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GREEN AND INNOVATIVE TRANSFORMATIONS FOR GLOBALIZING CITIES

ЗЕЛЕНІ ТА ІННОВАЦІЙНІ ТРАНСФОРМАЦІЇ ДЛЯ МІСТ, ЩО ГЛОБАЛІЗУЮТЬСЯ

Sarkisian Larysa
PhD in Economics, Associate Professor,
State University of Trade and Economics
ORCID: https://orcid.org/0000-0003-3030-5000

Varlamova Mariia
PhD in Economics, Associate Professor,
Vasyl Stus Donetsk National University
ORCID: https://orcid.org/0000-0001-7111-1136

Саркісян Лариса Геворгівна
Державний торговельно-економічний університет

Варламова Марія Леонідівна
Донецький національний університет імені Василя Стуса

Cities are engines of economic growth and competitiveness and simultaneously key sources of ecological and social vulnerability. Urban areas create networks interlinked with common economic, cultural, social, environmental, and digital processes which help attract international flows of capital and talent. As a result, the global climate change agenda, energy issues, intense migration, and changing security challenges lead to reshaping urban development policies in an increasingly globalizing world, prioritizing the combination of approaches that enhance growth and sustainability principles. In this paper, we discuss how rethinking established approaches to urban development, effective strategic and tactical spatial planning, a high degree of economic and social integration into global processes, green energy transformation, and security provision can increase city competitiveness. We then identify the main factors and consequences of urban transformation in the context of involvement in global economic processes in chosen regions. Against this background, we suggest priority actions of strategic planning process aiming to intensify Ukrainian cities' integration into the global economy (case studies of Kyiv and Lviv) during the war and post-war recovery and reconstruction. It is expected that the study's results will clarify the vision of cities as engines of global and local economic growth and define the key priorities of strategic planning in the transformation period. On that basis, adaptation to new economic, social, and ecological conditions and processes will significantly increase the efficiency of urban management practices, namely, to the city's emergence as an innovation hub. A self-sustaining innovation ecosystem that is capable of implementing the technologies of the Fourth Industrial Revolution and positively reshaping the quality of life in urban areas. In such circumstances, the ability to respond to shocks of different levels will be a key sign of the resilience of globalizing cities. The findings can be limited by a small sample of cities for research and the lack of available and/or reliable data due to incomplete scattered and hidden due to security issues information about urban development.

Keywords: energy strategy, urban development, globalizing cities, energy efficiency, ecologisation, "green" transition, sustainable development, climate changes.

Міста є двигунами економічного зростання та конкурентоспроможності та водночас ключовим джерелом екологічної та соціальної вразливості. Міські території створюють мережі, взаємопов'язані спільними економічними, культурними, соціальними, екологічними та цифровими процесами, які допомагають залучати міжнародні потоки капіталу та талантів. Як наслідок, глобальнbq порядок денний зміни клімату, енергетичні проблеми, інтенсивна міграція та зміна викликів безпеці призводять до зміни політики розвитку міст у світі, що все більше глобалізується, надаючи перевагу поєднанню підходів, які сприяють зростанню та принципам стійкості. У цій статті ми обговорюємо, як переосмислення усталених підходів до міського розвитку, ефективне стратегічне та тактичне просторове планування, високий ступінь економічної та соціальної інтеграції в глобальні процеси та перетворення зеленої енергії та забезпечення безпеки можуть підвищити конкурентоспроможність міста. Далі ми визначаємо основні фактори та наслідки міської трансформації в контексті

