key risk factors, which can significantly complicate the implementation of strategically important infrastructure projects. The implementation of the principles of lean manufacturing involves a deep transformation of organizational culture, aimed at the philosophy of continuous improvement (kaizen) and active interdisciplinary interaction. The successful implementation of this approach requires systematic staff training, the development of professional competencies and high involvement of the management of all participating organizations in the process of change. Early Contractor Involvement (ECI) is recognized as one of the key success factors, which allows for comprehensive project management already at the initial stages of its implementation.

According to the results of the SWOT analysis, an integrated model combining PPP mechanisms and lean manufacturing principles has significant potential to increase operational efficiency, stimulate innovation activity and more rationally distribute risks among project participants. However, the practical implementation of these synergies may be limited by a number of systemic barriers, including corruption, lack of transparency in administrative procedures, destabilization of supply chains in post-conflict settings, and the risk of social tensions.

Table 1 – SWOT analysis of the application of lean management principles in infrastructure projects

<b>Strengths</b>	<b>Weaknesses</b>
<p>Optimization and cost reduction: The introduction of the lean manufacturing concept rationalizes work processes. This leads to shorter delivery times for infrastructure facilities and minimization of financial costs.</p> <p>Risk diversification: The PPP mechanism assumes a solidary distribution of risks between the government and business, which ensures a high degree of protection of projects from macroeconomic and operational fluctuations.</p> <p>Stimulating innovation activity: The use of lean technologies (lean manufacturing) initiates the introduction of advanced management practices, thereby increasing the overall effectiveness and quality of project implementation.</p> <p>Competence synergy: The private sector is able to compensate for the lack of highly specialized knowledge from government agencies by providing expert experience in the field of modern project management and lean methodologies.</p> <p>Result orientation and transparency: The use of key performance indicators (KPIs) and result-based contracts in PPPs perfectly complements the philosophy of continuous improvement. This increases the level of accountability and the final quality of work.</p> <p>Accelerated digitalization: The synthesis of PPP and lean approach catalyzes the transition to digital project management systems, which additionally minimizes any types of losses and managerial errors.</p>	<p>Regulatory and legal barriers: Excessive regulatory burden and complex legal framework are a significant obstacle to the effective integration of lean technologies (lean management) into PPP projects.</p> <p>Resource allocation asymmetry: Shifting the investment focus towards high-margin initiatives creates the risk of chronic underfunding of socially significant but less profitable projects.</p> <p>Institutional constraints: Lack of specialized competencies and lack of practical experience in using lean manufacturing tools in public sector structures.</p> <p>The conservatism of the administrative apparatus: The introduction of innovative management paradigms often causes resistance from government representatives who gravitate towards traditional, established patterns of work.</p> <p>Staff shortages in post-conflict reconstruction: The lack of relevant lean manufacturing skills among local specialists and departments is a serious hindering factor.</p> <p>Rigidity of PPP contracts: The bureaucracy and cumbersomeness of legal agreements come into direct conflict with the need for lean manufacturing for flexibility and iterative work processes.</p>
<b>Opportunities</b>	<b>Threats</b>
<p>Technological scaling: Enhanced integration of digital tools (building information modeling - BIM, Internet of Things - IoT, predictive analytics) multiplies the effect of implementing lean methodologies in PPP projects. This significantly reduces transaction costs and minimizes the environmental footprint.</p> <p>Institutional partnership: Strategic cooperation with international financial institutions (such as the World Bank, the EBRD) and private foundations opens up access to preferential credit lines and expert and technical support for the implementation of PPP initiatives based on the principles of lean manufacturing.</p> <p>Innovative infrastructure renewal: The systematic application of advanced technological and management solutions acts as a driver for the formation of a highly efficient, reliable and long-term sustainable infrastructure base.</p> <p>Greening of projects (ESG Agenda): Synchronization of infrastructure PPP projects with green technologies and environmental initiatives forms a solid foundation for sustainable macroeconomic development.</p>	<p>Macroeconomic and social turbulence: Fluctuations in global financial markets and internal social instability create significant barriers to attracting and subsequently retaining investment capital.</p> <p>Macro-level volatility: Sudden political transformations and economic shocks can destabilize the progress of projects to the point of complete shutdown.</p> <p>Corruption-related factors and lack of transparency: Institutional weakness and shadow schemes critically reduce the level of investor confidence, thereby negating the overall effectiveness of PPP initiatives.</p> <p>Vulnerability of logistics chains: Infrastructure and transport gaps (especially those typical of post-conflict reconstruction conditions) provoke a high risk of deadlines and exponential growth in project costs.</p> <p>Socio-economic tensions: Asymmetry in the distribution of benefits and commercialization of public infrastructure (e.g. the introduction of toll highways) they can catalyze the growth of public discontent and protest sentiments.</p>
<p>Source – the authors, based on [20]</p>	

