

Features of investment in economies with different level of development: The role of infrastructure projects financing

Maria Vakulich^{1*} , Ihor Zlakoman², Larysa Boltianska³ ,
Viktoriia Budnyk⁴ , Oleksandr Zinevych⁵ 

¹Educational and Scientific Institute “Prydniprovsk State Academy of Civil Engineering and Architecture” of Ukrainian State University of Science and Technologies, Ukraine

²National University Odesa Law Academy Fontanska Rd, Odesa, 65009, Ukraine

³Department of Economics and Business, Faculty of Economics and Business, Dmytro Motornyi Tavria State Agrotechnological University

⁴Department of Business Logistics and Transport Technologies, Faculty of Management and Technologies, State University of Infrastructure and Technologies

⁵Inerregional Academy of Personnel Management 2 Frometivska str., Kyiv, 03039, Ukraine



ARTICLE INFO	ABSTRACT
<i>Article history:</i> Received June 12, 2025 Received in revised form Dec. 05, 2025 Accepted May 05, 2026 Available online June 01, 2026 <i>Keywords:</i> Infrastructure Infrastructure investments Investments Public-private partnerships Transport *Corresponding author: Maria Vakulich Educational and Scientific Institute “Prydniprovsk State Academy of Civil Engineering and Architecture” of Ukrainian State University of Science and Technologies, Ukraine Email: docent12345@ukr.net ORCID: https://orcid.org/0000-0002-3367-5536	<i>The role of infrastructure investment is increasingly critical in both developed and transitional economies due to its wide-ranging multiplier effects, including capital inflows, production growth, and enhanced transport efficiency. This article aims to examine the significance of infrastructure investments across these economic contexts. Using a comparative and structural analysis of infrastructure investment from 1990 to 2023, the study highlights key regional differences across Europe, Central Asia, East Asia, and the Pacific. These variations are influenced by factors such as institutional capacity, urbanization levels, population density, infrastructure needs, export potential, and budget constraints. Political and regulatory frameworks for attracting public and private investment significantly shape capital allocation strategies. In East Asia and the Pacific, investment is primarily directed toward new transport infrastructure through greenfield projects and mixed financing models. Conversely, Europe and Central Asia focus on modernizing existing infrastructure through pragmatic and balanced investment policies, often influenced by national financial strategies. The findings offer practical value by demonstrating how the experiences of developed economies can inform infrastructure strategies in transitioning countries, promoting more efficient investment practices and long-term development planning. These insights are particularly relevant for policymakers seeking to optimize infrastructure growth within their specific economic and institutional contexts.</i>

Introduction

Infrastructure development requires significant private investment amid geopolitical uncertainty, conflict, and a state funding deficit. Various types of investment resources play an important role in

the modernization, construction, management, and renovation of roads, railways, ports, and airports, ranking second as investment targets after the electricity sector (OECD 2020). Infrastructure investment covers the costs of building new transport facilities, improving

transport networks, developing multimodal networks and logistics, and maintaining them (OECD 2022; 2020). Effective transport infrastructure requires the involvement of various sources and types of financing, which in turn are determined by the institutional, investment, and economic characteristics of different countries. Developed countries traditionally have well-developed infrastructure, so investment in its modernization, maintenance, and green transformation prevails. Broad access to private capital in developed countries and efficient financial markets, as well as more stable institutions, contribute to attracting private investment. In contrast, in countries with economies in transition, the policy focus is on building new infrastructure, and capital investment is highly dependent on public financing and funds from international financial organizations. Institutional weaknesses, administrative barriers in transition economies, and high corruption risks reduce the level of investment attractiveness for private investors (Han, Su, and Thia 2021).

In 2023, private infrastructure investment declined significantly compared to 2022, amounting to \$86 billion in low- and middle-income countries. The exceptions were the Middle East and North Africa (MENA) and East Asia and the Pacific (EAP). At the same time, thanks to a project-based approach, more countries were able to attract financing: 68 countries received funds to invest in 322 projects in 2023, compared to 54 countries and 260 projects in 2022 (World Bank 2023). Institutional investors – pension funds, insurers, sovereign wealth funds – play a special role, as they are increasingly viewing infrastructure as a source of long-term and sustainable investment. However, their participation in investment depends on the level of development of the regulatory framework, the predictability of concession rules, market transparency, and the reliability of contractual mechanisms. The last two decades have also seen a significant increase in institutional investors' interest in investing in sustainable (green) infrastructure projects (Walter 2024). In transition economies with a less stable institutional environment, the potential for institutional investment is low. In developed economies, such as in Europe, institutional investors are active participants in the investment market. Given the above-mentioned features of investing in infrastructure development in

countries with developed and transition economies, it is important to explore financial mechanisms for capital investment. Despite the growing role of private, public, and institutional investment, there are a number of problems that need to be addressed. These include limited access to long-term sources of infrastructure financing, an unstable regulatory environment, imperfect models of public-private partnerships, imbalances in the distribution of investment across regions and countries, and others.

