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O. Tarasevych,

Doctor of Sciences (Economics), Professor,
Head of the Department of Economic-Legal Issues in Urban Studies,
State Organization “V. Mamutov Institute of Economic and Legal Research of the NAS of
Ukraine”, Kyiv (Ukraine)

<https://orcid.org/0000-0002-6016-3608>

O. Zadoia,

PhD (Economics), Associate Professor,
Senior Researcher of the Department of Economic-Legal Issues in Urban Studies,
State Organization “V. Mamutov Institute of Economic and Legal Research of the NAS of
Ukraine”, Kyiv (Ukraine),

Associate Professor of Global Economics Department,
Alfred Nobel University, Dnipro (Ukraine)

<https://orcid.org/0000-0002-4251-3061>

A. Mahdich,

PhD (Economics), Associate Professor,
Professor of Global Economics Department,
Alfred Nobel University, Dnipro (Ukraine)

<https://orcid.org/0000-0001-9290-9745>

L. Zhylynska,

Doctor of Sciences (Economics), Associate Professor,
Senior Researcher of the Department of Economic-Legal Issues in Urban Studies,
State Organization “V. Mamutov Institute of Economic and Legal Research of the NAS of
Ukraine”, Kyiv (Ukraine)

<https://orcid.org/0000-0002-7524-4507>

SOCIO-ECONOMIC RESILIENCE MODELS OF EUROPEAN CITIES: GUIDELINES FOR POST-WAR UKRAINE

The article examines the socio-economic models of resilience of European cities in the context of intensifying global crises and substantiates the possibilities of their adaptation to the tasks of post-war recovery and development of Ukrainian cities. The relevance of the study is determined by the need to rethink traditional approaches to urban development under conditions of war-related destruction, structural shifts in the economy, demographic losses, and increasing social vulnerability.

The purpose of the article is to provide a theoretical reflection and a comparative economic analysis of the socio-economic resilience of European cities in order to identify the key factors of urban economic resistance to systemic shocks and to formulate adaptive guidelines for the post-war development of Ukrainian cities. The methodological framework of the study is based on a combination of comparative analysis, a structural-functional approach, and the application of a system of quantitative and qualitative resilience indicators.



The empirical basis of the study includes data from Eurostat, the OECD, the European Commission, as well as strategic urban development documents of Amsterdam, Barcelona, Berlin, Warsaw, Copenhagen, and Tallinn. The assessment of socio-economic resilience was conducted across the following dimensions: economic diversification, employment and labor market conditions, investment activity, fiscal sustainability, institutional capacity, and social cohesion.

The results of the study confirm that a high level of resilience is characteristic of cities with diversified economic structures, well-developed local governance, financial stability, and strong social cohesion. It is substantiated that social cohesion serves as an important intangible resource that enhances the adaptive capacity of urban economies. A comparison of European and Ukrainian cities (Kyiv, Lviv, Odesa, Dnipro, Vinnytsia, and Zhytomyr) demonstrates the feasibility of a selective transfer of European resilience practices, taking into account national and local specificities. The practical significance of the findings lies in the formation of analytical guidelines for post-war recovery strategies and the sustainable development of Ukrainian cities.

Keywords: *socio-economic resilience, urban development, European cities, post-war recovery, economic diversification, social cohesion, institutional capacity, urban economy, strategic planning, Ukraine*

JEL classification: *D21, E02, H12, J24, O18, R11, R12*

У статті досліджено соціально-економічні моделі резильєнтності європейських міст у контексті посилення глобальних кризових явищ та обґрунтовано можливості їх адаптації до завдань повоєнного відновлення і розвитку міст України. Актуальність дослідження зумовлена необхідністю переосмислення традиційних підходів до міського розвитку в умовах воєнних руйнувань, структурних зрушень в економіці, демографічних втрат і зростання соціальної вразливості.

Метою статті є теоретичне осмислення та порівняльний економічний аналіз соціально-економічної резильєнтності європейських міст з метою виявлення ключових чинників стійкості міських економік до системних шоків та формування адаптивних орієнтирів для повоєнного розвитку українських міст. Методологічну основу дослідження становить поєднання порівняльного аналізу, структурно-функціонального підходу та використання системи кількісних і якісних індикаторів резильєнтності.

Емпіричною базою дослідження слугували дані *Eurostat*, *OECD*, Європейської Комісії, а також стратегічні документи розвитку міст Амстердама, Барселони, Берліна, Варшави, Копенгагена та Талліна. Оцінювання соціально-економічної резильєнтності здійснювалося за такими напрямками: економічна диверсифікація, зайнятість і ринок праці, інвестиційна активність, бюджетна стійкість, інституційна спроможність та соціальна згуртованість.

Результати дослідження підтвердили, що високий рівень резильєнтності притаманний містам з диверсифікованою економікою, розвиненим місцевим самоврядуванням, фінансовою стабільністю та високою соціальною згуртованістю. Обґрунтовано, що соціальна згуртованість виступає важливим нематеріальним ресурсом, який підсилює адаптаційні можливості міських економік. Порівняння європейських і українських міст (Київ, Львів, Одеса, Дніпро, Вінниця, Житомир) засвідчило доцільність селективного трансферу європейських практик резильєнтності з урахуванням національних та локальних особливостей. Практичне значення результатів полягає у формуванні аналітичних орієнтирів для стратегій повоєнного відновлення та сталого розвитку міст України.

Ключові слова: *соціально-економічна резильєнтність, міський розвиток, європейські міста, повоєнне відновлення, економічна диверсифікація, соціальна згуртованість, інституційна спроможність, міська економіка, стратегічне планування, Україна*

JEL classification: *D21, E02, H12, J24, O18, R11, R12*

Problem Statement and Review of Publications.

