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Article

Scientific and Theoretical Foundations of Transport and Logistics Infrastructure Development

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Abstract: The development of transport and logistics infrastructure is an essential condition for improving economic connectivity, strengthening regional competitiveness and facilitating international trade, especially for landlocked economies. However, the theoretical foundations of infrastructure development remain multidisciplinary and fragmented, which complicates the design of coherent infrastructure policies. The purpose of this study is to systematise the scientific and theoretical foundations of transport and logistics infrastructure development and to propose an integrated conceptual framework for its analysis. The study applies a qualitative and conceptual research design based on a structured review of peer-reviewed publications and analytical reports of international organisations, combined with comparative analysis, systematisation, classification and conceptual modelling. The results show that transport and logistics infrastructure should be understood not merely as a collection of physical facilities, but as an interconnected socio-economic system that includes physical, organisational, institutional, digital and environmental components. Seven complementary theoretical approaches – economic growth theory, systems theory, spatial economics, transaction cost economics, network theory, institutional economics and sustainable development theory – are identified, and four mechanisms through which infrastructure affects regional competitiveness are described. An integrated conceptual framework is proposed in which physical capacity, spatial accessibility, institutional efficiency, technological integration and environmental sustainability jointly determine logistics performance and, through it, economic outcomes; a set of indicators for assessing each dimension is also suggested. The study contributes to the theoretical understanding of infrastructure development and provides an analytical basis for designing more effective regional and national transport-logistics policies and for future empirical research.

Keywords: Transport infrastructure, logistics infrastructure, infrastructure development, regional competitiveness, logistics performance, transport networks, digital transformation, sustainable development.

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1. Introduction

Transport and logistics infrastructure plays a fundamental role in the functioning of modern economic systems. The movement of raw materials, intermediate goods and finished products depends on the availability, quality and efficiency of transport networks and logistics facilities. In an increasingly interconnected global economy, the competitiveness of countries and regions is influenced not only by their production capacities but also by their ability to connect markets, reduce transportation costs and ensure reliable supply chains. Trade costs, of which transport and logistics costs are a major component, remain substantial and significantly affect the volume and structure of

international trade [1]. Time itself has become a trade barrier: delays in transit reduce the value of goods and the probability of participating in time-sensitive global value chains [2].

The economic significance of transport infrastructure extends beyond the transportation sector itself. Efficient roads, railways, terminals, warehouses, distribution centres and intermodal facilities facilitate the movement of goods, improve market accessibility, support industrial development and strengthen territorial integration. Since the seminal work of Aschauer, who drew attention to the productivity of public infrastructure capital [3], research on transport infrastructure has demonstrated that infrastructure investment can influence productivity and economic growth, although the magnitude of these effects varies according to geographical, institutional and methodological conditions [4], [5]. International organisations also emphasise that the regional effects of transport investment depend on the characteristics of regions and on complementary policies [6], [7].

The issue is particularly relevant for landlocked countries, including the economies of Central Asia. For such countries, the cost, time and, above all, the reliability of logistics chains are critical determinants of competitiveness and access to world markets [8]. Uzbekistan, as a doubly landlocked country, depends on transit corridors and on the efficiency of its domestic transport and logistics system to integrate into regional and global trade.

From a theoretical perspective, transport and logistics infrastructure cannot be considered exclusively as a physical capital asset. It represents a complex system in which physical networks interact with economic agents, information flows, institutional regulations and technological solutions [9]. Therefore, its development requires an interdisciplinary approach combining economics, transport geography, regional science, management and institutional analysis.

The existing literature provides different explanations of the relationship between infrastructure and economic development. Melo, Graham and Brage-Ardao, in a meta-analysis of empirical evidence, highlight the contribution of transport infrastructure investment to productivity and economic growth and show that the estimated effects depend on infrastructure type, the level of aggregation and regional conditions [4]. Deng reviews recent advances in research on the relationship between transport infrastructure, productivity and economic development and draws attention to methodological challenges such as reverse causality and spatial spillovers [5]. Graham shows that transport investment can raise productivity through agglomeration economies by increasing the effective density of economic activity [10].