The purpose of this article is to identify the role and importance of investment in infrastructure development in countries with developed and transition economies.

Literature review

Academic literature from the last five years highlights the role of infrastructure investment in stimulating economic growth, reducing inequality, developing transport, and improving social and environmental sustainability. Research directly links investment in infrastructure projects to sustainable development goals, and the link between financing for transport and transport networks, information and communication systems, and other elements of infrastructure affects economic growth and the resolution of inequality issues (Chen and Chen 2023; Gundes 2022; Meng, Ye, and Wang 2024).

Within the scope of the importance of infrastructure investment, we highlight the following areas of research: macroeconomic effects of infrastructure investment (Du, Zhang, and Han 2022; Perez-Montiel and Manera 2022; Hu and Li 2025), transnational investment and initiatives (Zou et al. 2022; Jiang, Liu, and Zhang 2024; Duggan, Hooijmaaijers, and Santiago 2024), infrastructure and transport (Cho and Choi 2021; Xin et al. 2022; Guler et al. 2023), infrastructure financing (Engel, Fischer, and Galetovic 2020; Dubas-Jakóbczyk and Koziel 2022; Shefer 2024), social and environmental impacts of investment (Xiong et al. 2022; Islam, Dalhat, and Al Mamun 2022; Azad et al. 2021).

Research on the role of infrastructure investment in ensuring sustainable economic development focuses on the impact of public and private capital investment in various infrastructure sectors. An analysis of academic publications over the last few years (2021–2024) shows the multifaceted nature of this issue, which covers economic, social, spatial, and environmental aspects.

Macroeconomic effects of infrastructure investment. Researchers have focused considerable attention on the macroeconomic consequences of infrastructure financing. The article by [Du, Zhang, and Han \(2022\)](#) empirically assesses and proves the positive impact of China's infrastructure projects in 2004-2019 on the quality of economic growth by promoting technological innovation, which stimulated structural modernization of the economy, improvement of the industrial structure, and production efficiency. Similar conclusions are drawn in the work of [Perez-Montiel and Manera \(2022\)](#) using the example of Spain: the authors found a sustained long-term multiplier effect of public investment, which manifests itself in an increase in production levels. [Hu and Li \(2025\)](#), on the other hand, draw attention to social aspects, arguing that China's infrastructure projects have the potential to reduce regional inequality if strategically planned. This effect is achieved by increasing trade between regions and reducing income disparities.

Geo-economic initiatives and transnational investments. Recent studies examine the geo-economic role of investments. [Zou et al. \(2022\)](#) conducted an in-depth analysis of China's motives for infrastructure investments under the Belt and Road Initiative, highlighting the synergy between geo-economic, energy, and political interests. One of the main motives for investment under the initiative has been structural transformation in the country and the need to support economic growth. As a result of geo-economic investment, China ensures: accessibility between different regions, a smooth flow of production factors that reduce production costs, and a stronger national currency. A study by [Jiang, Liu, and Zhang \(2024\)](#) examines the quantitative effects of the Asian Infrastructure Investment Bank's investment activities on Chinese foreign investment, emphasizing the role of institutional investment in stimulating the country's foreign economic activity. The creation of the bank contributed to an average increase in China's foreign investment of 15.45% between 2014 and 2020, with the number of infrastructure projects increasing by 20.04% and the volume of direct investment flows by 23.04%. In turn, [Duggan, Hooijmaaijers, and Santiago \(2024\)](#) analyzed China's strategic presence in the EU's agricultural infrastructure, revealing the dimensions of international infrastructure policy. China's Go Global foreign direct investment policy allows Chinese companies to increase their

own investments in the foreign agri-food sector. Chinese firms are increasingly acquiring European agri-food companies as part of China's policy to enhance food security. In addition, the transfer of knowledge from European companies enables China to achieve its national goal of modernizing its food system.

Transport infrastructure and accessibility. Academic literature pays particular attention to transport infrastructure. [Xin et al. \(2022\)](#) propose a model for the joint optimization of shipping networks and port infrastructure based on a case study of West Africa. [Cho and Choi \(2021\)](#) demonstrate the positive impact of investment in sustainable transport and increased transport accessibility on economic activity, which is particularly relevant in the context of sustainable development. An analysis of the trade spillover effects of infrastructure investment in the EU under cohesion policy, conducted by [Shevtsova et al. \(2025\)](#) on the cohesion policy confirms the multiplier effect of these projects on interregional trade. In the target regions, policy measures led to a 0.03% increase in real exports and a 0.15% increase in real GDP, as well as an increase in interregional trade.

Financing and management of infrastructure projects. Financial mechanisms for infrastructure investment are examined through the prism of public-private partnerships, fiscal policy, and the importance of external funds. [Engel, Fischer, and Galetovic \(2020\)](#) provide clear criteria for the feasibility of public-private partnerships, while [Dubas-Jakóbczyk and Koziel \(2022\)](#) analyze the effectiveness of financing medical infrastructure in Poland with EU structural funds. [Shefer \(2024\)](#) systematizes approaches to investing in transport infrastructure in the context of structural changes. The study by [Nikonenko et al. \(2022\)](#) examines the issue of attracting investment to various sectors of the economy.