Following the onset of the full-scale war in Ukraine in 2022, the country has suffered substantial economic losses

and large-scale population displacement. According to the UNHCR, as of October 2024, more than 6.1 million Ukrainian refugees were residing in Europe [1]. Such demographic and economic shocks

underscore the urgent need to develop recovery strategies based on the principles of resilience.

In this context, the experience of European cities that have successfully withstood various crises (economic, environmental, and pandemic-related) can serve as valuable reference points for strengthening the socio-economic resilience of Ukrainian cities. A theoretical and methodological analysis of the essence of resilience and its key determinants will make it possible to formulate practical recommendations for building sustainable urban development models under post-war recovery conditions.

The concept of “resilience” originated in ecology (Holling, C. S., 1973) [2] and was later adapted to social and economic systems. Although the notion of resilience itself is not new, its application to regional and urban economies has emerged only in recent decades. Contemporary studies interpret economic resilience as the ability of an economic system to recover or adapt following the impact of adverse exogenous shocks. According to this approach, economic resilience is defined as the “capacity of an economy to recover from or adjust to the effects of unfavourable shocks” [3]. In turn, socio-economic resilience of a city implies the integration of such economic characteristics with the social stability and adaptive capacity of the local community.

Contemporary scholars emphasise that resilience is a multidimensional concept. System resilience is commonly described through a set of key characteristics and parameters, including:

- shock resistance – the ability to minimise disruptions caused by extreme impacts;
- adaptability – the speed and flexibility with which a system responds to changing conditions;
- shock depth – the scale and severity of the negative impact on the system;
- speed of recovery – the time required for the system to return to a stable state (or to transition to a new development trajectory) [4].

Within this paradigm, economic and social resilience are viewed as interrelated phenomena: long-term economic stability is impossible without social support, and vice versa. According to Leshchukh I. V., economic and social resilience should be considered inseparably linked, as strong social ties and trust (social capital), together with a diversified economic base, contribute to faster urban recovery after crises [5]. Accordingly, in economic discourse, the term “socio-economic resilience” of a city is understood as the ability of an urban socio-economic system to withstand shocks and to preserve or restore its development trajectory.

Urban resilience is a complex, multidimensional phenomenon that encompasses the economic, social, infrastructural, environmental, and institutional aspects of a city’s functioning [6]. In a general sense, the socio-economic resilience of a city refers to the capacity of its economy and social institutions to avoid collapse under adverse impacts, to adapt to them, and to ensure the recovery of stable development. This approach implies that a city with a resilient economy can rapidly reconfigure its production and service sectors, while a resilient social system is able to organise social support and social protection for the population during a crisis.

The core components of urban resilience are usually formed at the intersection of economic and social factors. According to the findings of existing studies, the key elements of urban (or community) resilience include:

- social capital (trust, community networks, and residents’ cooperation);
- economic development (employment levels, dynamics of business activity, and business clusters);
- human capital (levels of education and professional qualifications of the population);
- physical resources (resilient infrastructure, housing stock, and critical facilities);
- geographical location (transport accessibility, climatic conditions, and environmental characteristic [7].

Each of these components contributes to strengthening a city's capacity to cope with crisis situations. In particular, well-developed social capital ensures more effective interaction among citizens in emergency circumstances, while a diversified economy (a broad range of industries and enterprises) reduces a city's dependence on the performance of any single sector.

Domestic and international studies propose a wide range of methods for analysing models of urban development; however, a universal typology has not yet been established. Cities are traditionally classified according to their economic profile (industrial, service-oriented, knowledge-intensive) or their strategic orientation (innovative, sustainable development-oriented, circular). A special role in such classifications is assigned to local economic clusters – integrated networks of enterprises and institutions that form specialised hubs (such as technoparks, industrial zones, etc.). For example, Shulha O. V. identifies the development of local economic clusters as an important element of strategies aimed at enhancing resilience [6]. In other words, approaches to the typologisation of socio-economic models of cities emphasise the structure of the local economy (specialisation versus diversification), the role of innovation and creative potential, as well as governance arrangements and the level of social cohesion.

In turn, Fredrik Norris and his colleagues developed a conceptual framework of community resilience that integrates social capital, economic adaptability, social cohesion, and information systems. They defined community resilience as a dynamic process rather than a static characteristic and identified four key components: adaptability, learning, equity, and the capacity for mobilisation [8].

A critical reflection on regional economic resilience was presented in the scholarly work of Ron Martin and Peter Sunley. They identified three main approaches: engineering resilience (a “return” to the previous state), ecological resilience (adaptation to new conditions), and evolutionary resilience (transformation

towards new development trajectories). The authors emphasise that regional resilience is a historical process, shaped by past decisions, institutions, and networks [9].

An understanding of how green infrastructure and biodiversity contribute to urban resilience to climate change, economic crises, and social disruptions is articulated in the research of Elmqvist and colleagues. The authors developed a socio-ecological framework of urban resilience that integrates ecological, social, and economic systems. They define urban resilience as the capacity of an urban system to maintain critical functions and services in the face of shocks. The study highlights the role of natural systems, such as parks, water bodies, and green corridors, in providing ecosystem services and fostering social cohesion [10].

An important contribution to the study of the stability and adaptability of socio-ecological systems was made by Brian Walker and his colleagues, who emphasised the evolutionary nature of resilience and distinguished between three key concepts: resilience (the ability of a system to absorb disturbances), adaptability (the ability to adjust to change), and transformability (the ability to shift to fundamentally new states). The authors demonstrate that some systems may be resilient but not adaptive (locked into undesirable states), or adaptive but not resilient (quickly changing trajectories in response to minor shocks) [11].

