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CONCEPT OF MIXED-USE DEVELOPMENT IN UKRAINIAN CITIES: ECONOMIC EFFECT AND IMPACT ON URBAN INFRASTRUCTURE

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КОНЦЕПЦІЯ MIXED-USE DEVELOPMENT У МІСТАХ УКРАЇНИ: ЕКОНОМІЧНИЙ ЕФЕКТ ТА ВПЛИВ НА МІСЬКУ ІНФРАСТРУКТУРУ

The aim of this article is to examine the economic effects of implementing the mixed-use development concept in Ukrainian cities and to analyze its impact on urban infrastructure. The study highlights that mixed-use development is one of the most promising tools for optimizing urban space, as it ensures the integration of residential, commercial, and social functions, supports the formation of compact districts, and reduces commuting (pendulum) mobility. It is demonstrated that this approach contributes to improving the efficiency of urban infrastructure through flexibility, the creation of local centers of activity, enhanced walkability, and the stimulation of local economic development. At the same time, it is established that in the absence of comprehensive planning, the implementation of this concept may lead to significant overloading of engineering networks and transport systems, functional imbalances, and the spatial isolation of individual residential complexes. The study emphasizes the importance of a solid theoretical understanding of mixed-use development, as well as the need to base its implementation on a combination of functional, spatial, economic, and socio-urban approaches, which allow for a comprehensive planning and adjustment of its impact on urban development. The synergistic integration of these approaches within a single space effectively creates self-sustaining urban systems, where the interaction between supply and demand ensures economic viability and increases the market value of real estate. It is concluded that the economic effect of mixed-use development is manifested through the diversification of income sources, the formation of stable local demand, the reduction of household expenses, and the stimulation of small and medium-sized business development, all of which enhance the investment attractiveness of urban areas. The value of this study lies in the comprehensive substantiation of the role of mixed-use development as an effective tool for transforming urban space under conditions of intensive urbanization. Its practical significance and future prospects consist in the development of well-founded recommendations for local governments, developers, and urban planners aimed at improving the efficiency of urban infrastructure use and preventing its overload.

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Метою цієї статті є вивчення особливостей формування економічного ефекту від впровадження концепції mixed-use development у містах України та аналіз її впливу на міську інфраструктуру. В дослідженні звернено увагу на той факт, що багатофункціональна забудова (mixed-use development) є одним із найбільш перспективних інструментів оптимізації міського простору, що забезпечує інтеграцію житлових, комерційних і соціальних функцій, формування компактних районів і зниження маятникової мобільності. При цьому доведена її спрямованість на підвищення ефективності використання міської інфраструктури через гнучкість, формування локальних центрів активності, розвиток пішохідної доступності та активізації локальної економіки. Встановлено, що за відсутності комплексного планування реалізація концепції може призводити до значного перевантаження інженерних мереж, транспортних систем, дисбалансу функцій та формування просторової ізоляції окремих житлових комплексів. У дослідженні звертається увага на важливість теоретичного осмислення багатофункціональної забудови, а також на доцільність базування окресленого процесу на сукупності функціонального, просторового, економічного та соціально-урбаністичного підходів, що дозволяють комплексно спланувати та скоригувати її вплив на розвиток міського середовища. Синергетичне поєднання різних підходів у межах одного простору фактично формує самопідтримувані урбаністичні системи, де взаємодія попиту та пропозиції забезпечує економічну життєздатність і підвищення ринкової вартості об'єктів нерухомості. Констатовано, що економічний ефект mixed-use development проявляється через диверсифікацію джерел доходів, формування сталого локального попиту, зниження витрат домогосподарств і стимулювання розвитку малого та середнього бізнесу, що в сукупності підвищує інвестиційну привабливість територій. Цінність дослідження полягає у комплексному обгрунтуванні ролі багатофункціональної забудови (mixed-use development) як ефективного інструменту трансформації міського простору в умовах інтенсивної урбанізації. Практична значущість і перспективи дослідження полягають у формуванні обгрунтованих рекомендацій для органів місцевого самоврядування, девелоперів та урбаністів щодо підвищення ефективності використання міської інфраструктури та запобігання її перевантаженню.