Gemba routes are recognized as one of the most effective operational monitoring tools in lean

management. Direct visits to project sites, active interaction with staff, and personal monitoring of work processes allow management to obtain verified, objective data on the actual state of the project (Figure 2).

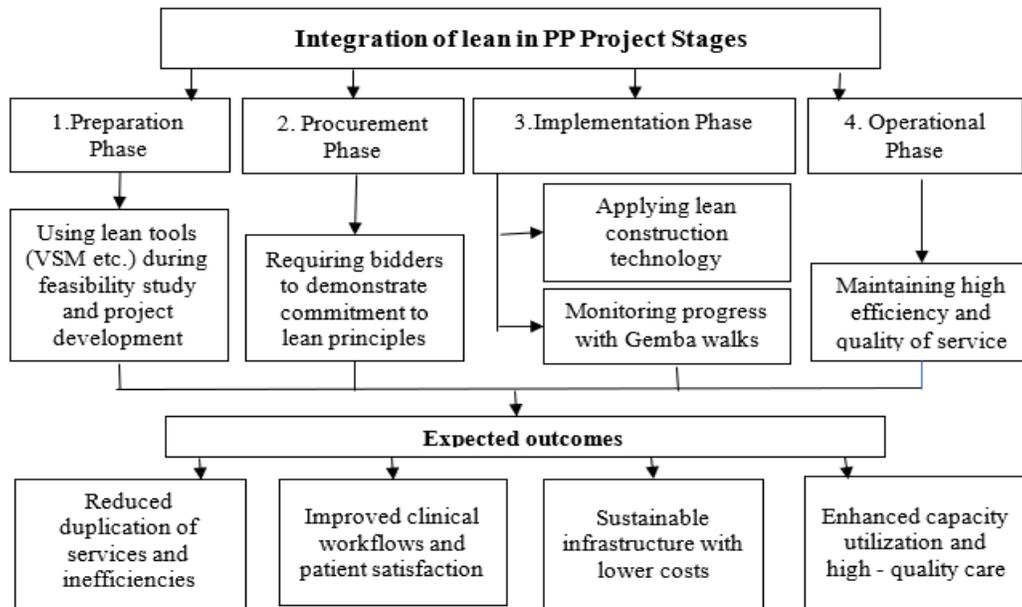


Figure 2. Conceptual model for integrating lean manufacturing principles into the life cycle of a PPP project

To ensure that PPP projects benefit both society and the environment while respecting the principles of sustainable development, it is important to set goals that are consistent with the SDGs from the very beginning of the project. However, the implementation of lean manufacturing in such initiatives is hindered by a number of challenges, including financial constraints, organizational resistance to change, and difficulties related to risk sharing among partners.

### Conclusion

Current global trends are focused on developing a sustainable and efficient infrastructure. The synergy of public-private partnership (PPP) mechanisms and lean manufacturing principles ensures successful digital transformation and environmental safety. However, achieving success requires easing regulatory barriers and maintaining political stability through transparent governance and fair allocation of resources. It is essential to strengthen the institutional framework by improving project monitoring systems, creating transparent mechanisms for appealing administrative decisions, and improving the professional capacity of government partners. This integrated approach ensures that private sector participation in PPPs is effective and large-scale.