The challenge of overcoming contemporary shocks and crises has been examined in a collective study by Michael Trippel and his colleagues. They proposed the concept of transformative resilience, defined as the ability of regions to use crises (such as COVID-19 or energy crises) as windows of opportunity for shifting towards sustainable development trajectories through the reorientation and transformation of regional innovation systems into problem-oriented systems. Unlike traditional concepts that focus on “recovery” or “adaptation,” transformative resilience emphasises a transition towards green development, including decentralisation, the circular economy, and active public engagement [12].

First, institutional capacity encompasses the quality and coherence of local government actions, the effectiveness of the legal system, and the efficiency of governance practices. Institutions enable prompt decision-making and resource allocation during crises, as well as the formation of a regulatory framework for recovery (including planning mechanisms and investment incentives).

Second, community social capital, including levels of trust, civic networks, and volunteer initiatives, facilitates the mobilisation of local resources and enhances the flexibility of the population's response to shocks. Citizens' willingness to cooperate and provide mutual support accelerates the mitigation of the social consequences of crises.

Third, economic diversification refers to the presence of a variety of economic sectors and enterprises within a city. A diversified economic structure reduces vulnerability to the decline of individual markets and increases adaptive capacity. In practice, cities with a broad sectoral base tend to experience smaller losses during periods of recession.

The systemic integration of strong institutions, active social capital, and a diversified economy forms a resilient urban model. Within such a model, local authorities respond swiftly to emerging challenges, communities consolidate to support vulnerable groups, and business processes rapidly adapt to new conditions. Thus, resilience represents a complex outcome of the synergy of governance, social, and economic factors (institutions + social capital + diversification), enabling cities not only to overcome crises but also to seize new opportunities for sustainable development.

The aim of the article is to provide a theoretical conceptualisation and a comparative economic analysis of the socio-economic resilience of European cities in order to identify the key structural, institutional, and social factors that underpin the resilience of urban economies to systemic shocks, as well as to substantiate adaptive benchmarks for the post-war recovery and long-term development of Ukrainian cities.

The study will be conducted with the aim of testing (confirming or refuting) the following hypotheses:

– **Hypothesis 1.** The level of socio-economic resilience of European cities is positively correlated with the degree of economic diversification and the level of institutional autonomy of local self-government.

– **Hypothesis 2.** Cities with well-developed innovation ecosystems and a stable labour market demonstrate a higher speed of economic recovery after crisis shocks.

– **Hypothesis 3.** Social inclusiveness and community engagement are critical intangible factors of the long-term resilience of urban economies.

– **Hypothesis 4.** The mechanical transfer of European urban resilience models to Ukrainian cities is ineffective without adaptation to existing institutional and fiscal constraints.

Presentation of the Research Results.

To provide an empirical justification of socio-economic resilience models in European cities, the study conducts a comparative analysis of key statistical indicators for six case cities – Copenhagen, Amsterdam, Berlin, Warsaw, Barcelona, and Tallinn. This selection is justified by the presence of diverse challenges whose successful management demonstrates the degree of resilience of these cities: Amsterdam – the transition to a circular economy and climate adaptation; Barcelona – smart city development and digital governance; Berlin – post-crisis transformation and reindustrialisation; Warsaw – adaptation of a post-socialist city; Copenhagen – energy efficiency and the transition to a “green economy”; Tallinn – city-level digital governance and addressing ethnic and linguistic divides. Thus, all the crisis phenomena examined are currently relevant to Ukraine.

The analysis covers parameters of economic diversification, labour market performance, investment activity, budgetary sustainability, institutional capacity, and social cohesion, which together form the foundation of urban socio-economic resilience (Fig. 1).

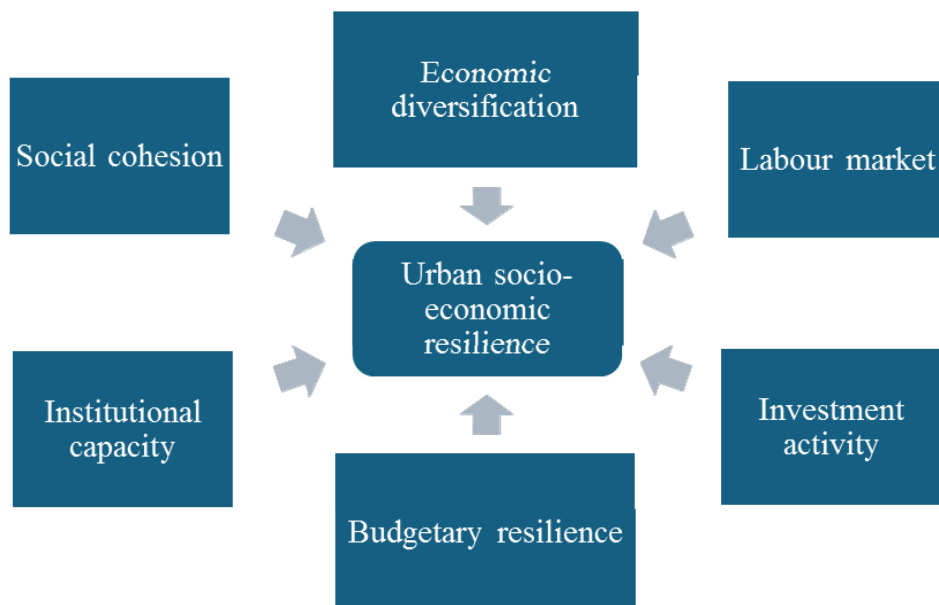


Fig. 1. Components of the foundation of urban socio-economic resilience
Compiled by the authors

The comparative analysis of the gross regional product (GRP) structure shows that the service sector dominates in all the cities under study, which is a characteristic feature of the post-industrial development of European urban economies. At the same time, the degree of economic diversification varies across cities, providing an empirical basis for identifying different models of socio-economic resilience (Table 1). In this context, resilience is understood as the ability of an urban economy not only to withstand external shocks (such as pandemics, energy crises, or disruptions of logistics chains), but also to adapt to them without losing critical functions.

