UDC 332-1
SCOPUS CODE 2001
https://doi.org/10.36073/1512-0996-2025-3-231-243

The External Relations of the Region and the Role of the Transport Complex in Ensuring their Success

Marina Metreveli Department of Tourism and Marketing, Georgian Technical University, Georgia, 0160, Tbilisi, 75, M. Kostava str.
E-mail: metrevelimarina11@gtu.ge

Reviewers:
L. Kochlamazashvili, Professor, Faculty of Business Technologies, GTU
E-mail: l.kochlamazashvili@gtu.ge
M. Chechelashvili, Associate Professor, Faculty of Business Technologies, GTU
E-mail: m.chechelashvili@gtu.ge

Abstract.

In the second half of the 18th century, A. Smith noted: "Since water transport opens up wider markets for any industry than those accessible only by land transportation, it is on the sea coasts and along the full-flowing rivers that any sphere of production naturally begins to be subdivided and improved, and often it does not take long for these improvements to spread to the interior of the country." In this section, based on theoretical analysis, we will determine the contribution of the transport complex to ensuring the region's external relations. Numerous theories developed by researchers provide theoretical justification for the transport complex's role in regional economic development and the formation of its external economic relations. These theories can be categorized based on their scope of application, initial premises, use of mathematical tools, and other factors. In this study, we will consider the presence of a center of economic activity in the region as the foundation for classification. The first group represents the classical German school of spatial placement, which assumes a particular center of regional economic activity.

Keywords: Cargo movement; Plant location; Relations of the region; Transport complex.

Introduction

The task of this work is to determine the role and place of the transport complex in the region's development of external relations. For this purpose, the following issues were comprehensively discussed and resolved: (i) regional relations, (ii) transport complex, (iii) cargo movement, and (iv) movement of enterprises.

Methodology. During the research, the author was guided by the theoretical provisions and methodological principles of economic science. During the work

process, works by Georgian and foreign scientists, as well as materials from scientific conferences and periodicals, were utilized. As for the research methods, the dissertation uses methods, techniques, and logical techniques of economic analysis, including comparative financial analysis, grouping, observation, correlation, and system analysis.

The author formulates the conclusions and recommendations presented in this work based on an analysis of the research results on the functioning of the transport system in various fields, including engineering, food production, and service provision.

The **significance of the topic** is evident in the fact that even economists from past centuries recognized the crucial role of transport in the smooth functioning of the economy. Today, in an era characterized by advanced transport systems, having a well-developed transport network is essential and profitable for any industry. The contribution of the transport complex to facilitating the region's foreign relations is significant, as it encompasses not only land transport but also rail, water, and air transport.

Main Part

The importance of transport in facilitating the region's economic ties is emphasized in the works of J. Thünen, V. Laundhardt, A. Weber, A. Lesch, and V. Christaller. The formation of the spatial distribution theory, which underpins theories of interregional and international trade, is typically associated with the publication in 1826 of Johann Heinrich von Thünen's book, "The Isolated State in Its Relation to Agriculture and National Economy." This foundational work identifies patterns in the distribution of agricultural production. In his initial studies, J. Thünen posited the existence of a state economically isolated from the rest of the world, within which a central city serves as the sole market for agricultural products. The price of each product at any point varies from its price in the city by the amount of transportation costs, which are considered directly proportional to the weight of the cargo and the distance transported. J. Thünen demonstrated that the optimal scheme for placing agricultural production is a system of concentric circles (belts) of varying diameters around the central city, delineating zones for different types of agricultural activities. The higher the yield (productivity), the closer the production should be to the city. Conversely, the more expensive a product is per unit of weight, the farther it is advisable to place it from the city. Consequently, the intensity of farming decreases with distance from the city. Building on agricultural standards, J. Thünen established the key provisions of the theory of land rent based on location. The German scientist premised that the price of a product is independent of its production location. Therefore, land rent is determined by the savings on transportation costs for farms located closer to the center. The highest rent is found in the first ring, with rent decreasing as the distance from the center increases. The lower the transportation costs for delivering agricultural products, the higher the land rent will be. J. Thünen generalized the study of land rent and used it as a basis for further expanding the prerequisites and including external territories.