### References

1. Yun S. From gap to growth in development finance: Leveraging public-private partnerships (PPPs) to bridge the infrastructure financing gap [Electronic resource] // Yale Journal of International Affairs. — 2024. — May 23. — URL: <https://www.yalejournal.org/publications/from-gap-to-growth-in-development-finance>.
2. Kruhlov V., Dvorak J., Moroz V., Tereshchenko D. Revitalizing Ukrainian cities: The role of public-private partnerships in smart urban development // Central European Public Administration Review. — 2024. — Vol. 22, № 1. — P. 85–107.
3. Ali Z., Irfan S., Salman Y. Effectiveness of Public Private Partnerships: A Systematic Literature

Review // Journal of Management and Research. — 2020. — Vol. 7, № 2. — P. 104-145.

4. Jermenchuk O. P., Paljchyk M. L. Problemnii aspekty pravovogo reghuljuvannja derzhavno-privatnogho partnerstva u sferi zakhystu krytychnoji infrastruktury // Informacijna bezpeka ljudyny, suspiljstva, derzhavy. — 2019. — № 2 (26). — P. 40–49.

5. Havrysh O., Yukhnov B., Suray A. Development of public-private partnership in the process of post-war reconstruction of Ukraine: Analysis of legislative initiatives // Adaptive Management: Theory and Practice. Series Economics. — 2024. — Vol. 18 (36). — DOI: [10.33296/2707-0654-18\(36\)-02](https://doi.org/10.33296/2707-0654-18(36)-02).

6. Shevchenko A. E. Theoretical principles of researching public-private partnership as an instrument of post-war economic reconstruction in Ukraine // Uzhhorod National University Herald Series Law. — 2024. — № 2 (82). — P. 284–288.

7. Woetzel J., Pohl H. Infrastructure: Doing more with less [Electronic resource] // World Bank Policy Research Working Paper. — 2014. — № 6882. — URL: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2439703](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2439703).

8. Othman A. A. E., El-Gendawy H. S. Public-Private Partnership for Lean Sustainable Development in Construction // Journal of Construction Project Management and Innovation. — 2012. — Vol. 2, № 2. — P. 377-402.

9. Gazali A., Dhiandra A. R., Nugroho M. S. [et al.] Impact of Lean Construction Implementation on Construction Building Projects // Jurnal Pensil: Pendidikan Teknik Sipil. — 2025. — Vol. 14, № 2. — P. 256–271.

10. Wright H., Dimsdale T., Healy C. [et al.]. Sustainable infrastructure and the multilateral development banks: Changing the narrative [Electronic resource] / E3G, 2018. — URL: <http://www.jstor.com/stable/resrep21743>.

11. Eweje G., Sajjad A., Nath S. D. Multi-stakeholder partnerships: A catalyst to achieve sustainable development goals // Marketing Intelligence & Planning. — 2021. — Vol. 39, № 2. — P. 186–212.

12. Chou J.-S., Pramudawardhani D. Cross-country comparisons of key drivers, critical success factors and risk allocation for public-private partnership projects // International Journal of Project Management. — 2015. — Vol. 33, № 5. — P. 1136–1150.

13. Soecipto R. M., Verhoest K. Contract stability in European road infrastructure PPPs: How does governmental PPP support contribute to preventing contract renegotiation? // Public Management Review. — 2018. — Vol. 20. — P. 1145–1164.

14. Schanzenbach D. W. Nunn R., Nantz G., Rotrosen A. No free lunch: The pros and cons of public-private partnerships for infrastructure financing [Electronic resource] - Brookings Institution, 2017. — URL: <https://www.brookings.edu/articles/no-free-lunch-the-pros-and-cons-of-public-private-partnerships-for-infrastructure-financing/>.