Key words: commuting (pendulum mobility), mixed-use development, market value, economic effect, urban environment development, real estate.

Ключові слова: маятникова мобільність, багатофункціональна забудова, ринкова вартість, економічний ефект, розвиток міського середовища, нерухомість.

PROBLEM STATEMENT

Amid rapid urbanization and urban transformation in Western Ukraine, driven by migration and population displacement due to security-related factors, the need to seek new, more effective approaches to the spatial development of modern cities is increasing. One such approach is mixed-use development, which integrates residential, commercial, office, and recreational functions within a single space. Drawing on global practice, this model serves as a tool for enhancing the efficiency of land use, reducing transportation burdens, and fostering more sustainable and comfortable urban environments.

For Ukrainian cities, the implementation of the mixed-use development concept is particularly relevant in the context of the post-Soviet legacy of functional zoning, which-amid the gradual expansion of cities in Western Ukraine-exacerbates problems of inefficient resource use, commuting flows (daily travel between home and workplace), and the overloading of transport infrastructure. In the context of urban expansion, infrastructure modernization, and increasing investment activity in the real estate sector, mixed-use projects in these cities can serve as a catalyst for economic development and an improvement in the quality of life.

At the same time, implementing this concept is accompanied by several challenges related to planning engineering networks, ensuring transport accessibility, and balancing the interests of various stakeholder groups. The absence of a comprehensive approach to the implementation of mixed-use projects may lead to infrastructure overload, rising housing costs, and the deterioration of environmental conditions, among others.

ACTUAL SCIENTIFIC RESEARCHES AND ISSUES ANALYSIS

The challenges of implementing the mixed-use development concept in Ukrainian cities have been examined in considerable detail in the works of Konyk S.I. [5], Gavrada Yu. [1], Korol S. [4], and Marchenko M. [5]. In particular, their research focuses on analyzing current trends in urban environment development, the transformation of the city's functional structure, and the role of multifunctional development in improving the efficiency of urban land use.

Meanwhile, issues related to the specific features of applying theoretical approaches to defining mixed-use development, the formation of economic effects, and their impact on urban infrastructure remain insufficiently explored in domestic academic literature.

This produces a range of issues. In particular, there is significant fragmentation in the implementation of mixed-use development principles, reflected in the prevalence of isolated, point-based solutions without proper integration into strategic territorial development documents. As a result, imbalances emerge between the functional composition of urban areas and the capacity of urban infrastructure, increasing pressure on transport and engineering networks and reducing the overall efficiency of spatial urban development.

RESEARCH AIM

This study aims to examine the economic effects of implementing the mixed-use development concept in Ukrainian cities and to analyze its impact on urban infrastructure. The study highlights the main theoretical approaches to defining multifunctional development, drawing on the concept of the American urbanist Jane Jacobs (as formulated in her work The Death and Life of Great American Cities). It also analyzes examples of implementing such projects and evaluates their advantages and risks for urban development. Particular attention is paid to identifying the conditions necessary for the effective integration of mixed-use development into the system of strategic planning in Ukrainian cities.

Table 1. Features of development within the mixed-use development concept

Features of development	Specific features of the characteristic*	Features of best-case implementation scenarios
Flexibility (a diverse range of apartments and commercial spaces)	Developers typically create a variety of apartments and commercial spaces. In response to demand, a development or district can provide residents with all types of housing units and adapt to their needs.	Formation of an adaptive functional structure with the possibility of rapid spatial transformation (redevelopment, change of use of premises), oriented toward the demand of internally displaced persons and new urban residents.
Smart growth	Investment in the development and rethinking of existing spaces and infrastructure rather than new construction (i.e., instead of building a new district, developers transform former industrial zones into urban environments). As a result, constructed facilities don't create additional pressure on urban infrastructure, as the district offers residents all types of activities.	Priority for redevelopment of degraded or industrial urban areas in Ukraine (brownfield projects), integration of infrastructure without overloading urban networks, reduction of environmental impact.
Land-use synergy (shared land use)	Infrastructure responsibilities are shared not only by residents but also by organizations and businesses located in the area.	Introduction of public–private partnership models, fair distribution of infrastructure costs between developers, businesses, and the community, development of the local economy.
Creation of compact districts	Development of pedestrian connectivity. Within a single building or area, there may be offices, housing, shops, cafés, and social facilities. In such districts, residents have minimal need for private transport.*	Formation of a "15-minute city" with high walkability, development of public transport and cycling infrastructure, and reduction of car-dependent urban environments.