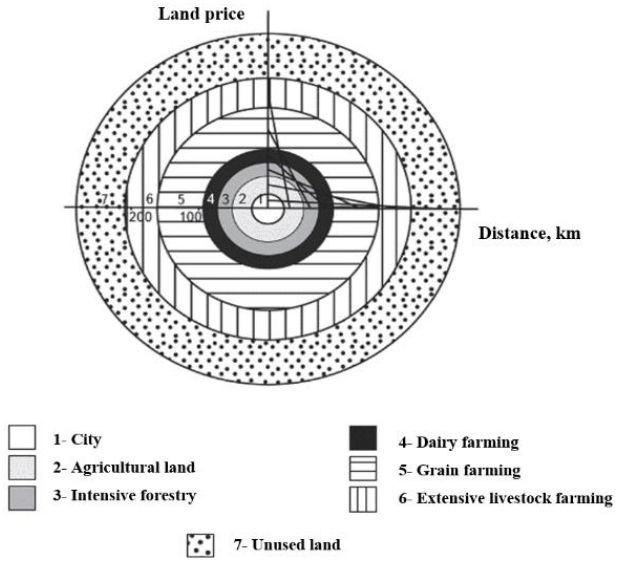

Fig. 1. Zones ("rings") of J. Thünen's agricultural "Standort"

ISSN 1512-0996
www.shromebi.gtu.ge

V. Launhardt builds on J. Thünen's theory of spatial organization in the economy. The primary contribution of the German scientist V. Launhardt, whose notable work "The Practice of Effective Placement of Enterprises" was published in 1882, is a method for determining the optimal location of an industrial enterprise about sources of raw materials and the market for product sales.

This study was not initially restricted to the boundaries of a single state. Transportation costs are the crucial factor in production location for both V. Launhardt and J. Thünen. Production costs are assumed to be uniform across all sites within the study area.

The optimal site for the enterprise is affected by the weight ratios of the transported goods and the distances involved. To tackle this challenge, V. Launhardt developed a method known as the weight (or location) triangle. Among the three proposed sites for the plant, the optimal one is the one that minimizes transportation costs (Fig. 2).

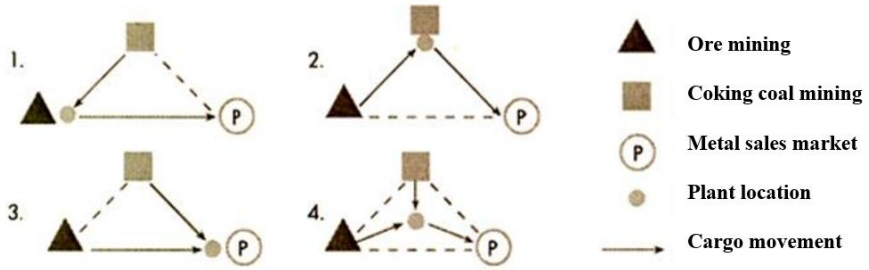

Fig. 2 illustrates the options for placing a metallurgical plant ("Location triangle") as described by Launhardt.

The main work of the German economist and sociologist Max Weber, "On the Location of Industry: Pure Theory of the Location of Industries," was published in 1909. The scientist set himself the task of creating a universal theory of production location based on the consideration of an individual enterprise. He made a significant step forward compared to J. Thunen and W. Launhardt, introducing new factors of production location into the theoretical analysis, in addition to transport costs, and setting a more general optimization problem: the minimization of total production costs, rather than just transport. The optimal location of production will be a place where total production costs are lower than in another. A. Weber leaves three factors: costs of raw materials, labor costs, and transport costs. However, the first of these - the difference in prices of the materials used - can be expressed in terms of differences in transport costs, which should be excluded from independent analysis. He considers all other conditions, including the location of the enterprise, as a particular "united agglomeration force", or the third standard factor. Thus, ultimately, three factors are analyzed: transport, labor, and agglomeration.

