

SPECIAL ISSUE: Reflections and Learnings for a Post-War Urban Planning

How can spatial planning and project management help in rebuilding and recovering Ukrainian cities?

Nataliia Yehorchenkova, SPECTRA Centre of Excellence EU, Slovak University of Technology in Bratislava

Oleksii Yehorchenkov, SPECTRA Centre of Excellence EU, Slovak University of Technology in Bratislava

Abstract

The Russia-Ukraine war has devastated cities and infrastructure, creating unprecedented challenges for recovery and rebuilding. While enemy missiles are flying on Ukrainian cities, this article explores how spatial planning and project management can address these challenges effectively. Spatial planning focuses on sustainable land use and resilient infrastructure, while project management provides tools for organization and adaptation. By integrating project management approaches, Ukraine can navigate uncertainty and rebuild smarter, greener, and more inclusive cities.

Keywords

Ukraine recovery,
spatial planning,
project
management

Introduction

The ongoing Russia-Ukraine war has led to the widespread destruction of cities, villages, infrastructure, and, most tragically, the loss of thousands of lives. The peaceful past is now left behind, impacting not only every Ukrainian but also the entire political, social, and cultural systems of Ukraine. In many regions, life has been set back: residential buildings, factories, roads, railway stations, and communication networks have been destroyed or severely damaged. The war has also caused significant environmental problems. Amidst this devastation, a crucial question looms: How can we plan and rebuild our cities when missiles continue to fall?

Eventually, the war will end. And even if not immediately, people will begin returning to normal life, and Ukraine will start to rebuild. A meaningful answer to the question “What will happen next?” can be found in the application of spatial planning practices and policies.

Authors:

Nataliia Yehorchenkova (*corresponding author*), SPECTRA Centre of Excellence EU, Slovak University of Technology in Bratislava, Slovakia, n.yehorchenkova@gmail.com, ORCID: [0000-0001-5970-0958](https://orcid.org/0000-0001-5970-0958)

Oleksii Yehorchenkov, SPECTRA Centre of Excellence EU, Slovak University of Technology in Bratislava, Slovakia, o.yehorchenkov@gmail.com, ORCID: [0000-0003-1390-5311](https://orcid.org/0000-0003-1390-5311)

The use of spatial planning approaches and methods will allow Ukraine to create a comprehensive strategy for restoration, incorporating the best global practices: green public spaces, inclusive services and planning, smart and sustainable buildings and infrastructure, and a digital innovation ecosystem. Naturally, both representatives of the international community and Ukrainian scientists and practitioners from various fields should be involved in these spatial planning processes.

Next to spatial planning research, which is crucial for restoring Ukraine's territories, there is also strong support for research in project management—an equally essential area. Project management expertise is critical for organizing and managing spatial planning and construction efforts effectively, particularly in the face of ongoing and post-war uncertainty and instability.

By combining insights from project management, Ukraine can better navigate the complexities of rebuilding in a way that maximizes resilience and sustainability. Scientific research in project management will enable the organization of spatial planning and construction processes in ways that reduce the impact of ongoing and post-war uncertainty and instability on the success of ongoing projects.

The article invites further discussion and research on how to rebuild Ukraine while effectively managing the complexities and uncertainties of war, drawing on the collective wisdom of nations that have encountered similar challenges. This article explores the intersection of spatial planning and project management as a dual framework for Ukraine's reconstruction. It advocates for interdisciplinary collaboration between international experts and Ukrainian professionals, emphasizing that the collective knowledge of nations that have endured similar hardships can guide this transformative process. By integrating spatial planning strategies with project management expertise, Ukraine has an opportunity to rebuild not just what was lost, but to create cities and communities that are smarter, greener, and more resilient for generations to come.

What challenges to face during the ongoing and post-war period?

The situation in Ukraine undoubtedly presents significant challenges from every perspective. Broadly, the challenges faced during the war can be categorized into three key areas: *infrastructure, energy, socio-economic challenges*.

Each of these categories is further divided based on the varying levels of damage experienced across different regions of Ukraine. This regional differentiation highlights the diverse and complex impacts of the conflict. Let's consider them.

Infrastructure challenges

Based on the report of Kyiv School of Economics (2024, a). As of January 2024, the total direct damage to Ukraine's infrastructure due to Russia's full-scale invasion is estimated at \$155 billion. This figure includes the destruction caused by the explosion of the Kakhovka Hydroelectric Power Station dam in June 2023.