15. Stella C., Menassa S. Successful public-private partnerships: How countries should set up an effective ecosystem for public-private partnerships [Electronic resource] / Arthur D. Little, 2020. — URL: <https://www.adlittle.com/en/insights/viewpoints/successful-public-private-partnerships>.

16. Ceranic B., Beardmore J., Cox A. Rapid deployment modular building solutions and climatic adaptability: Case-based study of a novel approach to «thermal capacity on demand» // Energy and Buildings. — 2018. — Vol. 167. — DOI: [10.1016/j.enbuild.2018.01.044](https://doi.org/10.1016/j.enbuild.2018.01.044).

17. European Commission. Rebuilding Ukraine: Principles and priorities for a sustainable and resilient recovery [Electronic resource] / European Commission. — 2022. — URL: <https://ec.europa.eu>.

18. Berglöf E., Rashkovan V. Reconstructing and reforming Ukraine // LSE Public Policy Review. — 2023. — Vol. 3, № 1. — Art. 18.

19. Taherdoost H., Madanchian M. Determination of business strategies using SWOT analysis; planning and managing the organizational resources to enhance growth and profitability // Macro Management & Public Policies. — 2021. — Vol. 3, № 1. — P. 19–22.

20. Mishenina H., Mishenin Ye. Integrating Lean Management into PPP Projects: A Pathway to Sustainable Infrastructure Recovery in Post-Conflict Ukraine // *Financial and Credit Activity: Problems of Theory and Practice*. — 2024. — Vol. 2, № 55. — P. 191–206.

### Әдебиеттер тізімі

1. Yun S. From gap to growth in development finance: Leveraging public-private partnerships (PPPs) to bridge the infrastructure financing gap [Electronic resource] // *Yale Journal of International Affairs*. — 2024. — May 23. — URL: <https://www.yalejournal.org/publications/from-gap-to-growth-in-development-finance>.
2. Kruhlov V., Dvorak J., Moroz V., Tereshchenko D. Revitalizing Ukrainian cities: The role of public-private partnerships in smart urban development // *Central European Public Administration Review*. — 2024. — Vol. 22, № 1. — P. 85–107.
3. Ali Z., Irfan S., Salman Y. Effectiveness of Public Private Partnerships: A Systematic Literature Review // *Journal of Management and Research*. — 2020. — Vol. 7, № 2. — P. 104-145.
4. Jermenchuk O. P., Paljchyk M. L. Problemnii aspekti pravovogo rehuljuvannja derzhavno-pryvatnogho partnerstva u sferi zakhystu krytychnoji infrastruktury // *Informacijna bezpeka ljudyny, suspiljstva, derzhavy*. — 2019. — № 2 (26). — P. 40–49.
5. Havrysh O., Yukhnov B., Suray A. Development of public-private partnership in the process of post-war reconstruction of Ukraine: Analysis of legislative initiatives // *Adaptive Management: Theory and Practice. Series Economics*. — 2024. — Vol. 18 (36). — DOI: [10.33296/2707-0654-18\(36\)-02](https://doi.org/10.33296/2707-0654-18(36)-02).
6. Shevchenko A. E. Theoretical principles of researching public-private partnership as an instrument of post-war economic reconstruction in Ukraine // *Uzhhorod National University Herald Series Law*. — 2024. — № 2 (82). — P. 284–288.
7. Woetzel J., Pohl H. Infrastructure: Doing more with less [Electronic resource] // *World Bank Policy Research Working Paper*. — 2014. — № 6882. — URL: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2439703](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2439703).
8. Othman A. A. E., El-Gendawy H. S. Public-Private Partnership for Lean Sustainable Development in Construction // *Journal of Construction Project Management and Innovation*. — 2012. — Vol. 2, № 2. — P. 377-402.
9. Gazali A., Dhiandra A. R., Nugroho M. S. [et al.] Impact of Lean Construction Implementation on Construction Building Projects // *Jurnal Pensil: Pendidikan Teknik Sipil*. — 2025. — Vol. 14, № 2. — P. 256–271.
10. Wright H., Dimsdale T., Healy C. [et al.]. Sustainable infrastructure and the multilateral development banks: Changing the narrative [Electronic resource] / E3G, 2018. — URL: <http://www.jstor.com/stable/resrep21743>.
11. Eweje G., Sajjad A., Nath S. D. Multi-stakeholder partnerships: A catalyst to achieve sustainable development goals // *Marketing Intelligence & Planning*. — 2021. — Vol. 39, № 2. — P. 186–212.
12. Chou J.-S., Pramudawardhani D. Cross-country comparisons of key drivers, critical success factors and risk allocation for public-private partnership projects // *International Journal of Project Management*. — 2015. — Vol. 33, № 5. — P. 1136–1150.
13. Soecipto R. M., Verhoest K. Contract stability in European road infrastructure PPPs: How does governmental PPP support contribute to preventing contract renegotiation? // *Public Management Review*. — 2018. — Vol. 20. — P. 1145–1164.
14. Schanzenbach D. W. Nunn R., Nantz G., Rotrosen A. No free lunch: The pros and cons of publicprivate partnerships for infrastructure financing [Electronic resource] - Brookings Institution, 2017. — URL: <https://www.brookings.edu/articles/no-freelunch-the-pros-and-cons-of-public-private-partnerships-for-infrastructure-financing/>.