Socio-economic dimensions of infrastructure investment. The studies by [Azad et al. \(2021\)](#) and [Islam, Dalhat, and Al Mamun \(2022\)](#) point to the need to take the human factor into account in urban and road infrastructure planning. The article by [Xiong et al. \(2022\)](#) focuses on environmental sustainability and the impact of infrastructure investments on the socio-environmental vulnerability of regions. [Kuybida et al. \(2023\)](#) analyze social investment in Ukraine. [Chmyr et al. \(2023\)](#) study the social aspects of investment.

In summary, despite the significant attention paid to infrastructure investment in the current academic literature, there are several gaps that require more detailed study. First, most studies focus on quantitative assessments of the economic effects of investment, ignoring qualitative changes in the spatial structure of the economy. Second, there is an asymmetry between regional cases, cases of countries with developed and transition economies, their models, and types of infrastructure investment. Much of the work is devoted to China as one of the largest investors in infrastructure development during the economic boom. This limits the possibility of comparing different countries by type of investment and its importance for transport development. Thirdly, some studies cover infrastructure financing, but financial mechanisms and the use of various financial instruments for infrastructure development, including comparisons of public financing, public-private partnerships, and international institutional investor funds, are generally under-researched. Therefore, this study focuses on a comparative analysis of infrastructure investment in developed and transition economies, including issues of financial provision.

Methods

The study is comparative and analytical in nature, so the methodology is based on a descriptive and analytical quantitative design. The method of structural comparative analysis made it possible to identify the main differences between countries with developed and transition economies in terms of models and types of investment in infrastructure projects for the period 1990–2023. Regions of Europe and Central Asia, East Asia, and the Pacific were selected for comparison of infrastructure investments.

The countries for comparative analysis of infrastructure investment in countries with transitional and developed economies were selected based on UN classification criteria and taking into account the following indicators: level of economic development, volume and dynamics of investment in transport infrastructure and networks, financing models (types of public-

private partnerships, public financing or private investment), types of indirect state support. The analysis of investments was conducted for countries with economies in transition and European countries with developed economies to reflect differences in investment volumes and factors influencing investment.

The World Bank's PPI Database was used to compare the sample of countries and to conduct a comparative analysis of data on volumes, models, types of investment, and its role in infrastructure development.

The main limitations of the study are the availability of complete and standardized quantitative data on infrastructure investment in transition economies, including the unavailability of data on various sources, types of public investment in infrastructure development projects, differences in reporting methodologies for investment volumes, and investment strategies of transition economies.

Results and discussion

A comparative analysis of countries with transition and developed economies reveals specific features and characteristics of infrastructure investment. At the end of 2023, 563 active infrastructure projects out of 570 projects for 1990–2023 were concentrated in Europe and Central Asia, East Asia, and the Pacific. Most projects are concentrated in East Asia and the Pacific (453 or 79%): in China (338), while other regions and countries have significantly less potential for attracting investment (Cambodia 7, Philippines 32, Indonesia 24, Malaysia 23, Vietnam 14). Europe and Central Asia account for 117 projects (21%) for 1990–2023 (Albania 4, Armenia 5, Bulgaria 9, post-Soviet countries 46, Turkey 40, Ukraine 4). Of the 570 projects, 175 are local or municipal, 227 are national, 91 are initiated and implemented in provinces, states or regions, and the remaining 77 are of international significance (ports, airports, railways). The largest number of projects are being implemented in the road and port sectors. At the same time, roads and airports account for the largest share of investment in 1990–2023 ([figure 1](#)).