Sector-Specific Damages:

- *Housing*: Approximately 250,000 residential buildings have been damaged or destroyed, comprising 222,000 private houses, over 27,000 apartment buildings, and 526 dormitories. The direct damage to the housing sector is estimated at \$58.9 billion, reflecting an increase of \$4.8 billion since the end of 2023. The most affected regions include Donetsk, Kyiv, Luhansk, Kharkiv, Chernihiv, and Kherson.
- *Infrastructure*: Damages to infrastructure have reached \$36.8 billion.
- *Industry and business*: Direct damages amount to \$13.1 billion, with 78 small, medium, and large private enterprises, as well as 348 state-owned enterprises, destroyed or damaged.
- *Energy sector*: The energy sector has sustained direct damages of up to \$9 billion.
- *Agricultural sector*: Damages in the agro-industrial complex amount to \$8.7 billion.

While these sectoral figures quantify the overall scale of loss, they mask where destruction is most acute. To understand the geography of impacts, we turn to the housing stock—one of the most granular indicators—drawing on Kyiv School of Economics (2023) data. Destruction is overwhelmingly concentrated in the east and south. Donetsk oblast accounts for about **86 thousand** destroyed or damaged units—the highest nationwide—followed by **Kyiv (~22.7 thousand)**, **Luhansk (~11.3 thousand)** and **Kharkiv (~9.8 thousand)**. Frontline oblasts in the south-east, including **Zaporizhzhia** and **Dnipropetrovsk**, each record roughly **6–7 thousand**, while **Chernihiv** in the north is similarly elevated. Southern regions such as **Kherson**, **Mykolaiv** and **Odesa** also show substantial losses. By contrast, most central and western oblasts register only marginal counts (generally hundreds of units or less), indicating comparatively limited direct destruction of the housing stock.

The war in Ukraine has caused unprecedented damage to physical infrastructure, with losses exceeding \$155 billion, including the destruction of key industrial facilities. Rebuilding this infrastructure is critical for economic recovery and requires significant international support. Sustainable urban planning and energy-efficient designs present an opportunity to modernize Ukraine's infrastructure while addressing future challenges, but delays in ending the conflict will exponentially increase reconstruction costs and long-term recovery needs.

Energy challenges

As of May 2024, the damage to Ukraine's energy sector from Russia's invasion is estimated at \$56.5 billion, including \$16.1 billion in direct damages and \$40.4 billion in indirect losses. Approximately 18 gigawatt of electricity generation capacity has been compromised, with key assets like the Zaporizhzhia Nuclear Power Plant and major hydroelectric and thermal power plants severely damaged. Oil and gas infrastructure, including refineries and storage facilities, has also been devastated, while nearly half of the high-voltage substations are damaged, disrupting energy distribution. Recovery costs are projected at \$50.5 billion, emphasizing sustainable rebuilding through the "Build Back Better" principle. Allocations include \$33.8 billion for the power industry and \$16.7 billion for the oil and gas sector, reflecting the immense resources needed to restore Ukraine's energy infrastructure. (Kyiv School of Economics (2024, b).

Socio-economic challenges

The Centre for Economic Strategy's "Ukraine War Economy Tracker" (Samoiliuk M., 2024) highlights the ongoing challenges and dynamics of Ukraine's economy during the conflict. The labor market experienced a sharp decline in demand and supply at the war's onset, with unemployment reaching 15.3% by October 2024 and 20.5% of the population economizing on food. Business and consumer confidence remain subdued, with the National Bank of Ukraine's business activity expectations index at 49.4 and the Consumer Confidence Index at 68.8. Since the invasion, Ukraine has received approximately \$100.79 billion in foreign financial aid, covering 64% of its additional financing needs, including recent contributions like a \$1.1 billion IMF loan and \$300 million from Canada in October 2024. Fiscal policy shows resilience, with tax revenues in October increasing 32% year-over-year, largely driven by consumption taxes, while defense and security expenditures dominated the budget, totaling UAH 1,475 billion for the first nine months of 2024. However, the foreign trade balance remains negative, with a \$-3.2 billion deficit in September. These factors illustrate Ukraine's complex economic landscape amid the ongoing war.