15. Stella C., Menassa S. Successful public-private partnerships: How countries should set up an effective ecosystem for public-private partnerships [Electronic resource] / Arthur D. Little, 2020. — URL: <https://www.adlittle.com/en/insights/viewpoints/successful-public-private-partnerships>.

16. Ceranic B., Beardmore J., Cox A. Rapid deployment modular building solutions and climatic adaptability: Case-based study of a novel approach to «thermal capacity on demand» // Energy and Buildings. — 2018. — Vol. 167. — DOI: [10.1016/j.enbuild.2018.01.044](https://doi.org/10.1016/j.enbuild.2018.01.044).

17. European Commission. Rebuilding Ukraine: Principles and priorities for a sustainable and resilient recovery [Electronic resource] / European Commission. — 2022. — URL: <https://ec.europa.eu>.

18. Berglöf E., Rashkovan V. Reconstructing and reforming Ukraine // LSE Public Policy Review. — 2023. — Vol. 3, № 1. — Art. 18.

19. Taherdoost H., Madanchian M. Determination of business strategies using SWOT analysis; planning and managing the organizational resources to enhance growth and profitability // Macro Management & Public Policies. — 2021. — Vol. 3, № 1. — P. 19–22.

20. Mishenina H., Mishenin Ye. Integrating Lean Management into PPP Projects: A Pathway to Sustainable Infrastructure Recovery in Post-Conflict Ukraine // Financial and Credit Activity: Problems of Theory and Practice. — 2024. — Vol. 2, № 55. — P. 191–206.

## ҮНЕМДІ БАСҚАРУ ҚҰРАЛДАРЫНЫҢ КӨМЕГІМЕН МЖӘ ИНФРАҚҰРЫЛЫМДЫҚ ЖОБАЛАРЫНЫҢ ТИІМДІЛІГІН АРТТЫРУ

МИШЕНИНА Г. 

Мишенина Галина – Зерттеуші (менеджмент факультеті), Клайпеда университеті, Клайпеда қ., Литва.

E-mail: [halyna.mishenina@ku.lt](mailto:halyna.mishenina@ku.lt), <https://orcid.org/0000-0003-4366-1864>