From the perspective of spatial economics, transport infrastructure improves regional accessibility, facilitates market integration and influences the geographical distribution of economic activities. The concept of accessibility was formalised by Hansen as the potential of opportunities for interaction [11], while the new economic geography explains how the interaction of transport costs, increasing returns and market size determines the concentration or dispersion of economic activity [12]. Rosik and Wójcik demonstrate that the wider economic and spatial impacts of transport infrastructure can be examined through accessibility models, production functions, regional modelling and cost-benefit analysis [13]. Notteboom et al. emphasise the importance of logistics centres as interconnected elements of modern transport networks and propose a taxonomy that overcomes the conceptual ambiguity of the term [14].

Transaction cost economics explains how efficient transport and logistics systems reduce transportation, information, coordination and delivery costs [15]. Network theory, in turn, highlights the role of connectivity, transport corridors and logistics hubs in ensuring the continuous movement of goods; graph-theoretic indicators make it possible to evaluate the structure, connectivity and robustness of transport networks [16].

Institutional economics draws attention to the importance of regulatory frameworks, customs procedures, investment mechanisms and governance quality, since institutions shape the incentives and transaction costs of economic agents [17]. Roberts et al. demonstrate that transport corridors can generate wider economic benefits, although their effects depend on complementary policies, and may be unevenly distributed across places and population groups [18].

Recent studies also emphasise digital transformation as an important factor in logistics performance. Hofmann and Rüsch show that Industry 4.0 technologies change logistics processes through real-time data, connectivity and decentralised control [19]. Arvis, Ulybina and Wiederer highlight the growing role of shipment-tracking data and digital indicators in evaluating logistics systems [20]. The sustainability dimension is reflected in the sustainable mobility paradigm, which calls for reducing the need to travel, encouraging modal shift and improving the efficiency of transport systems [21], in line with the general concept of sustainable development [22].

Despite the extensive body of research, the theoretical foundations of transport and logistics infrastructure development remain multidisciplinary and sometimes fragmented. Logistics research itself has drawn upon theories from economics, strategic management, marketing and human geography, often without explicit integration [23]. This creates a need for an integrated conceptual approach capable of explaining how infrastructure components interact and how their combined performance affects economic development.

The purpose of this study is to systematise the scientific and theoretical foundations of transport and logistics infrastructure development and to develop an integrated conceptual framework for analysing its economic, spatial, institutional, technological and environmental dimensions. To achieve this purpose, the study addresses the following objectives: (1) to clarify the economic content and structural components of transport and logistics infrastructure; (2) to examine the principal theoretical approaches explaining infrastructure development; (3) to identify the mechanisms through which infrastructure affects economic growth and regional competitiveness; (4) to determine the role of digitalisation, institutional quality and sustainability in modern infrastructure development; and (5) to propose an integrated conceptual framework and indicators for evaluating transport and logistics infrastructure development.

2. Materials and Methods

The study applies a qualitative and conceptual research design based on a structured review of academic publications and international analytical reports concerning transport infrastructure, logistics systems, regional development and infrastructure governance. The information base includes peer-reviewed journal articles, monographs and reports of international organisations such as the World Bank and the Organisation for Economic Co-operation and Development (OECD). Sources were selected according to their relevance to the research objectives, their contribution to the theoretical understanding of infrastructure and logistics, and the recognition of their findings in the scientific literature. Priority was given to meta-analyses, systematic reviews and foundational theoretical works.

The methodological framework combines several complementary research methods (Table 1).

Table 1. Research stages and methods

Stage	Method	Content and Output
1. Identification of theoretical approaches	Literature review	Examination of publications on infrastructure productivity, spatial impacts, logistics networks and centres, and the use of theory in logistics research
2. Comparison	Comparative analysis	Comparison of theoretical approaches by analytical focus, explanatory mechanisms and relevance to infrastructure development
3. Structuring	Systematisation and classification	Grouping of infrastructure components into physical, organisational, institutional, digital and environmental dimensions
4. Synthesis	Conceptual modelling	Integration of the relationships between infrastructure components, logistics performance and economic outcomes into a conceptual framework
5. Generalisation	Analytical generalisation	Formulation of common principles, assessment indicators and policy implications

Source: compiled by the author.

Literature review. Academic publications were examined to identify the main theoretical approaches to transport and logistics infrastructure development. Particular attention was given to research addressing infrastructure productivity, spatial impacts, logistics networks, logistics centres and the use of theory in logistics research.