The International Crisis Group's report, "A Fraught Path Forward for Ukraine's Liberated Territories" (International Crisis Group, 2024), outlines the significant challenges Ukraine faces in rebuilding and stabilizing areas reclaimed from Russian occupation. These regions suffer from widespread devastation, including destroyed infrastructure and housing, and are riddled with landmines and unexploded ordnance, posing ongoing threats to civilians and hindering reconstruction. Population displacement remains a major issue, complicating efforts to rebuild communities and restore normalcy. Local governance structures have been severely weakened,

requiring substantial efforts to reestablish effective administration. Additionally, addressing war crimes and prosecuting those responsible is a pressing challenge, while dealing with collaborators raises complex legal and social dilemmas, necessitating a balance between justice and reconciliation. Economic recovery is another critical hurdle, with the need to revive local economies, restore livelihoods, and ensure access to basic services. Security risks persist due to proximity to active conflict zones and potential sabotage attempts by pro-Russian elements. Furthermore, the psychological trauma experienced by residents during the occupation highlights the need for mental health support to foster social cohesion. The report underscores the importance of comprehensive domestic and international efforts to address these challenges and ensure the long-term recovery and stability of Ukraine's liberated territories.

Plans of Ukraine recovery

Oleksii Kuleba, Ukraine's Deputy Prime Minister for Restoration and Minister for Communities and Territories Development, emphasizes that spatial development plans are crucial for the long-term growth and transparent recovery of communities. These plans serve as a foundation for sustainable development, ensuring that reconstruction efforts align with strategic objectives and community needs. By integrating spatial planning into the recovery process, Ukraine aims to rebuild more resilient and well-organized communities, fostering economic growth and enhancing the quality of life for its citizens (Kuleba, 2024).

To address these challenges, the Ukrainian government has developed comprehensive plans and initiatives aimed at rebuilding the nation both during the ongoing conflict and in the post-war period. These efforts are focused on restoring infrastructure, revitalizing the economy, and ensuring social stability while laying the foundation for a resilient and sustainable future.

Ukraine's National Recovery Plan (National Recovery Council, 2022), developed by the National Recovery Council, outlines a comprehensive strategy to rebuild and modernize the nation amidst ongoing conflict. The plan emphasizes resilience, recovery, and sustainable growth, aiming to integrate Ukraine into the European Union and global markets. Key priorities include restoring critical infrastructure, enhancing energy efficiency, and revitalizing sectors such as defense, metallurgy, agriculture, and information technology. The plan also focuses on improving living standards, upgrading social services, and fostering a business-friendly environment to attract international investment. Guided by principles of transparency, accountability, and regional collaboration, the strategy seeks to transform Ukraine into a strong European nation, serving as a "magnet" for global investment.

The plan encompasses several **flagship projects** targeting key areas:

- *Defense and Security*: Allocating \$50 billion to enhance national defense capabilities and ensure security in the face of ongoing threats.
- *Energy Independence and Green Transition*: A \$130 billion program designed to achieve energy independence through renewable energy sources, modernize infrastructure, and adopt green technologies.
- *Housing and Regional Infrastructure*: With a budget between \$150–250 billion, this initiative aims to reconstruct damaged housing and regional infrastructure, ensuring resilience and modernity.
- *Transportation and Logistics*: A \$120–160 billion investment to upgrade logistics systems and integrate transportation networks with the EU for seamless economic collaboration.
- *Economic Development*: \$50 billion is allocated for fostering value-added economic sectors, with an additional \$75 billion for improving business competitiveness and ensuring access to capital.
- *Social Infrastructure*: Includes \$35 billion to rebuild schools, hospitals, and cultural facilities, with \$5 billion each for modernizing education and healthcare systems, and \$20 billion for culture and sports.
- *Environmental Recovery*: A \$20 billion initiative for restoring ecosystems, addressing environmental damages, and ensuring sustainability.
- *EU Integration and Institutional Strengthening*: Less than \$1 billion is dedicated to aligning Ukraine's systems with EU standards and strengthening institutional capacity.
- *Macroeconomic Stability*: Investments of \$60–80 billion are planned to stabilize the economy and foster growth, targeting a GDP growth of 7% annually.

The plan aims for an annual real GDP growth exceeding 7%, with a total financing requirement of over \$750 billion. It also aspires to position Ukraine among the top 25 countries in the Economic Complexity Index and the Human Capital Index (Ukraine's Recovery Plan, 2022).

Role of project management in Ukraine recovery

As outlined in the Recovery Plan (Ukraine's Recovery Plan, 2022), the rebuilding of Ukraine will be executed through a series of managed spatial planning projects. These initiatives will address various aspects of reconstruction, including infrastructure, energy, housing, and socio-economic development, ensuring a systematic and strategic approach to Ukraine's recovery and long-term growth.

This is why, in Ukraine's recovery process, project management plays a central role in addressing the complex challenges of reconstruction, from restoring essential services to fostering long-term socio-economic development. By leveraging globally recognized methodologies like Agile, Waterfall, and Hybrid approaches, along with advanced tools for resource planning and risk management, project management ensures that recovery efforts are not only effective but also transparent and accountable.