Thus, the service-diversified resilience model can be attributed to cities that demonstrate the highest share of the tertiary sector (services accounting for more than 87%), namely Berlin and Amsterdam. The minimal share of industry (8–10%) indicates that these cities have chosen a knowledge-based economy development path. Their resilience is grounded in income decentralisation: when one sector (for example, tourism) declines, stability is maintained through financial services, IT,

and creative industries. At the same time, this model entails certain risks – most notably a high dependence on global financial flows. However, in most cases, the significant share of public administration and healthcare plays the role of a “stabilising ballast,” sustaining consumer demand even during periods of crisis.

The high-tech industrial buffer model (Copenhagen, Warsaw) is characterised by the preservation of a noticeable share of the secondary sector (industry accounting for 10–13%). In Copenhagen, this is not traditional heavy industry but pharmaceutical production, which creates a model of “specialised resilience”: the presence of a tangible product with high value added makes the city more resistant to fluctuations in the service sector. In Warsaw, the higher combined share of industry and construction (together exceeding 17%) reflects the city’s role as a regional manufacturing hub. This enables the city to recover more rapidly from financial crises due to the strength of its real economic sector.

Tallinn and Barcelona can be classified under the adaptive digitalisation model. These cities are actively transforming

Table 1

Comparative table of the sectoral structure of European cities, 2024–2025
(share of GRP, %) *

City	Services	Industry	Construction	Agriculture	Key sectors
Amsterdam	88.0	8.0	3.8	0.2	International trade, fintech, logistics
Barcelona	89.0	7.5	3.4	0.1	Tourism, pharmaceuticals, biotechnology, digital services
Berlin	87.2	8.3	4.5	<0.1	Creative industries, biotechnology, ICT, tourism
Warsaw	82.5	12.0	5.4	0.1	Finance, logistics, IT, trade
Copenhagen	86.5	10.5	2.8	0.2	Pharmaceuticals, logistics, energy
Tallinn	85.0	12.5	2.2	0.3	Logistics, IT, digital services

* Sources: compiled by the authors based on [13–18]

their economic structures towards digital services in order to overcome past constraints (a small domestic market in Tallinn or excessive dependence on tourism in Barcelona). In Tallinn, 85% of services are primarily associated with the export of IT solutions. Resilience in this case has a “cloud-based” character: the economy is not tied to physical assets and can be easily scaled or virtually relocated. Barcelona, in turn, demonstrates an effort to shift from a model of “tourism vulnerability” towards that of a technological hub. The 89% share of services is gradually being reallocated from hospitality and tourism to biotechnology and digital platforms.

This analysis makes it possible to draw several key conclusions. First, an important indicator of urban resilience is the post-industrial threshold: the optimal share of the service economy is 80–85%. Lower values indicate an underdeveloped service sector, while higher values point to the risk of excessive concentration in a single sector. Second, the share of construction should remain within the range of 3–5%. A significant excess signals overheating of the real estate market, whereas an insufficient share indicates stagnation in infrastructure development. Third, service diversification is crucial: the most resilient cities demonstrate a balanced distribution between public services (ensuring social stability) and business services (driving economic growth). Overall, the data confirm that the contemporary model

of urban resilience is based on structural flexibility rather than resource accumulation. The most resilient cities combine a high level of digitalisation (Tallinn) with a high-tech industrial core (Copenhagen).

At the same time, the situation in the labour markets of European cities in 2024–2025 demonstrates significant unevenness, ranging from record-low unemployment in Warsaw to structural challenges in Berlin (Table 2).

Warsaw remains the city with the lowest unemployment rate among EU capitals. Despite a slight increase in unemployment at the national level (to 5.4% in July 2025), unemployment in Warsaw itself remains at a minimum. The city faces an acute shortage of highly skilled professionals.

Denmark set a historical record in 2025, with the number of employed persons nationwide exceeding three million. In Copenhagen, unemployment was recorded at 2.9%. The labour market is characterised by the “flexicurity” model, which combines flexible hiring and dismissal practices with a high level of social protection.

The Dutch labour market remains one of the tightest in Europe, with the number of job vacancies often exceeding the number of job seekers. The unemployment rate in Amsterdam fluctuates around 4%. The main challenge is labour shortages in technical and healthcare sectors.

Barcelona demonstrates the strongest employment performance in recent decades.

Table 2

Comparative table of labour market conditions in European cities, 2024–2025*

City	Unemployment rate (%)	Labour market condition	Main employment sectors
Amsterdam	4.0	Very tight	Fintech, international trade, tourism
Barcelona	7.0	Rapid improvement	Technology, digital services, tourism
Berlin	10.2	Structural changes	Creative industries, healthcare, public administration
Warsaw	1.5	Labour shortages	IT, finance, logistics, business services
Copenhagen	2.9	Record employment	Pharmaceuticals, green energy, IT
Tallinn	7.1	Stabilisation	ICT, services sector, start-ups

* Sources: compiled by the authors based on [13–17,19]

The unemployment rate in the city fell to 7% in March 2025, which is significantly lower than the national average in Spain (10.5%). March 2025 marked a record high in the number of workers registered in the social security system.

The Tallinn economy is undergoing a period of stabilisation following a volatile start to the year. Unemployment in the third quarter of 2025 declined to 7.1%, compared to 8.6% in the first quarter. Employment is increasing among young people, while it is declining in the industrial sector.