Comparative analysis. Different theoretical approaches were compared according to their principal analytical focus, explanatory mechanisms and relevance to infrastructure development.

Systematisation and classification. The main components of transport and logistics infrastructure were grouped into physical, organisational, institutional, technological and environmental dimensions.

Conceptual modelling. The relationships between infrastructure components and logistics performance were synthesised into an integrated conceptual framework. To operationalise the spatial dimension of the framework, the potential accessibility measure proposed by Hansen [11] was used:

$$A_i = \Sigma_j M_j \cdot f(c_{ij}), \qquad (1)$$

where A_i is the accessibility of region i; M_j is the economic mass (for example, population, gross regional product or employment) of destination j; c_{ij} is the generalised cost of travel between i and j (time, distance or monetary cost); and $f(c_{ij})$ is a decreasing impedance function. The measure shows that infrastructure improves accessibility by reducing c_{ij}, and that its effect is greater when the improved links connect a region with large economic centres.

Analytical generalisation. The findings of the literature review were used to identify common principles, propose indicators for each dimension of the framework and formulate theoretical implications for infrastructure development policy. The logistics performance dimensions were aligned with the components of the World Bank's Logistics Performance Index (LPI) [20].

The study relies on secondary sources. It does not claim to provide new econometric estimates or primary survey results. Therefore, the findings should be interpreted as a theoretical synthesis rather than as a quantitative assessment of a particular country's infrastructure performance.

3. Results

3.1 Structural components of transport and logistics infrastructure

The analysis indicates that transport and logistics infrastructure should be examined as a multidimensional system. Its main components can be classified into five interrelated groups (Table 2).

Table 2. Main structural components of transport and logistics infrastructure

Component	Main elements	Economic function
Physical infrastructure	Roads, railways, airports, terminals, bridges, warehouses	Ensuring the physical movement and storage of goods
Organisational infrastructure	Logistics operators, freight forwarders, distribution centres, intermodal services	Coordinating transportation and supply-chain operations
Institutional infrastructure	Regulations, customs procedures, investment frameworks, public-private partnerships	Establishing predictable conditions for infrastructure use
Digital infrastructure	Tracking systems, electronic documentation, data platforms, intelligent transport systems	Improving information exchange, transparency and operational efficiency
Environmental and social infrastructure	Green transport solutions, safety systems, sustainable facilities	Reducing environmental impacts and improving long-term resilience

Source: compiled by the author based on the reviewed literature.

The classification demonstrates that infrastructure development requires more than the construction of roads, railways and terminals. The efficiency of the overall system depends on the interaction between physical capacity, institutional arrangements, organisational coordination and digital technologies. For instance, the construction of a modern logistics centre may have limited economic effects if it is poorly connected to railway and road networks [14]. Similarly, the expansion of transport corridors may fail to generate their full potential if customs procedures remain time-consuming or logistics information is fragmented [18]. Therefore, infrastructure planning should adopt an integrated approach that considers the functionality and interdependence of all major components.

3.2 Theoretical foundations of infrastructure development

The comparative analysis identifies seven theoretical approaches that explain different dimensions of transport and logistics infrastructure development (Table 3).

Table 3. Theoretical foundations of transport and logistics infrastructure development

Theoretical approach	Main analytical focus	Explanation of infrastructure development	Representative sources
Economic growth theory	Productivity and output	Infrastructure improves production and distribution efficiency	[3]–[5]
Systems theory	Interdependence of components	Infrastructure performance depends on coordination across the entire system	[9], [24]

Theoretical approach	Main analytical focus	Explanation of infrastructure development	Representative sources
Spatial economics	Accessibility and territorial distribution	Infrastructure changes geographical relationships between economic centres	[11]–[13]
Transaction cost economics	Costs of economic exchange	Infrastructure reduces transportation, coordination and information costs	[1], [15]
Network theory	Connectivity and network structure	Infrastructure development improves the accessibility and reliability of transport networks	[14], [16]
Institutional economics	Governance and regulation	Institutional quality determines investment efficiency and infrastructure utilisation	[17], [18]
Sustainable development theory	Environmental and social outcomes	Infrastructure should balance economic efficiency with environmental and social objectives	[21], [22]

Source: author's systematisation of the theoretical literature.