Because when spatial planning addresses the question “What needs to be done”, project management focuses on “How it will be accomplished”.

Spatial planning is used by public authorities and local governments to influence the future location and distribution of territories, population distribution, and the implementation/conduct of various activities in space. Such planning is needed to balance the potentially competing needs of the economy, society, and the preservation of the environment. Spatial planning project refers to a structured and strategic initiative undertaken by governments, organizations, or communities to manage and organize the use of land and resources within a specific geographical area. Spatial planning projects primarily focus on organizing physical spaces, emphasizing land use and sustainability, often spanning large areas and years, involving government, communities, and interest groups, and requiring adherence to government regulations and environmental standards. It is the main difference between this kind of project and other kinds of projects like IT or construction (Yehorchenkova, 2024).

The management of spatial planning projects involves the organized coordination and oversight of activities aimed at achieving development objectives within a defined spatial framework. This process requires strategic planning to set clear goals and align them with broader regional or national development priorities. Effective management ensures efficient allocation of resources, adherence to regulatory and legal requirements, and active engagement with diverse stakeholders, including public authorities, private entities, and community groups. It also involves identifying and mitigating risks, such as environmental or economic challenges, while incorporating advanced tools like Geographic Information Systems (GIS) and data analytics to optimize decision-making. Monitoring and evaluation are integral to tracking progress and ensuring that projects meet sustainability and equity objectives. Overall, this approach fosters cohesive and resilient development that addresses the needs of present and future generations.

Today, a wide array of project management methodologies and frameworks is available, each designed to address specific needs across various industries and contexts. However, the question arises: can these methodologies effectively support Ukraine's recovery during the ongoing conflict and in the post-war period?

Main Features of Spatial Planning Projects for Ukraine's Recovery:

- *Long-term goals:* Focused on sustainability and resilience.
- *High uncertainty and risks:* Requires adaptability to conflict, socio-political changes, and resource challenges.
- *Complex stakeholders and governance:* Coordination across local, national, and international levels.
- *Sustainability and integration:* Combines housing, infrastructure, energy, and social services with climate-resilient solutions.
- *Resource constraints:* Demands efficient use of limited resources and reliance on international support.
- *Monitoring and collaboration:* Tracks progress and involves interdisciplinary expertise.
- *Community rebuilding:* Restores physical spaces, social cohesion, and economic activity.
- *Innovative and inclusive solutions:* Adopts smart technologies and prioritizes vulnerable populations.

These factors demand an adaptive and strategic application of project management methodologies and frameworks capable of addressing rapidly changing circumstances and unpredictable challenges. In this context, examining the suitability and adaptability of approaches such as Agile, Waterfall, PMI PMbok, and others becomes critical for ensuring that Ukraine's recovery efforts are not only efficient and sustainable but also resilient and responsive to the complexities of the situation.

Table 1 highlights various project management methodologies and frameworks suited for Ukraine's recovery efforts, each offering unique strengths. However, given the highly complex and uncertain conditions of spatial planning projects for Ukraine's recovery, no single methodology can fully address all challenges. A tailored approach, combining elements from multiple methodologies, is essential to ensure flexibility, efficiency, and long-term sustainability in these multifaceted recovery efforts.

Table 1 - Analyzing various project management methodologies/frameworks

| Methodology/ Framework | Suitability | Application | Reference |
|---|---|--|---|
| PMBOK (Project Management Body of Knowledge) | A standardized framework offering best practices and tools for managing projects in a structured manner. | Useful for providing a comprehensive approach to manage scope, time, cost, risk, and quality in recovery projects. | A guide to the Project Management Body of Knowledge (Project Management Institute, 2021) |
| Agile | A flexible and iterative methodology that focuses on adaptability, collaboration, and delivering incremental value. | Ideal for managing projects with high uncertainty, such as emergency responses or short-term reconstruction. | An introduction to agile methods (Cohen, 2004) |
| Scrum | A flexible, Agile framework emphasizing iterative delivery in short sprints and continuous stakeholder feedback. | Ideal for managing tasks in phases, such as rebuilding community facilities in iterative steps. | What is Scrum? (scrum.org) |
| Program Management | Coordinates multiple interrelated projects under a unified program, aligning with strategic recovery goals. | Manage clusters like housing, transportation, and energy reconstruction projects. | The Standard for Program Management – Fifth Edition (Project Management Institute, 2024) |
| Portfolio Management | Prioritizes projects and ensures alignment with national recovery strategies and optimal resource allocation. | Balance resources across competing priorities, such as rebuilding infrastructure and social services. | The Standard for Portfolio Management – Fourth Edition (Project Management Institute, 2017) |
| PRINCE2 | Provides a structured approach with clear roles and accountability, ideal for projects requiring transparency. | Useful for long-term, large-scale recovery projects with stringent governance needs. | PRINCE2 |