Berlin presents a specific situation characterised by simultaneously high unemployment and a large number of vacancies in the technology sector. In November 2025, the registered unemployment rate in Berlin reached 10.2%. This is linked to the ongoing transformation of the city's economy and the inflow of a large number of migrants who are still in the process of integrating into the labour market.

Thus, in the context of assessing the degree of resilience based on labour market indicators, several patterns can be identified. Eastern European cities demonstrate high adaptability due to low entry barriers and labour market dynamism (Warsaw), as well as through digital flexibility (Tallinn). Western European cities (Amsterdam and Copenhagen) exhibit resilience grounded in labour shortages, which stimulate investment in automation and employee

retention strategies. Cities in Southern and Central Europe are situated in a phase of structural transition: Barcelona is shifting from seasonal tourism-related vulnerability towards more stable, technology-based employment, while Berlin is undergoing a process of reindustrialisation.

The analysis of investment activity and the role of small and medium-sized enterprises (SMEs) in 2025 indicates a profound structural transformation of European cities. Against the backdrop of a pan-European slowdown in foreign direct investment (FDI), major metropolitan areas are emerging as “islands of resilience” due to their strategic concentration on artificial intelligence, biotechnology, and the energy transition (Table 3).

The analytical review allows us to identify the following key trends:

- Amsterdam in 2025 has become a global testing ground for the implementation of Doughnut Economics, where economic growth is subordinated to social and environmental boundaries. The main recipients of capital are fintech start-ups operating in the field of sustainable finance, as well as digital transformation projects. Small businesses form the backbone of the *Amsterdam Circular 2050 strategy*. Here, SMEs are not merely part of the service sector, but active actors in repair, recycling, and the sharing economy).

- Warsaw in 2025 has firmly established itself among the top three most

Table 3

Investment profile and the role of SMEs in European cities, 2025*

City	Investment status (FDI 2025)	Key investment sectors	Role of SMEs and start-ups
Amsterdam	5th place in Europe	Logistics, impact investing	Close integration of SMEs into global value chains.
Barcelona	1st place for FDI strategy	Digital healthcare, Green Tech	A strong start-up ecosystem (Barcelona Tech City).
Berlin	Top 10 (Major Cities)	Pharmaceuticals, AI, creative industries	A venture capital hub; SMEs account for over 60% of jobs.
Warsaw	3rd place in Europe	IT, fintech, R&D, data centres	Home to 22% of all Polish start-ups; a powerful outsourcing hub.
Copenhagen	Leader among mid-sized cities	Life sciences, renewable energy	SMEs as key drivers of green innovation.
Tallinn	Leader (Micro Cities)	Cybersecurity, e-government, AI	The highest number of unicorns per capita.

*Sources: compiled by the authors based on [13–23]

attractive cities for investment, ranking just behind London and Dublin. The city attracted over USD 1 billion in investment into the IT sector in the past year alone. The SME sector in the Warsaw metropolitan region generates nearly 18.3% of Poland's GDP [16]. A clear transition is underway from simple outsourcing towards the development of proprietary product-based IT companies.

- Berlin, despite the overall economic recession in Germany, remains the largest recipient of venture capital in the country. In 2024-2025, Berlin became a leader in terms of investment volume in the pharmaceutical sector and in the construction of large-scale data centres. At the same time, the city actively supports micro-SMEs in the creative sector, which helps sustain Berlin's reputation as the cultural capital of Europe [22].

- Barcelona has been recognised as the city with the most effective FDI attraction strategy in 2025. Investment is primarily focused on reindustrialisation through high technologies and semiconductors. The SME sector is critically important for resilience in this context, as the city is reorienting small tourism-related businesses towards the provision of digital services.

- Copenhagen in 2025 demonstrates the highest level of specialisation, which makes it highly competitive but also

dependent on specific industries. The city remains a magnet for FDI in the Life Sciences and Green Tech sectors [21]. The main investment flows are directed towards pharmaceutical development and offshore wind energy. Copenhagen has developed a model of "innovation satellites," in which small and medium-sized enterprises operate in close collaboration with large corporations, providing them with highly specialised scientific research and services.

- Tallinn continues to outperform larger cities in terms of digitalisation and the attraction of investment into security technologies, with a strong focus on AI and DefenseTech against the backdrop of ongoing geopolitical challenges. The Estonian SME model is among the most flexible in Europe: nearly 99% of companies are small enterprises, and the majority of them operate in the export of digital services [22].

Thus, in all the cities examined, SMEs play the role of an "economic shock absorber": even when large corporations reduce their workforce, SMEs continue to create jobs; moreover, through investment inflows and digital transformation, SME sectors demonstrate growth in value added. The analysis of investment activity also shows that all the studied cities actively use green and digital investments as tools for

enhancing resilience. Warsaw, by joining the EBRD “Green City” programme, is implementing a comprehensive action plan that includes around 27 projects aimed at reducing emissions and modernising infrastructure [24]. Amsterdam, in turn, is implementing a circular economy strategy focused on reducing resource dependency and creating new jobs in the fields of recycling and repair [18].

The financial capacity of cities varies significantly depending on the model of state governance and the level of decentralisation. Amsterdam demonstrates a high capacity for self-financing through property taxes and tourist levies (the highest in Europe in 2025). As a result, its budget is oriented towards long-term “circular” sustainability. The city holds substantial liquid reserves, which allows it to respond relatively easily to exogenous shocks.

Berlin, as a federal state, has the largest municipal budget but also the highest level of debt burden, which is nevertheless mitigated by the system of intergovernmental fiscal equalisation and transfers from the federal budget. However, the high debt load constrains new public investment, forcing the city to increasingly seek private partnerships.