**Андатпа.** Бұл мақалада инфрақұрылымдық жобаларды әзірлеу сапасын арттыру мақсатында үнемді өндіріс қағидастарын мемлекеттік-жекешелік әріптестік (МЖӘ) тетіктеріне интеграциялау әлеуеті талданады. Бюджеттік ресурстардың шектеулілігі және орнықты дамудың жаһандық мақсаттарына (ТДМ) қол жеткізу қажеттілігі жағдайында осы тәсілдердің үйлесімі жобалау қызметінің тиімділігін арттырудың стратегиялық құралы ретінде қарастырылады. Зерттеудің әдіснамалық негізі мазмұнды талдау, факторлық талдау, SWOT талдауы, сондай-ақ Case study әдісін қолдануды қамтитын кешенді тәсілге негізделген. Авторлар VSM, JIT, Кайдзен және 5S жүйесі сияқты үнемді құралдарды іске асырудың қадамдық тұжырымдамалық моделін МЖӘ өмірлік циклінің барлық кезеңдерінде, бастамадан бастап пайдалануға және келісімшартты аяқтауға дейін ұсынады.

Цифрлық трансформацияның (BIM, IoT) рөліне және Gemba ауысулары мен PDCA циклін қоса алғанда, жедел бақылау әдістеріне ерекше назар аударылады. Зерттеу реттеудің күрделілігі және басқарушылық инерция сияқты негізгі кедергілерді анықтайды және халықаралық институционалдық ынтымақтастықтың мүмкіндіктерін анықтайды. Үнемді басқаруды жүйелі қолдану жұмыстың шығындары мен мерзімдерін оңтайландырып қана қоймай, сонымен қатар инфрақұрылым объектілерінің ұзақ мерзімді экологиялық және әлеуметтік тұрақтылығын қамтамасыз етеді деген қорытындыға келді. Институционалдық архитектураны жетілдіру және мемлекеттік әріптестердің құзыреттерін дамыту осы пәнаралық басқару жүйесін табысты енгізу үшін қажетті жағдайлар болып танылды.

**Түйін сөздер:** мемлекеттік-жекешелік әріптестік (МЖӘ), үнемді өндіріс, орнықты даму, инфрақұрылымдық жобалар, қайта құру.

## ПОВЫШЕНИЕ ЭФФЕКТИВНОСТИ ИНФРАСТРУКТУРНЫХ ПРОЕКТОВ ГЧП С ПОМОЩЬЮ ИНСТРУМЕНТОВ БЕРЕЖЛИВОГО УПРАВЛЕНИЯ

МИШЕНИНА Г. 

Мишенина Галина - Исследователь (факультет менеджмента), университет Клайпеды, г.Клайпеда, Литва.

E-mail: [halyna.mishenina@ku.lt](mailto:halyna.mishenina@ku.lt), <https://orcid.org/0000-0003-4366-1864>

**Аннотация.** В данной статье анализируется потенциал интеграции принципов бережливого производства в

механизмы государственно-частного партнерства (ГЧП) с целью повышения качества разработки инфраструктурных проектов. В условиях ограниченности бюджетных ресурсов и необходимости достижения глобальных целей устойчивого развития (ЦУР) сочетание этих подходов рассматривается как стратегический инструмент повышения эффективности проектной деятельности. Методологическая основа исследования основана на комплексном подходе, включающем контент-анализ, факторный анализ, SWOT-анализ, а также использование метода case study. Авторы предлагают пошаговую концептуальную модель внедрения инструментов бережливого производства, таких как VSM, JIT, Кайдзен и система 5S, на всех этапах жизненного цикла ГЧП, от инициации до эксплуатации и завершения контракта.

Особое внимание уделяется роли цифровой трансформации (BIM, IoT) и методам оперативного мониторинга, включая переходы Gemba и цикл PDCA. В исследовании определены ключевые барьеры, такие как сложность регулирования и управленческая инерция, а также определены возможности для международного институционального сотрудничества. Сделан вывод о том, что систематическое применение бережливого управления не только оптимизирует затраты и сроки выполнения работ, но и обеспечивает долгосрочную экологическую и социальную устойчивость объектов инфраструктуры. Совершенствование институциональной архитектуры и развитие компетенций государственных партнеров признаны необходимыми условиями для успешного внедрения этой междисциплинарной системы управления.

**Ключевые слова:** государственно-частное партнерство (ГЧП), бережливое производство, устойчивое развитие, инфраструктурные проекты, реконструкция.