These approaches are complementary rather than mutually exclusive. Economic growth theory explains the relationship between infrastructure and productivity, while spatial economics clarifies the geographical distribution of infrastructure benefits. Systems theory, which treats an object as a set of interacting elements whose properties cannot be reduced to the properties of individual parts [24], explains why the performance of infrastructure depends on its weakest link. Transaction cost economics focuses on the reduction of exchange costs, and network theory explains the importance of connectivity and integration. Institutional economics and sustainable development theory broaden the analysis by incorporating governance quality, environmental impacts and long-term resilience. The combined application of these theories provides a more comprehensive explanation of infrastructure development than the use of any single theoretical approach.

3.3 Mechanisms linking infrastructure and regional competitiveness

Transport and logistics infrastructure affects regional competitiveness through several interconnected mechanisms.

First, improved transport accessibility reduces the geographical and economic distance between producers and markets. As follows from formula (1), a reduction in the generalised cost of travel increases the accessibility of a region to economic mass. This enables enterprises to expand their market coverage and obtain inputs from a wider range of suppliers, and may strengthen agglomeration economies [10], [12].

Second, reliable logistics services contribute to lower inventory costs and more predictable delivery schedules. These factors are particularly important for manufacturing enterprises operating through complex supply chains. For landlocked countries, unpredictability of transit times often has a larger effect on total logistics costs than freight rates themselves, because firms must hold additional inventories to insure against delays [2], [8].

Third, infrastructure connectivity can stimulate investment by improving the attractiveness of industrial locations and logistics hubs. Regions with reliable transport connections may become more attractive for production facilities, distribution centres and export-oriented businesses [14].

Fourth, infrastructure improvements can generate spatial spillover effects. Investments implemented in one region may influence neighbouring territories by

improving their access to markets and transport networks. However, these effects depend on the quality of interregional connections and the economic structure of the territories involved; improved connectivity may also lead to the relocation of activity towards larger centres [12], [18].

Rosik and Wójcik identify several methodological approaches for evaluating the wider economic and spatial effects of transport infrastructure investments, including accessibility models, production functions, regional modelling and cost-benefit analysis [13]. This confirms that infrastructure performance should be evaluated through both direct and indirect effects.

3.4 Digitalisation as a component of modern infrastructure

Digitalisation has become an increasingly important element of modern transport and logistics infrastructure. Traditional infrastructure provides the physical capacity to move goods, while digital infrastructure improves the management, monitoring and coordination of these movements. Technologies such as the Internet of Things, artificial intelligence, geographic information systems, electronic documentation and real-time tracking can improve operational visibility and decision-making across supply chains [19].

The World Bank's 2024 research on the Logistics Performance Index highlights the growing importance of shipment-tracking data and quantitative performance indicators. The updated approach incorporates information from international container, air cargo and postal shipment datasets to measure supply-chain speed and connectivity [20]. This development illustrates a broader transformation in logistics performance measurement: instead of relying exclusively on expert perceptions, policymakers increasingly have access to operational data that can help identify delays, connectivity gaps and inefficiencies. Digital transformation therefore changes the nature of infrastructure development. It requires investment not only in physical facilities but also in interoperable information systems, data security, digital skills and institutional coordination.

3.5 Integrated conceptual framework

Based on the reviewed theoretical approaches, this study proposes an integrated conceptual framework consisting of five interrelated dimensions (Fig. 1):

1. **Physical capacity:** the availability, quality and technical condition of roads, railways, terminals, warehouses and other facilities.
2. **Spatial accessibility:** the level of connectivity between production centres, logistics hubs, domestic markets and international transport corridors.
3. **Institutional efficiency:** the quality of regulations, customs procedures, investment mechanisms and infrastructure governance.
4. **Technological integration:** the application of digital platforms, tracking technologies, data exchange and intelligent transport solutions.
5. **Environmental sustainability:** the reduction of emissions, efficient resource use, transport safety and infrastructure resilience.