Copenhagen demonstrates a combination of stable economic growth and environmental transformation, which creates a solid foundation for long-term investment. The Copenhagen municipal budget for 2025 is among the most surplus-oriented in the world. Consequently, the city’s resilience is based on substantial pension funds and corporate tax revenues, particularly from pharmaceutical giants. A distinctive feature of the Danish capital’s model is the active use of green bonds to finance infrastructure, which helps reduce borrowing costs.

Barcelona and Warsaw have more limited budgetary autonomy, yet they actively leverage national and European financial instruments to implement innovation- and climate-oriented projects. After years of high indebtedness, Barcelona in 2025 demonstrates a stable reduction in its debt burden; however, the service sector and value-added tax (VAT) remain the main

sources of revenue, making the city budget sensitive to fluctuations in consumer demand. Warsaw is currently entering a phase of restored fiscal autonomy following reforms of local government finance implemented in previous years. An increase in the city’s share of personal income tax revenues is expected, which will further strengthen budgetary resilience.

With regard to Tallinn, despite relatively small absolute fiscal figures, the city has one of the lowest debt-to-GRP ratios among European capitals. Owing to the full digitalisation of public administration, the operating costs of the municipal budget are minimal, which in turn makes it possible to achieve a relatively high level of resilience supported by low debt exposure. However, the key risk associated with the security dimension, arising from ongoing geopolitical threats, remains highly relevant and necessitates a revision of strategic objectives, including those related to sources of financing.

An analytical overview of the budgetary resilience of the selected cities, based on reports from credit rating agencies and Eurostat data, is presented in Table 4.

The analysis of these cities’ budgets makes it possible to distinguish three types of fiscal resilience:

- investment-based resilience (Copenhagen, Amsterdam): the ability to attract low-cost capital through green and social bonds;
- institutional resilience (Berlin, Barcelona): reliance on state support and strict fiscal rules;
- dynamic resilience (Warsaw, Tallinn): flexibility based on rapid reforms and digital transparency.

Overall, urban budgetary resilience in 2025 is determined by cities’ ability to balance rising expenditures on the green transition, social support, and debt servicing under conditions of moderate economic growth.

Alongside fiscal autonomy, another closely related indicator of resilience is the level of institutional capacity. Both aspects are critically important determinants of

Table 4

Comparative analysis of budgetary resilience in European cities, 2025*

City	Credit rating	Debt level	Fiscal autonomy
Amsterdam	AAA	Moderate	High
Barcelona	A- / BBB+	Decreasing	Medium
Berlin	AAA	High	Medium (federal transfers)
Warsaw	A-	Medium	Growing
Copenhagen	AAA	Very low	High (own-source taxes)
Tallinn	AA-	Low	Growing (digital efficiency)

*Sources: compiled by the authors based on [25–27]

urban resilience, especially in times of crisis. Institutional capacity is primarily shaped by the characteristics of the governance structure. All six cities have elected local self-government bodies, albeit with differing degrees of autonomy. Berlin simultaneously functions as a federal state (Land) within Germany, with its own government (the Senate), budget, and a regional subdivision into city districts. Copenhagen, Amsterdam, Barcelona, Warsaw, and Tallinn are municipalities within unitary states, where central authorities define most financial and legislative powers. Nevertheless, in recent years all these cities have been expanding local governance initiatives (for example, pilot projects of citizen participation in Berlin [28]), reflecting a gradual strengthening of institutional flexibility and responsiveness at the municipal level.

The assessment of urban resilience would be incomplete without examining the capacity of residents to respond to contemporary challenges. Therefore, social cohesion represents a critical indicator, as it determines the extent to which an urban community is able to act collectively in the face of crises – whether economic, migratory, or climatic. Within the context of the cities selected for this study, the following distinctive features can be identified:

– Amsterdam has traditionally been regarded as a benchmark of multiculturalism, yet in 2025 this model has been put to the test. The city’s inherently high level of civic participation has come under pressure due to a shortage of affordable housing, which pushes the middle class beyond the city limits and weakens the community’s “social glue” [22];

– Barcelona employs urban planning as a tool for restoring neighbourhood ties. The creation of pedestrian zones has increased levels of local interaction by 15% [15]. However, amid the shift from tourism dependence to the Barcelona Tech City concept, a key challenge remains – the conflict between tourism needs and the quality of life of local residents;

– Berlin’s social cohesion is built primarily at the district level and can be characterised as solidarity in diversity. The city has the highest number of volunteer organisations per capita in Germany. However, income disparities and a high level of dependence on social transfers in certain districts create pockets of social vulnerability [29];

– Warsaw’s cohesion in 2025 has been largely shaped by the success of the long-term integration of millions of Ukrainians. The level of social tension remains low due to shared cultural values and active support from non-governmental organisations. At the same time, increased pressure on the healthcare and education systems generates risks of community fatigue [30];

– Copenhagen consistently ranks at the top in terms of social capital and corresponds to a high-trust model. More than 75% of residents trust other people and the municipal authorities. Resilience is built around the concept of co-creation, whereby residents actively participate in urban planning processes. However, despite overall cohesion, geographical segregation persists (a wealthy city centre contrasted with socially disadvantaged neighbourhoods) [30];

– Tallinn demonstrates a model in which the digital state (e-government) acts as a mediator of public trust. Digital services are accessible to 99% of residents, which minimises corruption and increases trust in institutions. The main remaining challenge is the full integration of the Russian-speaking population into Estonia's socio-cultural space [31].

A summary of the characteristics of social cohesion is presented in Table 5.

Thus, from a resilience perspective, social cohesion functions as an “invisible infrastructure” in these cities: in high-trust cities, expenditures on control and law enforcement are lower, while cities with strong social ties respond more effectively to crises through networks of mutual aid. As a result, social cohesion helps cities attract highly skilled human capital, which in turn supports labour market stability and overall economic resilience.