1) Transport orientation. According to A. Weber, the amount of transport costs depends on the weight of the transported goods and the distance of transportation. Under the influence of transport costs, an industrial enterprise will be attracted to a location where, considering the proximity of the consumer center and sources of raw materials, transport costs are minimized. This point is the transport standard (transport point). To find it, V. Launhardt's weight (location) triangle is used.
2) Work orientation. Taking into account the differences in labor costs, a work point is determined, i.e., a point with the lowest working costs. The work point will attract production to itself, resulting in either production remaining at the transport point or moving to the work point. Such a move can occur when the savings on labor costs at a given point cover the excess in transport costs

due to the relocation of production. To determine this, taking into account the combined influence of transportation costs and the labor force, A. Weber resorts to constructing so-called isodaplines, which have the following meaning. Increases in transportation costs, caused by the movement of production from a transport point to a work point, increase with distance from the transport point, and more or less uniformly in any direction of distance. Therefore, in each direction, there must be points for which increases in transportation costs (or deviation costs) will be the same. A. Weber calls the lines connecting these points of identical deviation costs isodapanes (Figure 3).

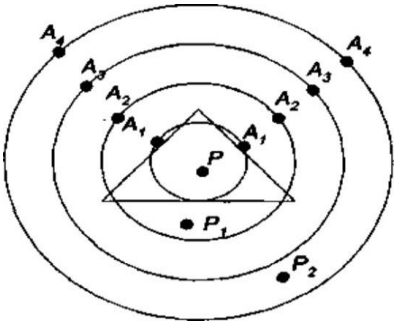

Fig. 3. Transport and work points in A. Weber's model
(Source: Compiled by the author)

Suppose a given work point is located inside its critical isodapana. In that case, moving production from a transport point to a work point is advisable; if it is outside, it is inadvisable. Thus, if the critical isodapana for work point P1 is curve A3, then the enterprise is most rationally located at transport point P. If the critical isodapana is A4, then the location will be more advantageous for a new enterprise.

1) Agglomeration orientation. A. Weber analyzed the influence of agglomeration factors on the placement of an industrial enterprise, based on an assessment of changes caused by agglomeration processes in the optimal production placement scheme obtained through transport and work orientations.

International seaport hubs are considered economic entities of individual enterprises, the location of which is determined by various factors, including the transportation of goods circulating in global trade, the availability of labor attracted to port facilities, and the development of industrial activity within the port.

Lösch made a further contribution to the development of the German school of standort theory. It significantly expands the range of factors and conditions considered in the placement of enterprises and their combination (taxes, duties, effects of monopolies and oligopolies, etc.). It analyzes the situation of firm placement in competitive conditions, when the choice of location is determined not only by each firm's desire to maximize profits, but also by the increase in the number of firms filling the entire market space. Accordingly, in spatial pricing, individual firms must adjust prices to protect their market from penetration by other firms. A. Lösch proved the optimality of the hexagonal placement of firms at the vertices of regular hexagons. A. Lösch considers an economic region as a market with boundaries determined by interregional competition. The ideal shape of a region is a regular hexagon. He analyzes several types (levels) of regions, including market zones defined by the radii of competitive sales of the corresponding types of products, and the economic landscape, which is the highest level of region uniting market zones.

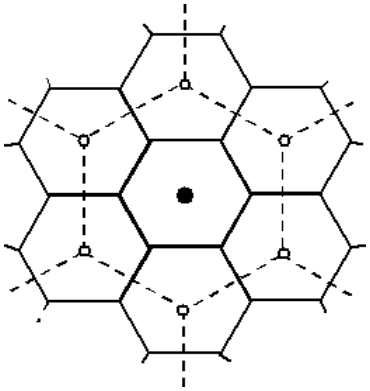

Fig. 4. Economic landscape according to A. Lesch
(*Source: Compiled by the author)*

ISSN 1512-0996
www.shromebi.gtu.ge

The German scientist gave a detailed description of the market functioning of the system of producers and consumers, where each economic variable is tied to a specific point in space. The primary elements of the equilibrium model's equations are the demand and cost functions. The state of equilibrium, according to A. The following conditions characterize Lösch:

A. The location of each firm has the maximum possible advantages for producers and consumers;
B. firms are located so that the territory is fully used;
C. There is equality of prices and costs (no excess income);
D. All market zones have a minimum size, represented by a hexagon.