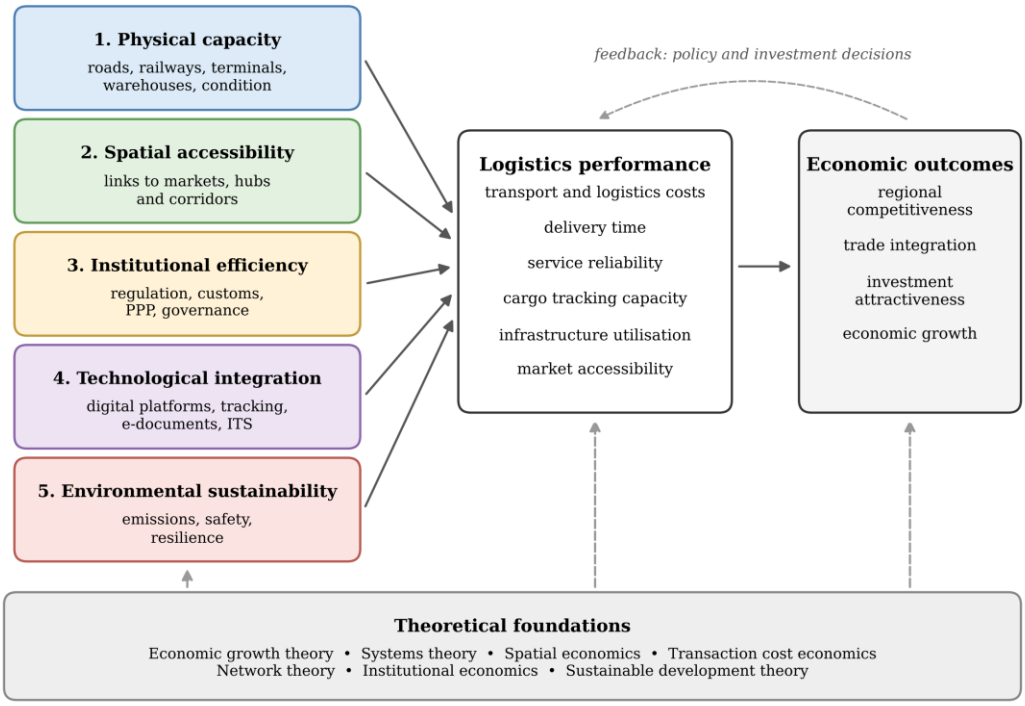


Figure 1. Integrated conceptual framework of transport and logistics infrastructure development

Source: developed by the author.

These dimensions jointly influence logistics performance, which can be assessed through transportation costs, delivery time, service reliability, cargo-tracking capacity, infrastructure utilisation and market accessibility. Logistics performance, in turn, determines economic outcomes – regional competitiveness, trade integration, investment attractiveness and economic growth – while these outcomes provide feedback for policy and investment decisions. The seven theoretical approaches identified above form the foundation of the framework. Indicative indicators for assessing each dimension are presented in Table 4.

Table 4. Indicative indicators for assessing the dimensions of the framework

Dimension	Indicative indicators	Related LPI components
Physical capacity	Density and technical condition of road and railway networks; capacity of terminals and warehouses; share of infrastructure in good condition	Infrastructure
Spatial accessibility	Potential accessibility index (formula (1)); travel time and cost to major markets and corridors; connectivity of logistics hubs	International shipments; timeliness
Institutional efficiency	Time and cost of customs clearance; number of documents; quality of regulation and PPP frameworks	Customs; logistics competence and quality
Technological integration	Share of electronic documents; use of tracking systems and digital platforms; data interoperability	Tracking and tracing
Environmental sustainability	CO_2 emissions per tonne-kilometre; share of rail and intermodal transport; accident rates; resilience of networks	–

Source: developed by the author; LPI components according to [20].

The framework emphasises that the dimensions are interdependent. For example, increased physical capacity may not lead to substantial improvements in logistics performance if institutional procedures remain inefficient. Similarly, digital technologies may have limited effects when transport networks and logistics facilities are insufficiently developed. The framework therefore emphasises balanced infrastructure development and coordinated policy implementation.

4. Discussion

The results are consistent with the view, supported by meta-analytical evidence, that the economic effects of transport infrastructure are heterogeneous and context-dependent [4], [5]. The proposed framework offers a theoretical explanation for this heterogeneity: the same investment in physical capacity produces different results depending on spatial accessibility, institutional efficiency, technological integration and sustainability. This explains why the effects of transport corridors depend on complementary policies [18] and why the regional effects of transport investment differ between regions [6], [7].