The comparative analysis of statistical data indicates that the socio-economic resilience of European cities is formed at the intersection of economic diversification, labour market efficiency, investment activity, institutional capacity, and social cohesion. Cities with more diversified economic structures, active small business sectors, and well-developed mechanisms of community participation demonstrate a higher capacity for adaptation and recovery after crises, providing valuable benchmarks for the post-war reconstruction and long-term development of Ukrainian cities.

The analysis of European resilience models reveals significant potential for adaptation; however, some elements are incompatible with the Ukrainian context, and their direct transfer would therefore be counterproductive.

First, the fiscal autonomy of Amsterdam, Copenhagen, and Berlin is based on a stable tax base and well-developed local financing systems formed over decades. Copenhagen attracts capital through green bonds, Amsterdam generates substantial revenues from tourist levies, and Berlin relies on federal transfers. Ukrainian

cities, especially under conditions of wartime losses, do not possess comparable resources. Moreover, the reform of local public finance in Ukraine remains incomplete, and property taxation as a revenue base is insufficiently developed, which makes the direct transfer of fiscal models, particularly those involving Eurobond financing, unfeasible [34].

Second, the political decentralisation of the Netherlands and Denmark, where cities enjoy substantial autonomy, stands in contrast to the Ukrainian system, which remains dependent on centralised programmes and discretionary transfers. In the Netherlands, cities participate in shaping national policy, while Denmark applies a co-creation model that involves residents in planning processes. The Ukrainian context, in which the war has led to a concentration of authority within central institutions, makes such models largely impractical in the short term. An overly rapid expansion of local powers during a period of crisis could weaken the coordination of recovery efforts [35].

Third, the economic specialisation of Copenhagen and Tallinn is rooted in global networks and the long-term accumulation of competencies. Copenhagen has been developing its pharmaceutical cluster since the 1950s, while Tallinn acquired its digital capabilities through post-socialist reforms in the 1990s. Owing to the impacts of military conflict, Ukraine cannot rapidly replicate such specialised ecosystems. A strategy aimed at the immediate capture of narrow niches would therefore be counterproductive; instead, greater emphasis should be placed on economic diversification aligned with existing capabilities.

Finally, social cohesion in European cities is rooted in long-standing traditions of civil society and, in many cases, linguistic homogeneity. Copenhagen exhibits a high level of interpersonal trust, whereas Tallinn faces challenges related to linguistic fragmentation. Ukrainian cities, which have absorbed millions of internally displaced persons, confront far more acute challenges of social integration and language barriers. Models based on relatively homogeneous

Table 5

Comparative characteristics of social cohesion in European cities, 2025*

City	Level of interpersonal trust	Inclusion index (migrants/minorities)	Main challenge to social cohesion
Copenhagen	Very high	High	Segregation in suburban areas
Amsterdam	High	High	Housing inequality (gentrification)
Tallinn	Medium	Medium	Linguistic and ethnic divide
Berlin	Medium	High	Political polarisation and poverty
Warsaw	Growing	Medium	Refugee integration (resource sustainability)
Barcelona	High	Medium	Social stratification between districts

*Sources: compiled by the authors based on [15, 27, 29–33]

communities are therefore inadequate for a context characterised by high population mobility [36].

At the same time, among European practices there are elements that can be productively adapted. These practices do not imply the direct transfer of institutional systems, but rather provide methodological principles and motivating examples. Their implementation would also significantly enhance Ukraine's overall competitiveness on its path towards European integration [37].

It is evident that a strategy of economic diversification through the development of small and medium-sized enterprises (SMEs) demonstrates universal applicability. For Ukrainian cities, this principle can be adapted through:

- simplifying SME registration procedures during the stabilisation phase;
- expanding SME lending through state development funds;
- clustering SMEs within selected sectors (such as IT services, agrotechnologies, and mechanical engineering).

It can also be acknowledged that digital transformation of public administration can be implemented more rapidly and at lower cost. Ukraine has initiated digitalisation through the Diia platform; however, scaling this approach to the level of municipal services can be accelerated. Importantly, digital transformation does not require substantial capital investment [38].

A further critical element is the implementation of a circular economy strategy, which in Ukraine should be pursued through a revision of land-use approaches, the development of recycling and processing industries, and the introduction of environmental criteria into urban policy. Public consultations and local decision-making regarding street redesign and urban renewal can foster resident engagement and strengthen local identity, thereby enhancing citizen participation in urban planning and improving social cohesion.

Finally, the development of partnerships between the state, local businesses, and civil society enables the implementation of complex projects without excessive public expenditure. For Ukraine, this implies strengthening mechanisms of public-private partnership, particularly in energy, transport, and social infrastructure sectors.

To extrapolate European models of urban socio-economic resilience to the Ukrainian context, the study formed a comparative group of Ukrainian cities that are comparable in terms of socio-economic challenges and crisis phenomena. This group includes Kyiv, Lviv, Odesa, Dnipro, Vinnytsia, and Zhytomyr, which represent different types of urban economies, levels of institutional capacity, and adaptive strategies under conditions of wartime and post-war transformation (Table 6).

Table 6

Extrapolation of European models of urban socio-economic resilience to the Ukrainian context*

Cities	Key shared characteristic	Key shared challenges
Amsterdam – Lviv	Service-oriented, innovation-driven economy	Infrastructure overload, housing affordability, and migration pressure
Barcelona – Odesa	Port, tourism, and creative industries	Decline in tourist flows, social polarisation, and security concerns
Berlin – Kyiv	Capital city, polycentric model	Complex governance, uneven district development, and IDP integration
Warsaw – Dnipro	Industrial–transformational model	Structural restructuring, labour market challenges, and infrastructure modernisation
Copenhagen – Vinnytsia	Efficient municipal governance	Financial resilience and modernisation of municipal infrastructure
Tallinn – Zhytomyr	Mid-sized city with limited resources	Dependence on transfers, modernisation of governance, and population outflow

*Compiled by the authors

Taking into account the analysis conducted, it is necessary to define the priorities for developing a specific Ukrainian model of a resilient city, which include:

- economic diversification of sectors, taking into account the requirements of the digital transition;
- institutional robustness without institutional copying;
- the implementation of inclusive economic and social development;
- resource efficiency as a guiding development principle;
- deepening decentralisation;
- attracting international capital through improvements in the investment climate.