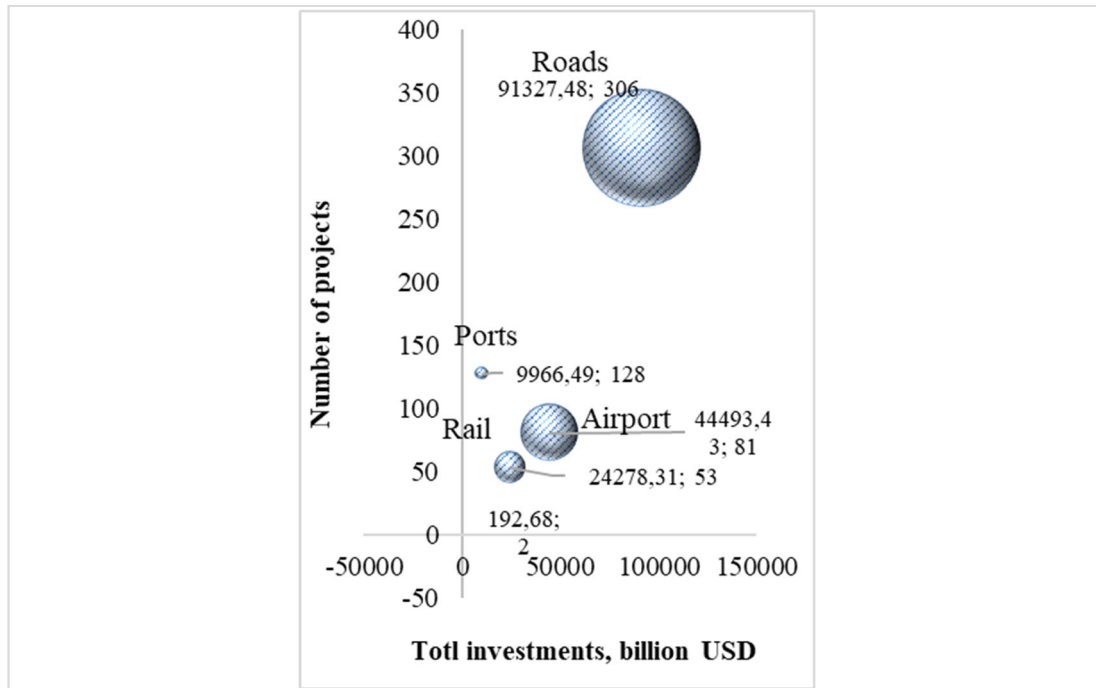


Figure 1. Investment volumes in infrastructure projects by type of infrastructure (roads, railways, ports, airports, railways) in the regions of Europe, Central Asia, East Asia, and the Pacific for the period 1990–2023

The structure of investment by investment area shows differences in infrastructure development needs between developed countries and countries with economies in transition. In East Asia, the number of projects and the volume of investment are dominated by areas such as financing the construction of roads, ports, railways, and airports. In contrast, governments and private companies in Europe and Central Asia invest more in airports and roads, with significantly less investment in ports and railways (table 1).

Table 1. Investment structure by investment areas (number of projects, investment volume) in 1990–2023

	East Asia and the Pacific	Europe and Central Asia
Airports	36 projects (6%), \$3,729.44 billion (2%)	45 projects (8%), \$40,763.99 billion (24%)
Ports	96 projects (17%), \$7,357.16 billion (4%)	32 projects (6%), \$2,609.33 billion (2%)
Railways	42 projects (7%), \$24,250.2 billion (14%)	11 projects (2%), \$28.11 billion (0.01%)
Roads	279 projects (49%), \$82,553.68 billion (48%)	27 projects (6%), \$8,773.8 billion (5%)

The significant differentiation in investment areas in these regions is linked to several factors. East Asian and Pacific countries have significant export potential, which requires the development of transport corridors and networks and ensuring their accessibility. Rapid urban growth in this region requires investment in railways and transport systems. The governments of the region's most developed economies have identified the modernization of aviation infrastructure as a strategic priority for development. The region's institutional capacity allows for strategic planning of infrastructure development. Factors influencing the choice of investment areas include the high population density of East Asia and the need to develop connections between different urbanized areas.

In Europe and Central Asia, on the other hand, the strategic priority is to develop air transport, with a greater need to modernize and manage the existing transport network and integrate it between countries. Solving the problem of urban congestion requires East Asia to invest in mass passenger transport that is highly accessible. The growth of international trade in East Asia has led to a need for airport development. Thus, East Asia and the Pacific Ocean show a high degree of diversification in infrastructure investment, while

Europe and Central Asia show a low degree of diversification, with a predominance of investment in roads and airports (table 2).

Table 2. Comparison of main investment areas in regions: East Asia and the Pacific, Europe and Central Asia in 1990–2023

Criterion	East Asia and the Pacific	Europe and Central Asia
Diversification of areas	High (airports, roads, ports, railways)	Low (dominated by investments in roads and airports)
Infrastructure strategy	Focus on high-speed roads and urban transport	Focus on infrastructure modernization
Investments in railways	High, especially in the direction of Light Rail	Minimal
Technological innovations	No data on innovation available in the data sample	Minimal (electric charging stations)

Countries in East Asia and the Pacific are focused on high-speed roads, urban transport development, and railways, while in Europe and

Central Asia, infrastructure strategy is concentrated on modernizing airport infrastructure, with minimal investment in rail transport.

In the East Asia and Pacific region, investments in greenfield transport infrastructure development projects dominate in terms of number and volume (337 projects or 59%, \$103,520.16 billion or 61%). Financing the construction and maintenance of new transport facilities is linked to the need to create and develop infrastructure in the countries concerned. These are often regions undergoing urbanization (e.g., Indonesia, Malaysia, Vietnam), which require new transport links, networks, and appropriate financing. Investments in the modernization and reconstruction or privatization of transport facilities account for a significantly smaller share in terms of number and volume (80 projects or 14%, \$11,081.34 billion or 7%). The privatization of 28 infrastructure facilities in the region amounted to \$3,170.85 billion for 2019–2023. This demonstrates a significantly lower level of renewal of existing assets (table 3).