The study also confirms the conclusion of Fisher-Holloway and Mokhele that logistics research draws on multiple theories without sufficient integration [23]. Unlike reviews that focus on a single dimension – productivity effects [4], spatial impacts [13] or logistics centres [14] – the proposed framework combines seven theoretical approaches and links them to measurable indicators. In particular, the alignment of the framework with the components of the Logistics Performance Index [20] makes it possible to use internationally comparable data in future empirical research, while the accessibility measure (1) connects the framework with the tradition of spatial economics [11].

At the same time, the analysis shows potential trade-offs. Improved connectivity may strengthen large centres at the expense of peripheral territories [12], and the expansion of transport capacity may increase emissions unless it is accompanied by modal shift and efficiency measures [21]. Therefore, infrastructure policies should combine efficiency objectives with territorial equity and environmental sustainability.

The theoretical findings suggest several priorities for infrastructure development, which are particularly relevant for landlocked countries such as Uzbekistan [8]:

First, infrastructure investment decisions should be based on comprehensive assessments of economic, spatial and social benefits rather than on construction volumes alone.

Second, national and regional transport networks should be developed as integrated systems. Particular attention should be paid to connections between major transport corridors, industrial centres, logistics hubs and peripheral territories.

Third, infrastructure governance should be strengthened through transparent investment procedures, effective regulation and cooperation between public authorities and private-sector participants.

Fourth, digital technologies should be integrated into infrastructure planning and logistics operations. This includes the development of interoperable information systems, electronic documentation and real-time cargo monitoring.

Fifth, environmental sustainability should be incorporated into the entire infrastructure life cycle, from project planning and construction to operation and maintenance.

Finally, infrastructure performance should be assessed through a combination of quantitative indicators and qualitative institutional analysis. The World Bank's Logistics Performance Index provides a useful international reference, covering customs efficiency, infrastructure quality, international shipment arrangements, logistics service competence, tracking and tracing, and delivery timeliness [20].

The study has limitations. It is based on secondary sources and offers a theoretical synthesis rather than an empirical test. The relative importance of the five dimensions and the strength of the relationships between them have not been estimated quantitatively. Future research should operationalise the framework through a composite index, test its relationships using regional data and econometric methods, and apply it to the assessment of transport-logistics systems in specific countries and regions.

5. Conclusion

The study has examined the scientific and theoretical foundations of transport and logistics infrastructure development through an integrated analysis of economic, spatial, institutional, technological and environmental perspectives. The findings demonstrate that transport and logistics infrastructure should be understood as a complex socio-economic system rather than merely as a collection of physical transport facilities. Its performance depends on the interaction of transport networks, logistics centres, service providers, institutional arrangements and digital technologies.

The analysis identifies seven major theoretical approaches that contribute to understanding infrastructure development: economic growth theory, systems theory, spatial economics, transaction cost economics, network theory, institutional economics and sustainable development theory. Each approach explains a particular dimension of infrastructure development, while their combined application provides a more comprehensive analytical foundation. The study also establishes that the economic effects of transport infrastructure depend on more than the scale of investment: accessibility, network connectivity, institutional quality, logistics service efficiency and environmental considerations influence the extent to which infrastructure contributes to regional competitiveness and economic growth.

The proposed integrated conceptual framework highlights five essential dimensions – physical capacity, spatial accessibility, institutional efficiency, technological integration and environmental sustainability – which jointly determine logistics performance and the ability of regions to participate effectively in domestic and international economic networks. A set of indicative indicators aligned with the Logistics Performance Index is proposed for assessing each dimension. From a policy perspective, infrastructure development should be based on coordinated planning, evidence-based investment decisions, institutional improvements, digital integration and environmental responsibility.

The principal contribution of this study lies in the systematisation of multidisciplinary theoretical approaches and the development of an integrated conceptual framework for analysing transport and logistics infrastructure development. Further research may apply this framework to the empirical assessment of regional transport-logistics systems, using indicators of infrastructure quality, logistics performance, accessibility, investment efficiency and regional economic development.

REFERENCES

[1] J. E. Anderson and E. van Wincoop, "Trade costs," *J. Econ. Lit.*, vol. 42, no. 3, pp. 691–751, 2004.

[2] D. L. Hummels and G. Schaur, "Time as a trade barrier," *Amer. Econ. Rev.*, vol. 103, no. 7, pp. 2935–2959, 2013.