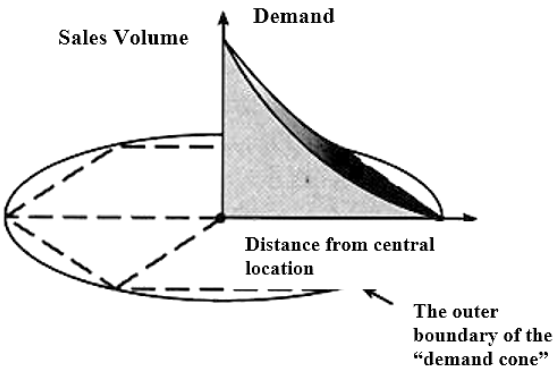

Fig. 5. Schematic representation of the market model according to A. Lösch (*Source: Compiled by the author)*

In their work, Marina Metreveli and Tina Dolidze emphasize the role of ports in a region's economic development. In the Middle Ages, a city located far from a port could develop only if neighboring cities left a relatively large source of agricultural supply unused. (Metreveli & Dolidze, 2024)

Separately, Pollak W., Wiebenson W. singled out "funnel cities" - transport hubs that are crucial in the transportation network, serving as entry points for commodity and material flows. Often, the formation of these funnel cities was determined by natural factors, such as the presence of mountains, rivers, and continuous coastlines. However, it can also be due to technological factors, including the infrastructure necessary for the transshipment of cargo from one mode of transport to another, as well as tunnels, bridges, and other related elements. In this case, goods will pass through the gates only if there is a large market zone on the other side. As examples of such transit cities, A. Lesch singles out Bratislava and Vienna: "Vienna is a three-wing gate leading to the Bohemian Basin (Czech Republic), surrounded by Hungary and southern Germany." (Pollack & Wiebenson, 2020)

If the barrier separates not only different markets but also territories where different modes of transport dominate, the transit city will act as a transfer point or hub. A. Lesch separately considers international commodity flows, using grain as an example. The transportation routes chosen by businesses served as the basis for justifying the location of transportation infrastructure facilities in the early 20th century. The choice of location for an international seaport, according to A. Lesch should be based on a comparison of land and sea transport rates.

Tamar Barnov, Marina Metreveli, and Tornike Antidze developed Lesch's ideas. In 1924, their scientific paper was published, in which the theory of the functions of a system of settlements (central places) in a market space was first outlined.

By central places, Georgian researchers refer to economic centers that provide goods and services not only to their population, but also to residents of neighboring settlements (sales zones). According to Barnov, Metreveli, and Antidze, service and sales zones tend to form regular hexagons over time, and the entire territory is composed of a set of hexagons. This allows minimizing the average distance for selling products and the distance that residents of the region must cover to make purchases and/or receive services. (Barnov, Metreveli, & Antidze, 2024)

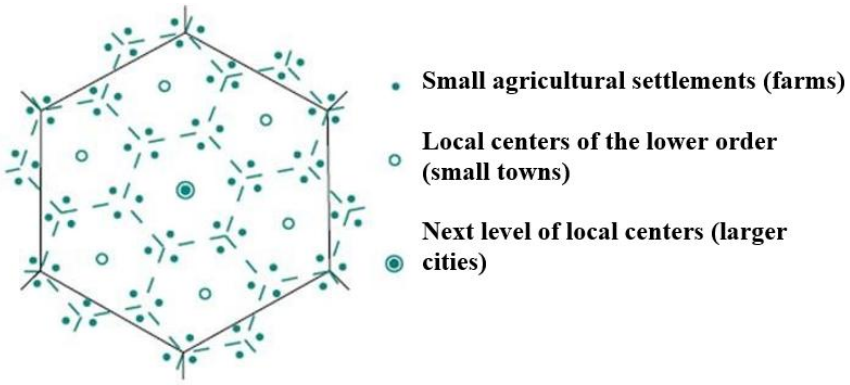

Figure 6. Layout of central places according to V. Christaller (*Source: Compiled by the author)*

Aschauer David explains why some goods and services should be produced and provided in all populated areas (essential goods), some in medium-sized populated areas and small towns (such as clothing and essential household services), and others in large cities (luxury goods, museums, theaters, etc.).

In the mid-20th century, alongside changes in the geopolitical situation, economic geography underwent a new phase of development. The classical theory was replaced by the concepts of "regional science" based on the methods of mathematical modeling and spatial analysis. (Aschauer, 2018)

The second group is represented by modern theories that form the basis of the so-called New Economic Geography, including A. Dixit, D. Stiglitz, E. Markusen, P. Krugman, M. Fujita, E. Venables, J.-F. Thisse, and W. Isard.