залучення до глобальних економічних процесів у вибраних регіонах. На цьому фоні ми пропонуємо пріоритетні дії процесу стратегічного планування, спрямовані на посилення інтеграції українських міст у світову економіку (на прикладах Києва та Львова) під час війни та післявоєнного відновлення та відбудови. Очікується, що результати дослідження висвітлить бачення міст як двигунів глобального та місцевого економічного зростання та визначать ключові пріоритети стратегічного планування в період трансформації. На цій основі адаптація до нових економічних, соціальних та екологічних умов і процесів значно підвищить ефективність практик міського менеджменту, а саме – становлення міста як інноваційного хабу. Самопідтримуваної інноваційної екосистеми, яка здатна впроваджувати технології Четвертої промислової революції та позитивно змінювати якість життя в містах. За таких обставин здатність реагувати на шоки різного рівня буде ключовою ознакою стійкості міст, що глобалізуються. Висновки можуть бути обмежені невеликою вибіркою міст для дослідження та відсутністю доступних та/або надійних даних через неповну, розпорошену та приховану через проблеми безпеки інформацію про міський розвиток.

Ключові слова: енергетична стратегія, розвиток міст, міста, що глобалізуються, енергоефективність, екологізація, «зелений перехід», сталий розвиток, зміни клімату.

Statement of the problem. Cities play a leading role in modern global economic processes. Multinational enterprises locate their offices, education institutions, and innovation infrastructure to attract talent from different countries, the financial services sector significantly affects economic development, and creative industries contribute to postindustrial growth in cities like New York, London, Tokyo, and Singapore. The impact of the Fourth Industrial Revolution, healthcare challenges, and changes in the economic and political landscape led to the transformation of the ideas and concepts of urban development – global perspectives open possibilities for creative destruction which shape and transform economic patterns. Cities are reinventing the governance approaches, restructuring the economic stimulus package, and adjusting with long-term growth strategies based on green energy transformation. The purpose of the article is to generate a more balanced economic vision of an environmentally sustainable globalizing city that can be resilient to external and internal shocks in a changing environment. Research methods. In the paper descriptive-analytical techniques were used to identify how cities are coping with transformation challenges and sustainability issues. The question arises what is the impact of governance frameworks, strategies, and practical implications on cities' competitiveness at the global scale in the process of changing needs.

Literature review. Understanding the growing role of cities and their impact on global GDP, scientists and practitioners participate in establishing new approaches, which describe the urban processes in the past few centuries. The first approach addresses a global city or a world city concept that assumes that globalization can be decomposed based on strategic geographical locations that create, facilitate, and approve global processes (pioneered by Saskia Sassen) [1]. The second approach addresses "globalizing cities", a term intended to underscore the diversity of pathways and the place-specific patterns in and through which processes of globalization and urban restructuring were being articulated (pioneered by Peter Marcuse and Ronald van Kempen). This diversity includes a broad range of globalized or globalizing vectors – including not only economic flows but the crystallization of new social, cultural, political, ecological, media, and diasporic networks as well [2].

Therefore, each city can choose its path to economic prosperity and social welfare. At the same time, an increase in urban competitiveness can harm the ecosystem and result in a shortage of drinking water, shrinkage of green zones at a rapid pace, and air pollution problems. In this perspective, only a complex approach can be implemented in a city’s sustainability transformations.

Studying the convergence between the potential of cities to face perturbations and their capacity not only to react but also to use these threats to perform better, to be more prepared, and to become more sustainable and liveable – is an inspiring challenge. In global and globalizing cities per capita, resource use could be lower than in smaller settlements (due to synergies, and economies of scale), while lower unitary costs, high productivity, and diversity of economic opportunities may create highly competitive advantages in the ‘new urban world’ [3].

Taking the historical perspective and Ukrainian cities' wartime experiences, we should also pay attention to the threats that arise because of military actions. Kristin Ljungkvist assumes that political violence has become increasingly urbanized [4]. Russian aggression

in Ukraine, multiple conflicts in different countries (Afghanistan, Syria, Iraq, etc.), and the First and Second World Wars proved that urban settlements are highly vulnerable to impacts of direct and indirect harm and violence during the war.