Note:

Thanks to the outlined characteristics, these districts are easily integrated into the public space.

Source: compiled based on [1; 4—5].

MAIN FINDINGS OF THE RESEARCH

The author notes that in the western regions of Ukraine (specifically, Zakarpattia, Ivano-Frankivsk, Lviv, Ternopil, Khmelnytskyi, Chernivtsi, Vinnytsia, Volyn, and Rivne regions), there is an intensive expansion of urban areas. This is driven by active migration processes and the relocation of population and businesses from unsafe regions. As of the end of 2025, 4.6 million internally displaced persons were registered in Ukraine.

These processes are most visible in the Zakarpattia, Ivano-Frankivsk, and Lviv regions. In particular, in Zakarpattia Oblast, the population of the city of Uzhhorod increased from 113,000 to over 220,000 residents between 2022 and 2026. Regarding the city of Mukachevo, the population growth over this period was approximately 22,000 people. Cities in Lviv Oblast are also recording population growth; in particular, the population of Lviv is estimated to have increased by about 150,000 people [7]. Comparable trends are observed in other cities within these regions. The described increase in population leads to accelerated development of suburban areas, densification of urban construction, and transformation of the functional structure of cities.

These processes place pressure on transport, engineering, and social infrastructure, requiring the implementation of more efficient approaches to urban space management. In particular, since 2023, there has been a steady increase in traffic intensity in cities in western Ukraine, as well as longer travel times within them, indicating an overload of the road network. At the same time, there is increased strain on engineering systems — water supply, sewage, and energy provision-which were often not designed for the current population size. An additional indicator is the overloading of social infrastructure facilities, including education, healthcare, and public service institutions, which is manifested in a shortage of places and a decline in service quality. In addition, the active expansion of cities, particularly intensive construction development, often results in real estate properties that are difficult to sell-namely those located far from social infrastructure such as hospitals, schools, and kindergartens.

One of the promising approaches to addressing the identified problems is the development of mixed-use development (interpreted here as the concept of mixed-use development), which involves combining different functional elements-residential, commercial, administrative, and recreational-within a single spatial environment. In the best-case implementation scenarios, this approach is characterized by flexibility, smart growth, shared land use, and the creation of compact neighborhoods (see Table 1).

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On the one hand, such development has a significant impact on urban infrastructure, particularly when implemented effectively [2; 5]:

— commuting flows are reduced (as transport system loads are optimized);

— the efficiency of engineering networks (water supply, energy provision, sewage systems) increases due to their concentrated use within localized spaces;

— local service centres are formed, which promotes the decentralization of urban activity and reduces pressure on central city districts.

On the other hand, mixed-use development in the context of rapid urban expansion is characterized by increased vulnerability. In particular, insufficient levels of integrated planning create problems such as a mismatch between engineering infrastructure and growing demand, continuous overload of the transport system (i.e., traffic congestion becomes a norm not only during peak hours but at any time of day), and an imbalance between different functional components.

In addition, in the absence of proper regulation, there are risks of sharp increases in real estate prices, deterioration in the quality of the urban environment, rising social tension, and uneven territorial development.

The theoretical understanding of mixed-use development is carried out within several scientific approaches (see Table 2).

By examining the specifics of the outlined approaches in more detail, it is necessary to consider the experience of the examples we have presented of modern residential developments, mixed-use complexes, and residential neighborhoods in Uzhhorod, Lviv, and other cities of Ukraine. This experience is important, as examples of contemporary residential and mixed-use developments in Ukraine (particularly in Uzhhorod and Lviv) demonstrate how the concept of mixed-use development operates not in theory, but in practice.