New Economic Geography (NEG) is a type of economic analysis that aims to explain the spatial structure of the economy by constructing models where increasing returns occur under conditions of imperfect competition. It is generally accepted that the first models of competition, which allowed for increasing returns to scale in production, were developed within the framework of the theory of industrial markets. The theory of industrial markets emerged as an independent scientific and applied field in the 1930s and 1960s. (Clark, 1942)

The fundamental difference between the economics of industrial markets and many other areas of the economy lies in the proximity of the subject of study to reality. The economics of industrial markets studies a non-extreme version of a market with perfect competition, as W. Shepherd put it, which is essential for a small sector of the modern economy. The analysis focuses on markets with imperfect competition, including various oligopolistic and monopolistic structures, markets characterized by monopolistic competition, and the so-called contestable markets, among others. In its most general form, the theory of industrial markets is an area of theoretical and applied research that analyzes the economy and the organization of various industrial sectors within the modern economy, including the service sector, as well as the market structures formed within them. This reflects the position of J. Tirole, who emphasizes the need to study the functioning of markets and their inherent market structures. However, there is a broader approach to this. According to it, the economy of industrial markets, while indeed having as its main task the study of market functioning, the interaction of markets and enterprises, also studies essential aspects of state economic policy related to market management and market structures. Among these are the analysis of policies that support competition and regulate the activities of monopolies, including natural ones, as well as industrial, technological, and innovation policies, along with several other aspects of state regulation.

The port industry, which unites entities located in different countries, confirms the basic postulates of the theory of industrial markets through its development. Free competition of sea ports, the effect of returns to

scale from commercial activity, characterizes this industry as a typical object for research tools. The traditional theory of industrial markets was based on the central paradigm (put forward in the 1930s and formed in the 1950s) "structure - conduct – performance" (Structure - Conduct - Performance), which initially proceeded from the cause-and-effect relationship between the market structure, the market behavior of enterprises and the performance of markets/enterprises. In the view of the authors of this paradigm, E. Mason and D. Bain, the economics of industrial markets, which involves developing standards for the effective operation of companies, serves to substantiate recommendations for improving the activities of firms and increasing their performance.

Continuing this argumentation and taking into account modern realities, it can be added that the economics of industrial markets equip both business and the state with the knowledge and experience necessary for making effective decisions, which enables them to succeed and prevail in modern, intense competitive battles in national and global markets. Addressing the question of the significance of this theory, W. Shepherd notes that the economy of industrial markets studies problems that determine the most critical conditions of economic life, being at the center of financial struggle and progress.

The works of A. Dixit and D. Stiglitz had a significant influence on the development of new economic geography.

In 1977, scientists developed a model to describe monopolistic competition, aiming to understand the existence of monopoly power and the increasing returns that generate this power. P. Krugman developed the model and created, based on it, the concept of monopolistic competition, where the equilibrium of prices in conditions of increasing returns to scale and the monopoly of each firm in its market is determined by the free access of other firms to the market, for which he received the A—Nobel Memorial Prize in Economics in 2008.

The final formulation of the NEG was presented in the book by M. Fujita, P. Krugman, and E. Venables, titled "The Spatial Economy: Cities, Regions, and International Trade."

The central place in the theory of new economic geography is given to:

1) trade costs;
2) costs of production factors and their mobility;
3) size and accessibility of the market;
4) characteristics of the structure of competition in regional markets;
5) The quality and size of the labor market.

P. Krugman, M. Fujita, and E. Venables in their work applied the model developed earlier by A. Dixit and D. Stiglitz in 1977.

The demand function for the product is directly determined by the price of the product itself, pi, and the prices of other products, which describes the total income of consumers. The expression in the denominator of the second equation can be interpreted as a general price index. (Metreveli & Ramishvili , "Globalization and ways of booking services for tourists", 2024)

This function is used in models of monopolistic competition, where firms produce slightly different products at a price that exceeds marginal costs. The number of firms (n) is endogenous and is determined from the condition of zero profit. The model proposed by P. Krugman can be adapted to the port industry. The cargo owner almost always has a choice of a transshipment port, characterized by its tariff system and the set of services it offers. Based on his preferences and commercial capabilities, he selects a port among competing options.

The key idea of the NEG is that the economic space is formed as a result of the interaction of centripetal and centrifugal forces. Under the influence of factors such as the costs of interaction between economic agents, increasing returns to scale, market size, and product variety, a polarized spatial structure of the economy is formed.