Table 3. Differences in types of public-private investment (PPI) in countries with transitional and developed economies by type of PPI agreement during 1990–2023

	East Asia and the Pacific (EAP)	Europe and Central Asia (ECA)	Differences, key characteristics
Greenfield project (financing, construction, operation of infrastructure facilities)	337 units (59%), \$103,520.16 billion (61%)	47 units (8%), \$46,737.5 billion (27%)	The predominance in EAP countries indicates a shift towards new green transport construction with the transfer of ownership rights to the public sector.
Brownfield (modernization, reconstruction)	80 units (14%), \$11,081.34 billion (7%)	48 units (8%), \$4,340.71 billion (3%)	The largest share is in the ECA region, with projects mainly focused on the modernization of existing transport facilities.
Divestiture (privatization of a transport facility)	28 units (5%), \$3,170.85 billion (2%)	11 units (2%), \$139.07 billion (0.01%)	More diversified types of PPIs are used in EAP as a form of privatization.
Management and lease contract (management or lease to a private partner)	8 units (1%), \$118.13 billion (0.01%)	11 units (2%), \$1,150.63 billion (1%)	More prevalent in the ECA, indicating a more cautious approach to transferring transport assets to private sector management.

In European and Central Asian countries, there is a similar structure of investment in infrastructure facilities, with a predominance of greenfield projects (47 units or 8%, \$46,737.5 billion or 27%), modernization and reconstruction projects. This financing model indicates a balanced strategy between transport construction and modernization. A pragmatic approach to transferring transport management without

changing the ownership structure is characteristic of countries with transition economies in this region (especially Ukraine and Georgia).

Private partners' investment costs under various types of PPI agreements in countries with transition and developed economies are mainly covered by two main forms of state support: state capital subsidies and income subsidies. Given that greenfield infrastructure projects predominate in

the East Asia and Pacific region, the state mainly invests in new facilities in the form of capital subsidies for their creation. As a result, between 1990 and 2023, governments in this region covered \$34,792.88 billion in construction costs for private companies, while \$2,660.27 billion was reimbursed in the form of income subsidies.

This indicates the significant profitability of greenfield projects in East Asia and the Pacific, low demand risks, sufficient demand for new public services, and the ability to provide them thanks to newly created transport facilities and networks. Capital subsidies were mainly provided by the Chinese government as part of 84 ongoing construction projects.

By comparison, the use of capital subsidies is less common in Europe and Central Asia. Total reimbursements to the private sector amounted to \$1,192.14 billion in 1990–2023. Income subsidies amounted to only \$284.6 billion over the same period. Other forms of state support for infrastructure development amounted to \$50891.17 billion in 1990–2023.

Such differences in state support explain the high degree of use of PPIs as an instrument for infrastructure development in East Asia, especially in China, as capital subsidies are paid at the construction stage. This indicates a high level of government responsibility and institutional investment capacity to channel resources into infrastructure development. Thus, in East Asia, state support objectives are focused on covering investment costs for private companies, while in Europe they are focused on ensuring the profitability of transport development projects in the presence of operational risks.

In East Asia and the Pacific, most investment projects (420 out of 570) received \$105,207.76 billion in indirect state support in 1990–2023. The lack of detailed data on the forms of this support makes it impossible to compare them and indicates low transparency and accountability of governments. Income guarantees were paid for 11 projects worth \$5,319.47 billion to cover lost

income in the private sector. Compensation for changes in loan rates amounted to \$526.3 billion, and tax breaks amounted to \$2,294.58 billion. Overall, China, Indonesia, Malaysia, and Vietnam are the leading countries in terms of the volume of various forms of state support provided.

In Europe and Central Asia, most investment projects (91 out of 570) received \$46,929.61 billion in indirect state support in 1990–2023. Income guarantees amounted to \$4,157.35 billion, and debt guarantees to \$842.9 billion. Thus, tax incentives are more widely used in East Asia, while debt or payment guarantees are more common in Europe and Central Asia. This makes PPI more attractive for East Asia than for European countries.

Revenue generation mechanisms within public-private partnerships determine the adequacy of financial support for infrastructure projects. Revenue sources affect the level of investment attractiveness of projects for private companies, tariff policy, and the ability of solvent demand for services provided under contracts. In this context, it is important to assess the revenue models of infrastructure projects in which investors' funds are invested.

In East Asia and the Pacific, the structure of revenue sources from infrastructure investment is characterized by a combination of the following main elements: user fees for services in all sectors (China, the Philippines, Indonesia) amounting to \$36,967.94 bln; fixed and variable payments from the state for the availability of services amounting to \$32,670.44 bln; and a mixed financing model amounting to \$3,727.43 bln, fixed and variable payments from the state for service availability amounting to \$32,670.44 bln, and a mixed financing model amounting to \$37,274.33 billion (particularly characteristic of China, Malaysia, and Turkey). For example, in the road sector, 57 projects generated \$20,076.77 billion in revenue from the provision of services to users, in the railway sector – \$12,050.06 billion, in ports – \$3,240.82 billion, and in airports – \$1,600.29 billion (table 4).