Thus, the functional approach to mixed-use development aims to integrate residential, commercial, administrative, and recreational functions within a single object or territory (a residential complex functioning as a unified development project). The main emphasis is placed on combining functions and overcoming the traditional functional separation of the urban environment. This approach is already being implemented in the development of modern residential complexes in Lviv and Uzhhorod, where the ground floors are allocated for commercial premises, services, and public spaces. For example, in Uzhhorod, this model is represented by the residential complexes Uzh Towers, Riverville, and Crystal. In Lviv, such examples include "Parus City", "AUROOM Sunrise", "FEEL HOUSE", and "Helga". These examples illustrate that each such development represents a self-

Table 2. Theoretical approaches to the interpretation of the phenomenon of mixed-use development in Ukrainian cities

Interpretation of mixed-use development	Content of the phenomenon category according to the approach	Key emphases of the phenomenon of mixed-use development	Examples of implementation
Functional	Considers the described development as the integration of residential, commercial, administrative, and recreational functions within a single object or territory	Interaction of functions, their combination, reduction of functional segregation within the city	Residential complexes in Lviv (e.g., developments with commercial premises on the ground floors, public spaces, and offices: “Fayna Town” (Kyiv), “Parus City” (Lviv))
Spatial	Focuses on compact development and efficient use of urban land	Building density, pedestrian accessibility, formation of a polycentric urban structure	New districts in Lviv and Uzhhorod formed according to the “short-distance city” principle (in particular, integrated development areas with embedded services and public spaces)
Economic	Views mixed-use development as a tool for increasing investment attractiveness and financial sustainability of projects	Income diversification, risk reduction for investors, increased profitability	Mixed-use development projects in Mukachevo, Uzhhorod, and Lviv (housing + offices + shopping centers, e.g., developments near transport hubs and shopping malls as partially mixed-use structures)
Socio-urban	Emphasizes the role of mixed-use development in creating a comfortable and inclusive urban environment	Quality of life, social interaction, safety, accessibility of services	New residential districts in Lviv and Uzhhorod with public spaces, car-free courtyards, and integrated social infrastructure (schools, kindergartens, community hubs within residential complexes)

Source: compiled based on [1; 3; 5].

contained functional system in which residents have access to basic services without the need for extensive movement.

It should be highlighted that this self-contained nature provides several advantages, including increased everyday convenience and accessibility of services, a reduction in commuting flows, more efficient use of urban land, and the formation of local activity centres. At the same time, alongside these advantages, certain risks also emerge, in particular a tendency toward the isolation of residential complexes from the broader urban fabric.

This phenomenon in Western practice is referred to as "closed or semi-closed residential complexes" or "island development," as such residential areas have their own courtyards, commercial units, and services, but are weakly integrated into the surrounding urban fabric. In particular, access to the territory of the Crystal residential complex is restricted (barriers, a private courtyard, and controlled entry), and residents have less interaction with neighboring districts. In addition, there is a risk of overloading internal infrastructure in the absence of adequate external planning (for example, narrow streets near the Crystal residential complex are not designed for high traffic volumes, leading to congestion at entry and exit points).

The spatial approach emphasizes compact development (through the creation of residential areas), the efficient use of urban land, and the creation of a walkable environment. In this context, mixed-use development contributes to the gradual formation of a polycentric urban structure, as well as to the implementation of the "15-minute city" concept, which implies reducing transportation distances and improving access to basic functions within local urban subsystems. In particular, this is characteristic of new residential districts in the area of Bozdosh Park and West Towers (Tokyo district [8]) in the city of Uzhhorod, as well as the residential districts Continent Residential Complex (on Truskavetska Street), Modern Residential Complex (Trolleybusna / Kniahyni Olhy Street), Continent Style Residential Complex (Heroiv Krut Street), and Continent Life Residential Complex (Lvivska Bichna Street) in the city of Lviv. These developments are characterized by a structure in which residential functions are integrated with services and public spaces within walking distance, thereby reducing transportation pressure and increasing the efficiency of urban space use. Such compact development provides several advantages, including reduced traffic congestion, improved urban environmental quality, enhanced pedestrian and cycling mobility, and more effective integration of functions within urban spaces.