It is important to recognise that the integration of Ukrainian cities into the European economic space should not be postponed until the completion of reconstruction. This process must begin in parallel with post-war rebuilding, creating the conditions for a dynamic and accelerated integration into the European Union.

Conclusions.

The study confirms that the socio-economic resilience of contemporary European cities is formed as a multidimensional phenomenon that integrates economic, institutional, and social components and determines the capacity of urban systems to adapt to crises, recover from shocks, and ensure long-term development.

Accordingly, all four proposed hypotheses have been empirically confirmed.

Hypothesis 1. Based on a comparative analysis of Amsterdam, Barcelona, Berlin, Warsaw, Copenhagen, and Tallinn, it has been established that the most resilient cities are those with a diversified economic structure, a well-developed small and medium-sized enterprise sector, high institutional capacity of local self-government, and active community participation in governance processes.

Hypothesis 2. The empirical results indicate that economic diversification reduces the vulnerability of urban economies to sectoral and external shocks, while a stable labour market and investment activity act as key drivers of rapid recovery. At the same time, budgetary resilience and access to multi-level financial resources, including national and European funds, significantly enhance cities' capacity to implement anti-crisis and transformative strategies.

Hypothesis 3. Social cohesion plays a pivotal role in ensuring resilience, manifested through high levels of trust, satisfaction with urban life, inclusive urban policies, and resident participation in decision-making. The comparative analysis demonstrates that cities with stronger social cohesion not only adapt more effectively to crisis conditions but also exhibit greater resilience to long-term structural changes, including demographic and technological shifts.

Hypothesis 4. The comparison of European case studies with Ukrainian cities (Kyiv, Lviv, Odesa, Dnipro, Vinnytsia, and Zhytomyr) substantiates the possibility of adapting selected elements of European resilience models to the conditions of post-war recovery in Ukraine. At the same time, the findings confirm that direct copying of institutional or economic solutions is ineffective; instead, a selective transfer of practices is required, taking into account the scale of destruction, security risks, financial constraints, and the social structure of Ukrainian cities.

The practical significance of the obtained results lies in the formulation of analytical benchmarks for the development of post-war recovery and sustainable development strategies for Ukrainian cities, particularly in terms of enhancing economic diversification, strengthening the institutional capacity of local self-government, fostering social cohesion, and applying innovative and green development instruments. Further research should focus on quantitative modelling of the impact of individual resilience indicators on the economic dynamics of Ukrainian cities in the post-war period.

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SOCIO-ECONOMIC MODELS OF RESILIENCE OF EUROPEAN CITIES: GUIDELINES FOR POST-WAR UKRAINE

Olena V. Tarasevych, State Organization “V. Mamutov Institute of Economic and Legal Research of the NAS of Ukraine”, Kyiv (Ukraine).

E-mail: veppm.nas@gmail.com

Oleksandr A. Zadoia, State Organization “V. Mamutov Institute of Economic and Legal Research of the NAS of Ukraine”, Kyiv (Ukraine); Alfred Nobel University, Dnipro (Ukraine).

E-mail: o.zadoia@duan.edu.ua

Alisa S. Mahdich, Alfred Nobel University, Dnipro (Ukraine).

E-mail: engprog@duan.edu.ua

Lюдмила О. Жылінська, State Organization “V. Mamutov Institute of Economic and Legal Research of the NAS of Ukraine”, Kyiv (Ukraine).

E-mail: ludazhil2017@gmail.com

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The article examines the socio-economic models of resilience of European cities in the context of intensifying global crises and substantiates the possibilities of their adaptation to the tasks of post-war recovery and development of Ukrainian cities. The relevance of the study is determined by the need to rethink traditional approaches to urban development under conditions of war-related destruction, structural shifts in the economy, demographic losses, and increasing social vulnerability.

The purpose of the article is to provide a theoretical reflection and a comparative economic analysis of the socio-economic resilience of European cities in order to identify the key factors of urban economic resistance to systemic shocks and to formulate adaptive guidelines for the post-war development of Ukrainian cities. The methodological framework of the study is based on a combination of comparative analysis, a structural-functional approach, and the application of a system of quantitative and qualitative resilience indicators.

The empirical basis of the study includes data from Eurostat, the OECD, the European Commission, as well as strategic urban development documents of Amsterdam, Barcelona, Berlin, Warsaw, Copenhagen, and Tallinn. The assessment of socio-economic resilience was conducted across the following dimensions: economic diversification, employment and labor market conditions, investment activity, fiscal sustainability, institutional capacity, and social cohesion.

The results of the study confirm that a high level of resilience is characteristic of cities with diversified economic structures, well-developed local governance, financial stability, and strong social cohesion. It is substantiated that social cohesion serves as an important intangible resource that enhances the adaptive capacity of urban economies. A comparison of European and Ukrainian cities (Kyiv, Lviv, Odesa, Dnipro, Vinnytsia, and Zhytomyr) demonstrates the feasibility of a selective transfer of European resilience practices, taking into account national and local specificities. The practical significance of the findings lies in the formation of analytical guidelines for post-war recovery strategies and the sustainable development of Ukrainian cities.

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