Table 4. Comparison of models for financing revenues from investments in infrastructure development in regions: East Asia and the Pacific, Europe, and Central Asia in 1990–2023

Region	Airports	Ports	Railways	Roads	Total investments
East Asia and Pacific	3729,44	7357,16	24250,2	82553,68	117890,48
Fixed annuity/availability	0	398,91	1914,51	30357,02	32670,44

Region	Airports	Ports	Railways	Roads	Total investments
payment(s) from the government					
Not Applicable	2107,36	3612,63	8177,35	23376,99	37274,33
Other Toll	0	0	0	931,27	931,27
Other Viability Gap Funding	0	104,8	0	165,95	270,75
Purchase agreements or transmission fees with public entity(ies)	0	0	726,79	84,35	811,14
User fees	1600,29	3240,82	12050,06	20076,77	36967,94
Variable annuity/availability payment(s) from the government	21,79	0	1381,49	7561,33	8964,61
Europe and Central Asia	40763,99	2609,33	28,11	8773,8	52367,91
Fixed annuity/availability payment(s) from the government	0	0	0	1071,28	1071,28
Not Applicable	36170,4	100,88	0	0	36275,78
User fees	4593,59	2508,45	28,11	7702,52	15020,85
Total investments	44493,43	9966,49	24278,31	91327,48	170258,39

In European countries and Central Asia, mixed financing models prevail, amounting to \$36,275.78 billion, as well as direct payments by users for services provided by private companies, amounting to \$15,020.85 billion, so demand risks are also concentrated in the private sector. The road sector accounts for \$91,327.48 billion of revenue, airports for \$44,493.43 billion, and the railway sector for \$24,278.31 billion. Therefore, the financing structure in this region is largely based on a commercial model and tariffs due to budget constraints and the goal of efficient use of funds. Political and economic factors also influence the financing structure of infrastructure projects in the region. Therefore, the income structure in Europe is influenced by the lower financial capacity of governments compared to East Asia, where the state compensates for expenditures. Political approaches to infrastructure privatization in Europe are characterized by a greater tendency to delegate

responsibility to private market operators. Unlike Europe, in Asia, the level of effective demand in densely populated regions of Asia and high passenger traffic, which ensures tariff coverage, are also important factors. Mixed financing models are common in countries with a high degree of institutional maturity and capacity and a developed regulatory framework.

A structural analysis of multilateral support for infrastructure projects in East Asia and the Pacific for 1990-2023 indicates the use of loans for investment in the development of the transport sector and networks (Asian Development Bank (ADB), International Finance Corporation, IFC), Multilateral Credit Guarantee Agency BCGA, International Bank for Reconstruction and Development (IBRD)). The largest investments, including direct investments, joint lending, capital and quasi-capital, and guarantees, were made in port infrastructure (table 5).

Table 5. Multilateral financial support for infrastructure projects in East Asia and the Pacific in 1990-2023, billion dollars

Infrastructure	Estimated total funding, million USD	Main partners	Unique tools
East Asia and the Pacific			
Ports	300	IFC, BCGA	Direct investment, joint lending, capital, quasi-capital, guarantees, consulting
Roads	734	ADB, IFC, BCGA	Provision of guarantees

Infrastructure	Estimated total funding, million USD	Main partners	Unique tools
Airports	283	ADB, IFC	Direct loans, joint loans, consulting without financing
Railways	242	ADB	Focus on the public sector and financing exclusively of public railway networks
Europe and Central Asia			
Ports	416	EBRD, EIB, IFC, BCGA	Direct loans, joint lending, guarantees, consulting, transaction services
Roads	1032	EBRD, EIB, ERB, ADB	Providing guarantees, focusing on regional transport corridors
Airports	1125	EBRD, IFC, ADB	Joint lending, consulting, large loans
Railways	108	EBRD, IFC	Direct financing of the public sector, limited diversification of instruments

In Europe and Central Asia, most financial resources in the form of multilateral support were allocated to airports (US\$1.125 billion) and roads (US\$1.032 billion) between 1990 and 2023. To a lesser extent, investments were made in port infrastructure (US\$416 million) and railways (US\$108 million). The combination of different financing instruments depending on the type of infrastructure depends on various types of risks. To reduce risks for private investors, investments in port infrastructure and airports with long payback periods combine lending instruments, joint loans, and guarantees. Given the low return on investment in railways, support is mainly provided in the form of government loans without private investment. In the road sector, where concession agreements predominate, loans and guarantees are combined to reduce the debt burden on the government budget.