Presentation of the main research material. Transformational processes in economic and social systems significantly affect the perception of the environment and its relationship with the efficiency of processes and the formation of well-being. Increasing the effectiveness of environmental initiatives requires significantly greater efforts by governments to define goals and prepare investment and financial plans. One of the components on which the implementation of the sustainable development concept is focused is the energy transition. The World Economic Forum calculates the Energy Transition Index (ETI) every year, and its results this year are as follows: the global average ETI score has increased by 10% since 2014 but has shown only marginal growth over the past three years; only 18% of countries in 2023 have balanced the imperatives of the energy triangle trilemma (ensuring energy security, ensuring energy equity – access to affordable, clean energy – and achieving environmental sustainability); a compromise has been reached on the transition focus on security and sustainability at the expense of equity; the top 10 countries account for only 2% of global CO2 emissions from fuel combustion and 4% of total energy supply; only 41 (out of 120) countries have made sustained progress over the past decade [5].

Taking advantage of involvement in the global economic system, city authorities, and governance policies and procedures could not always be ready to face the challenges of sustainability transformations. The process should require the development and implementation of a long-term strategy, oriented on improved planning and preparedness to the local and global environmental and energy changes. Cities are the source of significant environmental impacts through pollution, overuse, and pressure on natural resources, and are increasingly vulnerable to climate change and the impacts of natural disasters. For cities worldwide, there is a need for a holistic and systemic approach to modern challenges and the implementation of infrastructure projects aimed at sustainable development and solving environmental problems in connection with economic and social goals, as well as with global tasks of sustainable development.

Considering Ukrainian conditions, it can be stated that urbicide is now taking place in Ukrainian cities. Urbicide is not simply about the devastating impact of urban wars, nor merely about the city as a theater of violence. Russia's ongoing urbicide represents a particular form of purposeful violence in and against cities, where the city and *urbanity* itself are the strategic targets (Mariupol, Bakhmut, and Siverodonetsk as examples). Cities have often been targeted by authoritarians, not just for their tactical value, but also because of what they represent: tolerance, cosmopolitanism, intellectual life, heterogeneity, diversity, and democracy [6].

To mitigate the economic, social, and ecological consequences of war and find a new way to urban resilience, local authorities and residents are interested in information exchange, and cooperation with local and international city networks (Association of Ukrainian Cities, Global Cities, Global Cities Education Network) and in finding strategic options. United Nations Office for Disaster Risk Reduction (UNDRR) developed the Ten Essentials for Making Cities Resilient to accelerate the implementation of the Sendai Framework for Disaster Risk Reduction (2015–2030) at the local level. The Ten Essentials map directly against the Sendai priorities of action and its indicators for monitoring actions on disaster risk reduction. They are the critical and independent steps that need to be undertaken to build and maintain resilience (Table 1).

Essential 3 states that cities should strengthen their financial capacity for resilience. Because, when the economy goes, the entire urban resilience edifice crumbles. So, the worst hazard to confront an urban area is the loss of its economic base. Due to resulting constrained public sector resources, such a situation indeed impairs the mounting of effective reactions to other types of hazards. Prosperous cities that are leveled by earthquakes or hurricanes are rebuilt, but where the economic base has been severely atrophied, large urban sectors are allowed to deteriorate, until the built environment either burns or ruts and is eventually overtaken by nature [8].

It is often rather difficult for cities to replace lost economic activity, especially if it concerns a city that boasts no identifiable benefits. What works in one period yields no effect in the next, though the reason behind this subsequent failure remains unclear. One thing, however, is clear. Cities, like entrepreneurs, need to tirelessly search for economic innovation and accept the fact that some of these efforts will be fruitless –

without being able to know which from the outset. After all, sitting still is even more fruitless, and much riskier from a social point of view as well [9].

Table 1

Ten Essentials for Making Cities Resilient

№	Type
Essential 1	Organize disaster resilience
Essential 2	Identify, understand, and use current and future risk scenarios.
Essential 3	Strengthen financial capacity for resilience.
Essential 4	Pursue resilient urban development and design.
Essential 5	Safeguard Natural Buffers to Enhance the Protective Functions Offered by Natural Ecosystems
Essential 6	Strengthen Institutional Capacity for Resilience
Essential 7	Understand and Strengthen Societal Capacity for Resilience
Essential 8	Increase Infrastructure Resilience
Essential 9	Ensure Effective Preparedness and Disaster Response
Essential 10	Expedite recovery and build back better.