Among the representatives of the School of Economic Geography, it is necessary to note A. Granberg. He made a significant contribution to the development of regional economics theory and is rightfully considered the founder of the school of spatial intersectoral studies. It is he who owns the methodology for substantiating infrastructure facilities servicing the flows of goods in international trade. The intensity of freight and passenger traffic assesses the feasibility of constructing a facility that flows through it.

Currently, among scientists and practitioners, there are two distinct views on the impact of port activities on a region's economic development. The prevailing view is that ports contribute to the economic development of an area and have a multiplier effect on the growth of related industries. Another group of researchers believes that ports primarily respond to the growing demand for handling freight flows. In our opinion, there is a direct interdependence between the development of the regional economy and the development of the port. Cities with a port have a competitive advantage. The study examined the impact of ports on regional development (Table 1).

Nature of influence	***Positive***	***Negative***
Direct	-Economic activity of the port as an enterprise (taxes); -Creation of jobs.	- Impact on the environment
Indirect	-Creation of prerequisites for the placement of production in the region; -Formation of related industries, including additional logistics services.	- Load on the road network (deterioration of the road surface)
	- Changes in market availability and sales resources.	

Table 1. The impact of ports on the economic development of the region (*Source: Compiled by the author)*

Let us consider these components in more detail.

1. Economic activity of the port as a taxpayer. (Bierman & Smidt, 2024)

As a result of economic activity, seaports generate income, part of which is subject to payment to the national budget in the form of income tax. The amount of income tax varies by country, but, as a rule, is subject to payment to the federal budget everywhere. Financial resources can be returned to the region where the port is located through inter-budgetary transfers or targeted subsidies for the implementation of socially significant facilities.

2. Creation of related industries (additional logistics services). (Drezen & Stern, 2017)

In addition to direct loading and unloading operations, ports can provide services for cargo storage, batch assembly, customs clearance, further transportation, and other related activities. The creation of added value in the port is often associated with the concept of port-centric logistics.

Port-centric logistics encompasses a range of services related to the transportation and delivery of goods directly to and from port terminals. Port terminals handle three types of cargo flows: import, export, and transshipment (transshipment, mainly container cargo). To achieve maximum efficiency, this activity is conducted in pre-port zones. Below is a diagram illustrating the types of logistics services available at the terminal by cargo direction.

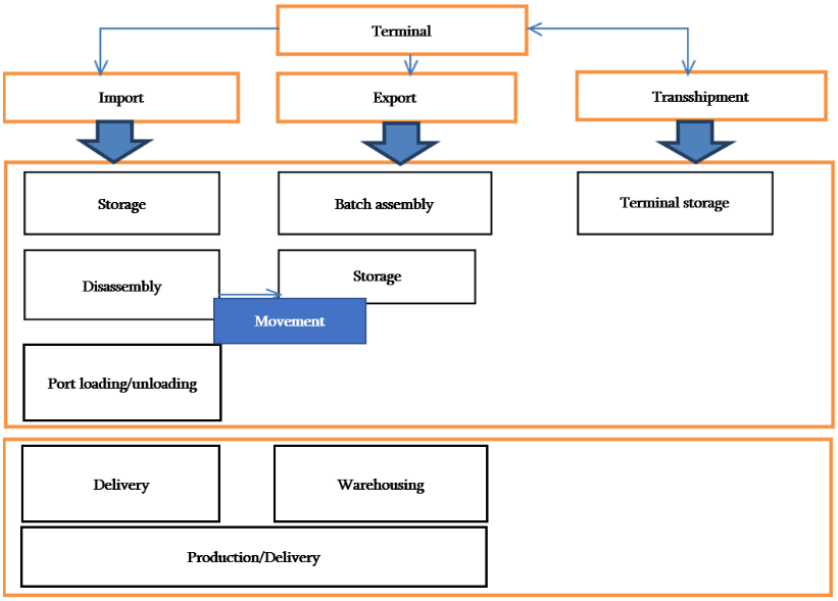

Fig. 7. Types of logistics services in the terminal by cargo direction
(Source: Compiled by the author following the source (Johnston & DiNardo, 2024)

Thanks to the development of port-oriented logistics, additional value is created for the stevedoring services provided by ports, resulting in an increased tax base and job creation in the region.