Alongside these advantages, several risks also emerge, including insufficient capacity of engineering networks, uneven development of peripheral areas, dependence on the quality of development planning, and the risk of excessive building density. The latter is already partially observed in the area near Bozdosh Park, where, as a result of excessive densification of residential complexes and reduced distances between buildings, a decrease in natural lighting in apartments and courtyards has been recorded, along with poorer ventilation of internal spaces and the formation of a visually overloaded urban environment.

The economic approach views mixed-use development as a tool for creating mixed-use spaces (combining residential areas and cottage settlements) aimed at increasing the investment attractiveness of territories and the financial sustainability of many development projects.

The main emphases include income diversification, reducing investment risks, and increasing the profitability of multiple real estate assets within a localized residential environment. In the cities of Mukachevo, Uzhhorod, and Lviv, this is reflected in the development of multifunctional residential townships that combine residential and commercial functions, as well as in complexes located near transport hubs and shopping centers, which form new local centers of urban activity. A representative example is the Lizrome residential township in Uzhhorod, designed for 1,435 residents, within which a range of facilities will operate, including shops, pharmacies, caf?s, a restaurant, a supermarket, a coworking space, a kindergarten, a fitness center / yoga studio / sports club, as well as parcel pickup points (parcel lockers and delivery services). It is noteworthy that such functional integration generates several advantages, including increased investment attractiveness of territories, the formation of new economic centers, the concentration effect on jobs and services, and the development of urban mobility. Simultaneously, the gated or semi-gated nature of such complexes may restrict their integration with the existing transport and pedestrian network, which, in turn, reduces the overall connectivity of the urban environment.

The socio-urban approach emphasizes the importance of a comfortable, safe, and inclusive urban environment in the vicinity of mixed-use developments. Within this approach, the primary focus is not on economic efficiency but on the quality of everyday life of residents, social interaction, and the formation of local communities.

In particular, in Lviv, such principles are partially implemented in residential complexes such as "Continent" (Truskavetska Street), "AUROOM Sunrise," and "Parus City," where internal courtyards, pedestrian spaces, and elements of public infrastructure without vehicular traffic are provided. These solutions contribute to enhanced safety, the development of social interactions among residents, and the formation of a more human-centered urban environment oriented toward everyday living within the neighborhood rather than merely facilitating movement.

Alongside these advantages, certain risks also emerge. The key benefits include enhanced safety and comfort, the development of local communities, reduced vehicular traffic within internal courtyards, and improved environmental performance. In parallel, several risks may arise, such as insufficient integration with the broader urban system, limited access for external users, potential social stratification between neighborhoods, and the dependence of environmental quality on the effectiveness of homeowners' associations or developers' management.

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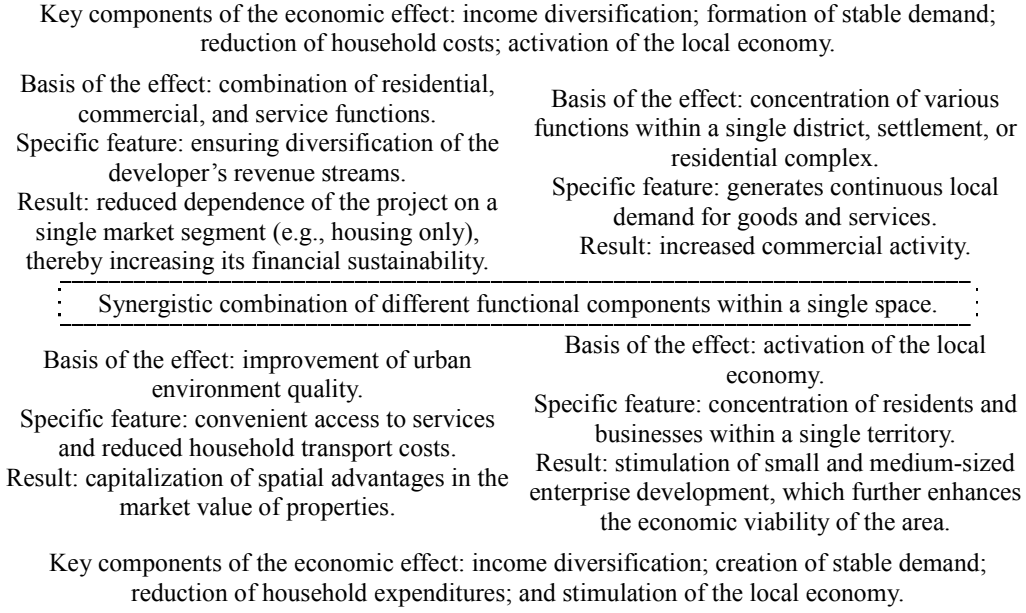