Conclusions

A comparison of infrastructure investment in countries with developed and transition economies reveals profound structural differences in capital investment in different regions, determined by institutional, political, and financial factors. Regional infrastructure strategies are shaped by various factors, including institutional capacity, level of urbanization, population density, needs for construction or modernization of existing infrastructure, export potential, and budgetary capabilities. Political approaches to regulating and attracting public and private sector investment in infrastructure

development play a key role in capital investment. East Asian and Pacific countries are focused on actively attracting investment and combining different financing models, with a predominance of mixed models. Greenfield projects dominate as a form of public-private partnership due to the need for new infrastructure construction and the development of interregional transport systems. In Europe and Central Asia, on the other hand, investment in the modernization of existing facilities dominates due to the need to maintain and increase the accessibility of existing infrastructure networks. In this region, a pragmatic, balanced approach to investment in new and existing facilities prevails, with a focus on airport development and support for the commercial viability of projects. The use of various public-private partnership financial mechanisms is determined by the nature of infrastructure projects and countries' infrastructure development needs, the level of risk, and the payback period and structure of project revenues. Therefore, the effectiveness of infrastructure investment is largely determined by the ability of countries to adapt financial instruments to the specifics of infrastructure facilities and strategic national development goals, as well as the financial policies of governments. The advantages of investing in East Asian infrastructure include high project profitability due to solvent demand, market scale, effective implementation of public-private partnerships thanks to state support during the construction phase, and active involvement of multilateral support from institutional investors. In turn, the advantages of investing in European

and Central Asian countries lie in their higher level of institutional stability, predictability of the regulatory environment, high level of engineering and technological support for projects, and well-established legal mechanisms for partnership.

Further research should focus on developing effective models for financing infrastructure in key transport sectors in transition economies, taking into account the characteristics of investment in developed countries.

References

- Azad, Mojdeh, Dua Abdelqader, Luis M. Taboada, and Christopher R. Cherry. 2021. "Walk-to-Transit Demand Estimation Methods Applied at the Parcel Level to Improve Pedestrian Infrastructure Investment." *Journal of Transport Geography* 92 (April):103019. <https://doi.org/10.1016/j.jtrangeo.2021.103019>.
- Chen, Mengkai, and Ting Chen. 2023. "Land Finance, Infrastructure Investment and Housing Prices in China." Edited by Jing Cheng. *PLOS ONE* 18 (10): e0292259. <https://doi.org/10.1371/journal.pone.0292259>.
- Chmyr, Yaroslav, Anastasia Nekryach, Larysa Kochybei, Alla Dakal, and Lilia Strelbytska. 2023. "Postindustrial Society and Global Informational Space as Infrastructure Medium and Factor for Actualization of the State Informational Security." In *National Security Drivers of Ukraine*, edited by O. Radchenko, V. Kovach, I. Semenets-Orlova, and A. Zaporozhets, 61–73. https://doi.org/10.1007/978-3-031-33724-6_4.
- Cho, Seongkyun, and Keechoo Choi. 2021. "Transport Accessibility and Economic Growth: Implications for Sustainable Transport Infrastructure Investments." *International Journal of Sustainable Transportation* 15 (8): 641–52. <https://doi.org/10.1080/15568318.2020.1774946>.
- Du, Xin, Hengming Zhang, and Yawen Han. 2022. "How Does New Infrastructure Investment Affect Economic Growth Quality? Empirical Evidence from China." *Sustainability* 14 (6): 3511. <https://doi.org/10.3390/su14063511>.
- Dubas-Jakóbczyk, Katarzyna, and Anna Koziel. 2022. "European Union Structural Funds as the Source of Financing Health Care Infrastructure Investments in Poland—A Longitudinal Analysis." *Frontiers in Public Health* 10 (March). <https://doi.org/10.3389/fpubh.2022.873433>.
- Duggan, Niall, Bas Hooijmaaijers, and Anabela Santiago. 2024. "Chinese Investment in the European Agricultural Infrastructure." *Asian Perspective* 48 (2): 201–26. <https://doi.org/10.1353/apr.2024.a928614>.
- Engel, Eduardo, Ronald Fischer, and Alexander Galetovic. 2020. "When and How to Use Public-Private Partnerships in Infrastructure: Lessons From the International Experience." Cambridge, MA. <https://doi.org/10.3386/w26766>.
- Guler, S. I., V. V. Gayah, A. Mahmud, A. Prajapati, and D. Thomas. 2023. "Economic Impacts of Transportation Infrastructure Investments. Center for Integrated Asset Management for Multimodal Transportation Infrastructure Systems (CIAMTIS)." https://rosap.ntl.bts.gov/view/dot/77770/dot_77770_DS1.pdf.
- Gundes, Selin. 2022. "Trends in Global Infrastructure Investment and Financial Consequences." *European Journal of Sustainable Development* 11 (1): 66. <https://doi.org/10.14207/ejsd.2022.v11n1p66>.
- Han, Xuehui, Jiaqi Su, and Jang Ping Thia. 2021. "Impact of Infrastructure Investment on Developed and Developing Economies." *Economic Change and Restructuring* 54 (4): 995–1024. <https://doi.org/10.1007/s10644-020-09287-4>.
- Hu, Jingxin, and Tao Li. 2025. "Infrastructure Investment and Inequality: Evidence from China." *Bulletin of Economic Research* 77 (3): 356–67. <https://doi.org/10.1111/boer.12493>.
- Islam, Md Kamrul, Muhammad Abubakar Dalhat, and Abdullah Al Mamun. 2022. "Road Infrastructure Investment Limits Based on Minimal Accidents Using Artificial Neural Network." *Applied Sciences* 12 (23): 11949. <https://doi.org/10.3390/app122311949>.
- Jiang, Lingduo, Shuangshuang Liu, and Guofeng Zhang. 2024. "The Impact of Asian Infrastructure Investment Bank on OFDI: Evidence from China." *Applied Economics* 56 (29): 3517–32.