Source: UNDRR, 2015 [7]

International banking and producer services replace manufacturing as the engine for economic growth and social patterning in the world's major cities [10]. As a result, they are evaluated as global service centers in each of these sectors, and aggregation of these results provides a measure of a city's global capacity or world-cityness [11]. For MNEs, the growing independence from the local country context and the increasing global convergence make global cities unique locations that bridge supranational and subnational contexts [12]. Apart from the higher education requirements for many office-based service jobs, an important difference between the relocation of services and manufacturing to developing countries is the strong concentration of service investments in large cities. Services offshoring remains fundamentally an urban phenomenon [13]. Globalizing cities also play an important role in internationalizing small and medium-sized enterprises. Sustaining economic growth in globalizing cities could be achieved through effective strategic and tactical spatial planning, a high degree of economic and social integration into global processes, and green transformation and security provision.

As the world grapples with the pressing challenges of climate change and rapid urbanization, cities emerge as focal points for sustainable development and green innovation. Kyiv and Lviv, two prominent cities in Ukraine, have the potential to lead the charge in transforming themselves into thriving innovation hubs that prioritize environmentally friendly practices and technologies. Moreover, considering the aftermath of a war that brings immense challenges for cities, including destruction, displacement, energy security risks, and environmental degradation, Kyiv and Lviv can seize this moment to transform into beacons of innovation and sustainability during their post-war recovery. There are a few components that lead our vision to the green transformation of these cities.

1) Expansion and enhancing renewable energy in the cities. The Russian war against Ukraine showed that one of the main goals for attacking the country was the energy sector and the energy infrastructure of cities. That is why cities need to remain energetically stable and independent, to develop decentralized generation, in particular with the use of renewable energy sources. During the reconstruction and recovery, Kyiv and Lviv can embrace renewable energy sources to power their resurgence. Solar energy, in particular, presents a vast potential for Ukraine, with its ample sunlight throughout the year. Installing solar panels on rooftops and developing solar farms on the outskirts of these cities can tap into this abundant renewable resource.

2) Sustainable Reconstruction. Post-war recovery provides a unique chance for Kyiv and Lviv to prioritize sustainable building practices and infrastructure development. Utilizing eco-friendly construction materials, obtaining green building certifications, and designing energy-efficient structures will be crucial in achieving long-term sustainability. Investing in smart city technologies can optimize resource utilization and enhance overall urban resilience.

3) Green Transportation and Connectivity. Efficient and sustainable transportation systems are essential components of post-war recovery. Kyiv and Lviv can focus on expanding public transportation options with electric buses, trams, and commuter trains to reduce carbon emissions

and combat air pollution. Implementing bike-sharing programs and creating pedestrian-friendly zones will promote eco-friendly mobility and enhance overall connectivity.

4) Circular Economy Initiatives. Implementing circular economy principles will be instrumental in achieving resource efficiency and waste reduction in Kyiv and Lviv. Developing recycli-ng facilities, promoting upcycling, and encouraging eco-friendly product design can contribute to a sustainable and resilient economy during the post-war recovery phase.

5) Innovation and Collaboration. Innovation and collaboration among academia, industry, and government will play a pivotal role in achieving sustainable solutions during the post-war recovery period. Establishing innovation centers and research clusters focused on green technologies can attract investments and foster knowledge-sharing for long-term success.