[3] D. A. Aschauer, "Is public expenditure productive?," *J. Monetary Econ.*, vol. 23, no. 2, pp. 177–200, 1989.

[4] P. C. Melo, D. J. Graham, and R. Brage-Ardao, "The productivity of transport infrastructure investment: A meta-analysis of empirical evidence," *Reg. Sci. Urban Econ.*, vol. 43, no. 5, pp. 695–706, 2013, doi: 10.1016/j.regsciurbeco.2013.05.002.

[5] T. Deng, "Impacts of transport infrastructure on productivity and economic growth: Recent advances and research challenges," *Transp. Rev.*, vol. 33, no. 6, pp. 686–699, 2013, doi: 10.1080/01441647.2013.851745.

[6] OECD, *Impact of Transport Infrastructure Investment on Regional Development*. Paris, France: OECD Publishing, 2002, doi: 10.1787/9789264193529-en.

[7] OECD, *Transport Bridging Divides* (OECD Regional Development Studies). Paris, France: OECD Publishing, 2020, doi: 10.1787/55ae1fd8-en.

[8] J.-F. Arvis, G. Raballand, and J.-F. Marteau, *The Cost of Being Landlocked: Logistics Costs and Supply Chain Reliability*. Washington, DC, USA: World Bank, 2010.

[9] J.-P. Rodrigue, *The Geography of Transport Systems*, 5th ed. London, U.K.: Routledge, 2020.

[10] D. J. Graham, "Agglomeration, productivity and transport investment," *J. Transp. Econ. Policy*, vol. 41, no. 3, pp. 317–343, 2007.

[11] W. G. Hansen, "How accessibility shapes land use," *J. Amer. Inst. Planners*, vol. 25, no. 2, pp. 73–76, 1959.

[12] P. Krugman, "Increasing returns and economic geography," *J. Polit. Econ.*, vol. 99, no. 3, pp. 483–499, 1991.

[13] P. Rosik and J. Wójcik, "Transport infrastructure and regional development: A survey of literature on wider economic and spatial impacts," *Sustainability*, vol. 15, no. 1, Art. no. 548, 2023, doi: 10.3390/su15010548.

[14] T. Notteboom, F. Parola, G. Satta, and M. Risitano, "A taxonomy of logistics centres: Overcoming conceptual ambiguity," *Transp. Rev.*, vol. 37, no. 3, pp. 276–299, 2017, doi: 10.1080/01441647.2016.1231234.

[15] O. E. Williamson, *The Economic Institutions of Capitalism*. New York, NY, USA: Free Press, 1985.

[16] S. Derrible and C. Kennedy, "Applications of graph theory and network science to transit network design," *Transp. Rev.*, vol. 31, no. 4, pp. 495–519, 2011.

[17] D. C. North, *Institutions, Institutional Change and Economic Performance*. Cambridge, U.K.: Cambridge Univ. Press, 1990.

[18] M. Roberts, M. Melecky, T. Bougna, and Y. Xu, "Transport corridors and their wider economic benefits: A quantitative review of the literature," *J. Reg. Sci.*, vol. 60, no. 2, pp. 207–248, 2020, doi: 10.1111/jors.12467.

[19] E. Hofmann and M. Rüsch, "Industry 4.0 and the current status as well as future prospects on logistics," *Comput. Ind.*, vol. 89, pp. 23–34, 2017.

[20] J.-F. Arvis, D. Ulybina, and C. Wiederer, "From survey to big data: The new Logistics Performance Index," World Bank, Washington, DC, USA, Policy Res. Working Paper 10772, 2024, doi: 10.1596/1813-9450-10772.

[21] D. Banister, "The sustainable mobility paradigm," *Transp. Policy*, vol. 15, no. 2, pp. 73–80, 2008.

[22] World Commission on Environment and Development, *Our Common Future*. Oxford, U.K.: Oxford Univ. Press, 1987.

[23] T. Fisher-Holloway and M. Mokhele, "The deployment of theory in logistics research: A systematic literature review," *J. Transp. Supply Chain Manag.*, vol. 16, Art. no. a716, 2022, doi: 10.4102/jtscm.v16i0.716.

[24] L. von Bertalanffy, *General System Theory: Foundations, Development, Applications*. New York, NY, USA: George Braziller, 1968.