Table 1 - Analyzing various project management methodologies/frameworks (continuation)

| Methodology/ Framework | Suitability | Application | Reference |
|------------------------------------|---|---|--|
| Lean Project Management | Maximizes value while minimizing waste, critical in resource-constrained recovery scenarios. | Useful for projects focused on rebuilding efficiently with limited budgets and materials. | Lean Project Management (Moujib, 2007) |
| Hybrid Project Management | Combines Agile's flexibility for uncertainty with Waterfall's structure for long-term planning. | Use Agile for short-term adaptive projects and Waterfall for large-scale infrastructure efforts. | Agile, traditional, and hybrid approaches to project success: Is hybrid a poor second choice? (Project Management Institute, 2022); Hybrid project management: A systematic literature review. International Journal of Information Systems and Project Management (Reiff, 2022) |
| Adaptive Project Framework | Designed for projects with high uncertainty, enabling adjustments based on changing circumstances. | Ideal for ongoing recovery efforts where conditions are unpredictable. | Adaptive Project Framework: Managing Complexity in the Face of Uncertainty (Wysocki, 2010) |
| Integrated Project Delivery | Encourages collaboration among stakeholders, promoting shared responsibilities and risk management. | Useful for large-scale projects requiring input from international donors, agencies, and investors. | An Introduction to Integrated Project Delivery (Lean Construction Institute) |

Discussion and conclusion

Project management methodologies and frameworks are not just a collection of approaches; they are a compilation of best practices, developed and refined by thousands of project managers across countless projects to achieve goals in the most effective way.

Managing projects as challenging as those required for Ukraine's recovery demands viewing these methodologies not as isolated tools but as part of an integrated project management system. This system emphasizes a unified structure:

- *One approach:* A consistent methodology tailored to the project's needs.
- *One professional language:* Clear and standardized communication among all stakeholders.
- *One tool:* A cohesive platform for managing resources, timelines, and deliverables.
- *One responsible person:* Clear accountability for every project aspect.

However, this vision comes with significant challenges:

- *Lack of a single methodology:* No single project management methodology fully addresses the complexities and uncertainties of recovery projects in these unique conditions.
- *Shortage of skilled project managers:* The scale and scope of these projects exceed the capacity of the current pool of professional project managers.

Given the global scale and implications of these recovery efforts, project management approaches must be reinforced by strong governance systems. This ensures coordination, accountability, and the alignment of resources and strategies with overarching recovery goals. Effective governance will be the backbone of successful project implementation in such demanding circumstances.

And last but not least, a critical challenge lies in ensuring that spatial planning experts, stakeholders, and governance bodies fully understand the importance of applying project management methodologies, approaches, and tools in Ukraine's recovery process.

From the authors' point of view, the answer to the question, "*How can we plan our cities when enemy missiles are flying at them?*" lies in one key principle: use project management. This understanding is vital because effective project management provides the structure, discipline, and strategies necessary to navigate the complexities of recovery efforts.

Without a shared appreciation of these tools, efforts may lack coordination, leading to inefficiencies, resource mismanagement, and missed opportunities for sustainable development. Project management methodologies ensure that goals are clearly defined, resources are allocated efficiently, risks are mitigated, and progress is monitored systematically.

By fostering collaboration among diverse stakeholders and promoting accountability, these methodologies help to align recovery projects with strategic objectives, maximizing their impact.

Incorporating project management principles is not just about improving efficiency; it is about ensuring that Ukraine's recovery process is transparent, inclusive, and resilient, ultimately building a foundation for long-term national stability and prosperity. Educating and aligning all involved parties on the value of these approaches is, therefore, an indispensable step in overcoming the challenges of recovery.

Rebuilding Ukraine during and after the war is an unprecedented challenge that requires strategic, adaptable, and multidisciplinary approaches. The integration of spatial planning and project management is key, with spatial planning addressing "what needs to be done" and project management focusing on "how to accomplish it." A tailored approach combining methodologies like Agile, PRINCE2, and Hybrid frameworks is essential to balance immediate needs with long-term goals. Strong governance, community engagement, and sustainability are crucial to ensuring effective recovery efforts. This process presents an opportunity to rebuild smarter, greener, and more resilient cities, laying the foundation for Ukraine's future.

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Conflict of interest

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