Fig. 1. Features of the mixed-use development concept in Ukrainian cities in terms of economic effects

Note:
Through the use of ground floors and non-residential premises, the investment attractiveness of territories increases.
Source: compiled based on [1—2; 4].

Consequently, mixed-use development should be regarded as a complex phenomenon. Under such conditions, effective integration of mixed-use development into the strategic planning system of Ukrainian cities becomes possible, involving the consideration of its economic impact and its influence on urban infrastructure as interrelated components of urban development.

Thus, the impact of mixed-use development on urban infrastructure is twofold: on the one hand, it increases the efficiency and compactness of use; on the other hand, it creates risks of local overloads and spatial segmentation, which require coordination at the level of strategic and urban planning.

From the perspective of economic impact, the key condition is the synergistic combination of different functional components within a single space. This is determined by the following specifics (Fig. 1):

1. The combination of residential, commercial, and service functions ensures diversification of developers' revenue streams.

2. The concentration of various functions within a single district, settlement, or residential complex generates continuous local demand for goods and services.

3. Improvement of urban environment quality ensures convenient access to services and reduces household transport costs.

4. Mixed-use development promotes the activation of the local economy, which is associated with the concentration of residents and businesses within a single territory.

More precisely, the synergistic combination of different functions within a single space creates a self-sustaining economic system in which demand, supply, and consumption mutually reinforce one another. Essentially, this refers to the formation of diversified income streams, increased profitability of construction projects (up to %, compared to average profitability), and the stimulation of leader development in local real estate and service markets within a single city [6].

CONCLUSIONS

Within the scope of the study, attention is drawn to the fact that mixed-use development is one of the most promising tools for optimizing urban space, ensuring the integration of residential, commercial, and social functions, the formation of compact districts, and the reduction of commuting mobility.

The following conclusions have been drawn regarding the implementation of the mixed-use development concept:

1. It has been demonstrated that it is aimed at improving the efficiency of urban infrastructure use through flexibility, the formation of local activity centres, the development of pedestrian accessibility, and the activation of the local economy.

2. It has been established that, in the absence of comprehensive planning, the implementation of this concept may lead to significant overload of engineering networks and transport systems, an imbalance of functions, and the formation of spatial isolation of individual residential complexes.

We emphasise the importance of a theoretical understanding of the phenomenon of mixed-use development, as well as the appropriateness of grounding this understanding in a combination of functional, spatial, economic, and socio-urban approaches, which enable comprehensive planning and adjustment of its impact on urban development. The synergistic combination of these approaches within a single space effectively forms self-sustaining urban systems in which the interaction of demand and supply ensures economic viability and increases the market value of real estate objects.

It has been established that the economic effect of mixed-use development is manifested through the diversification of income sources, the formation of stable local demand, the reduction of household expenses, and the stimulation of small and medium-sized business development, collectively increasing the investment attractiveness of territories.

The value of the study lies in its comprehensive substantiation of the role of mixed-use development as an effective tool for transforming urban space under conditions of intensive urbanisation.

The practical significance and prospects of the study are reflected in the formulation of evidence-based recommendations for local authorities, developers, and urban planners aimed at improving the efficiency of urban infrastructure use and preventing its overload.

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