Since the agenda of ecologically balanced and innovative development of cities is becoming more and more important. At the same time, the level of decentralization of the necessary actions aimed at the development of "green" and harmoniously developed cities is also increasing, the European Bank for Reconstruction and Development (EBRD) adopted the approach of "transition to the green economy" (Green Economy Transition), which aims to increase the

Table 2

Green City Program possibilities for Kyiv and Lviv

Components of green and innovative transformation	**Green City Program possibilities for Kyiv and Lviv**
Expansion and enhancing renewable energy in the cities	The Program offers an opportunity for Kyiv and Lviv to develop and upgrade green infrastructure projects. This may include investments in renewable energy sources, energy-efficient public transportation, waste management facilities, and green spaces such as parks and urban gardens. By adopting these green initiatives, the cities can reduce their carbon footprint and improve air and water quality. Moreover, under the program, Kyiv and Lviv can implement energy efficiency measures in public buildings, street lighting, and other municipal facilities. These upgrades can lead to significant energy savings, cost reduction, and decreased greenhouse gas emissions, contributing to a more sustainable and eco-friendly urban environment.
Sustainable Reconstruction	The Program provides funding and technical assistance for the development of sustainable infrastructure projects. Kyiv and Lviv can take advantage of this opportunity to rebuild their damaged infrastructure using eco-friendly materials and adopting sustainable building practices. Implementing energy-efficient measures in public buildings, schools, hospitals, and other municipal facilities will not only reduce environmental impact but also lead to long-term cost savings.
Green Transportation and Connectivity	The Program supports the development of sustainable transport systems. Kyiv and Lviv can explore opportunities to invest in electric buses, trams, and other forms of eco-friendly public transportation. Implementing bike-sharing schemes and pedestrian-friendly infrastructure can also enhance urban mobility and reduce air pollution.
Circular Economy Initiatives	Through the program, Kyiv and Lviv can adopt circular economy practices, such as promoting recycling, waste reduction, and resource efficiency. By establishing waste-to-energy facilities and encouraging the reuse of materials, the cities can move towards a more sustainable and circular economic model.
Innovation and Collaboration	The Program offers technical assistance and capacity building to support cities in planning, implementing, and monitoring their green projects. Kyiv and Lviv can access expertise and knowledge-sharing platforms to design and execute their sustainable urban development strategies effectively. Moreover, the Program provides Kyiv and Lviv with opportunities to collaborate with other cities in the region and beyond. By joining a network of green cities, they can exchange best practices, learn from successful initiatives, and gain inspiration to further enhance their sustainability efforts.

Source: our elaboration

share of "green" projects in the Bank's investment portfolio, including through the Green City Program. The EBRD Green City Program is an initiative aimed at supporting cities in improving their environmental sustainability and enhancing the quality of life for their residents. The program provides financing, technical assistance, and expertise to help cities implement green infrastructure projects and adopt sustainable practices. Kyiv and Lviv can take advantage of great opportunities from participation in this initiative for green and innovative development. Even though Kyiv became part of the initiative in 2019 [14], it does not fully utilize all opportunities. In the table below, we present the possibilities of the program, which can strengthen our vision for the development of green and innovative Kyiv and Lviv (Table 2).

In addition, for Lviv, participation in the program will allow the development of the "Green City" Action Plan as one of the tools for harmonizing long-term development goals with the ambitious "green growth" program, demonstrating a commitment to the global "green" agenda, will provide the city with long-term investments in various sectors of the economy, which will become important in post-war reconstruction. The "Green City" Action Plan was developed for Kyiv in 2022.

Conclusions. Taking into account the fact that as a result of military actions and targeted terror of the Russian Federation, the energy infrastructure in Ukraine has suffered significantly and, most likely, will suffer in the future, it is expedient to form new decentralized approaches to its restoration, which will ensure its sustainability and environmental friendliness to intensify the energy transition in of Ukraine and approximation of national norms in the energy sector to European ones.

The paper has implications for the generation of a vision of urban sustainable development based on an effective energy strategy which will help to overcome the growing challenges facing municipalities. The findings can help to find mitigation mechanisms of disruptions focusing on increasing the resilience of globalizing cities, rethinking international municipalism, and considering the benefits of a greater diversity of interests. The research will be useful in the context of planning the post-war reconstruction of Ukraine’s cities.

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