- <https://doi.org/10.1080/00036846.2023.2206630>.
- Kuybida, Vasyl, Svitlana Savitska, Mariana Shkoda, Ievgen Akhromkin, Lesia Pron, and Yevhenii Kolomiets. 2023. "Methodology of Development of Social Investment Projects for the Economy: Legal Aspects." *Journal of Law and Sustainable Development* 11 (4): e902.
<https://doi.org/10.55908/sdgs.v1i4.902>.
- Meng, Jiayin, Zhen Ye, and Ying Wang. 2024. "Financing and Investing in Sustainable Infrastructure: A Review and Research Agenda." *Sustainable Futures* 8 (December):100312.
<https://doi.org/10.1016/j.sfr.2024.100312>.
- Nikonenko, Uliana, Tetiana Shtets, Andrii Kalinin, Iryna Dorosh, and Larysa Sokolik. 2022. "Assessing the Policy of Attracting Investments in the Main Sectors of the Economy in the Context of Introducing Aspects of Industry 4.0." *International Journal of Sustainable Development and Planning* 17 (2): 497–505.
<https://doi.org/10.18280/ijstdp.170214>.
- OECD. 2020. "Infrastructure Investment." 2020.
https://www.oecd.org/en/data/indicators/infrastructure-investment.html?utm_source=chatgpt.com&oeecdcontrol-df9123c98c-var3=2020.
- . 2022. "Infrastructure Investment: The Role of Institutional Investors." 2022.
<https://www.oecd.org/en/topics/finance-and-investment.html>.
- Perez-Montiel, Jose, and Carles Manera. 2022. "Government Public Infrastructure Investment and Economic Performance in Spain (1980–2016)." *Applied Economic Analysis* 30 (90): 229–47.
<https://doi.org/10.1108/AEA-03-2021-0077>.
- Shefer, Daniel. 2024. "Transport Infrastructure Investments and Regional Development: Literature Review." In *Regional Development in an Age of Structural Economic Change*, 151–80. London: Routledge.
- Shevtsova, Yevgeniya, Jorge Díaz-Lanchas, Damiaan Persyn, and Giovanni Mandras. 2025. "Trade Spillover Effects of Transport Infrastructure Investments: A Structural Gravity Analysis for EU Regions." *Regional Studies* 59 (1).
- <https://doi.org/10.1080/00343404.2024.2441231>.
- Walter, Benjamin. 2024. "How Institutional Investors Can Play an Important Role in Promoting Sustainable Infrastructure." Allianz Global Investors. 2024.
<https://www.allianzgi.com/en/insights/promoting-sustainable-infrastructure>.
- World Bank. 2023. "Data Show Private Infrastructure Investment Continues to Improve Following Pandemic Slump." 2023.
<https://www.worldbank.org/en/news/press-release/2023/04/24/data-show-private-infrastructure-investment-continues-to-improve-following-pandemic-slump>.
- Xin, Xu, Xiaoli Wang, Lijun Ma, Kang Chen, and Maoyao Ye. 2022. "Shipping Network Design–Infrastructure Investment Joint Optimization Model: A Case Study of West Africa." *Maritime Policy & Management* 49 (5): 620–46.
<https://doi.org/10.1080/03088839.2021.1930225>.
- Xiong, Chang-Sheng, Yu-Yao Hu, Tian-Xiao Zhou, Rong Tan, and Yong-Lei Zhang. 2022. "Impact of Provincial Infrastructure Investment on the Vulnerability of Social-Ecological System in China." *The Journal of Applied Ecology* 33 (5): 1395–1404.
- Zou, Longcan, Jim Huangnan Shen, Jun Zhang, and Chien-Chiang Lee. 2022. "What Is the Rationale behind China's Infrastructure Investment under the Belt and Road Initiative." *Journal of Economic Surveys* 36 (3): 605–33.
<https://doi.org/10.1111/joes.12427>.

Author(s) contribution

Maria Vakulich contributed to the research concepts preparation, methodologies, investigations, data analysis, visualization, articles drafting and revisions.

Ihor Zlakoman contribute to the research concepts preparation and literature reviews, data analysis, of article drafts preparation and validation.

Larysa Boltianska contribute to methodology, supervision, and validation.

Viktoriia Budnyk contribute to methodology, supervision, and validation.

Oleksandr Zinevych contribute to methodology, supervision, and validation.

This page is intentionally left blank