1. Job creation.

According to the OECD, a 1 million tonne increase in port cargo turnover generates an average of 300 new jobs (European Commission, European ports: An engine for growth, 2012; Ferrari, C., Ports and Regional Development: A European Perspective, OECD Regional Development Working Papers, 2012).

A study conducted by the OECD group led by C. Ferrari also confirms the direct relationship between port cargo turnover and employment levels. The researchers conclude that in a region with an economically active population of 1 million, a one million-tonne increase in port cargo turnover will, in the short term, lead to a rise in employment in the port's cargo concentration zone of 400-600 people. In the long term, the impact is even more significant, potentially resulting in the creation of an additional 7,500 new jobs. The report concludes that the effects of port throughput on job creation also depend on the institutional characteristics of specific ports, with privately owned ports exerting a more significant influence on regional employment than publicly operated ones. However, it is essential to note that the influence of ports on regional employment tends to diminish with the advancement of information technology and the introduction of capital-intensive port equipment.

2. Improving market accessibility.

The reduction in transport costs resulting from port activities enables local producers to procure resources on the world market at lower prices, specialize in industries where the regional economy has a competitive advantage, and access new markets at lower costs. However, if local producers are inefficient, the establishment of a port could, especially in the short term, lead to a decline in local production and an increase in unemployment due to the decreased costs of imported goods. P. Rietveld and P. Nijkamp illustrate the ambiguous impact of transport infrastructure modernization on the regional economy. As an integral part of the regional transport infrastructure, seaports

are included in this framework. The construction or modernization of infrastructure yields positive outcomes for rapidly growing regions and areas greatly benefiting from the scale of production, such as large cities.

3. Establishing prerequisites for locating production in the region.

Ports serve as attractive locations for developing industrial clusters, which have a direct impact on the regional economy. E. Markusen distinguishes four types of industrial districts: (Markusen A. Sticky places in slippery space: A typology of industrial districts / Economic geography - Jul 1996, 72, 3, p. 293)

- Marshallian industrial districts;

These regions are characterized by a business environment formed by small, local companies, with decisions regarding investments and production scale made locally. The labor market is highly mobile, and employees move within the region from one company to another. Within the Italian type of cluster, which complements the Marshallian type, companies operating in the region interact purposefully, exchanging information, production plans, and other relevant details to enhance flexibility in economic activity and mitigate problems of overproduction. A classic example of a Marshallian industrial cluster is found in northern Italy, specializing in the production of design, furniture, and ceramics. (Dijkstra, 2019)

- "Hub and spoke" industrial districts;

These districts form regions in which key companies act as anchors, or hubs, of the regional economy, creating production chains with surrounding supplier firms, known as spokes. Examples include cities such as Seattle and New Jersey in the USA, Toyota City in Japan, Ulsan and Pohang in South Korea, and São José dos Campos in Brazil. The labor force is mobile, but to a lesser extent compared to Marshallian industrial districts; employees tend to be loyal primarily to larger companies within the region.

- Satellite;

In satellite clusters, large enterprises dominate the business structure, with decisions regarding production scale and investments made outside the region. These enterprises often function as branches of transnational companies (TNCs). Resources are primarily sourced externally, with minimal agreements with local suppliers and few orders placed within the region. Personnel exchanges are common between subsidiaries and the head office, but not within the local area. (Weisbrod & Weisbord, 2017)

Examples of such clusters in the United States include Elkhart (automotive components manufacturing) and Gumi (textiles and electronics) in South Korea, as well as Manaus (transport and logistics).

- State-owned;

In a classic state-owned industrial district, the core is a public or non-profit enterprise, such as a military base, a military weapons plant, a weapons testing center, a university, a prison complex, or a government district. The business structure and spatial placement of the cluster are determined not by the economic decisions of private firms, but by political will. A state-owned industrial district is, in many ways, similar to a hub-and-spoke structure, with the city-forming enterprise having several connections to the regional economy, much like satellite clusters. The labor market will vary depending on the type of enterprise: military plants operate in a local and regional market, while universities and research centers serve a national market. Two factors will determine the long-term development of a region of this type:

(1) the development prospects of the parent enterprise and

(2) the extent to which the city-forming enterprise stimulates growth within the region by supporting local suppliers, promoting the development of small and medium businesses, and creating demand for labor and other factors of production in the regional economy.

Examples in the United States include Santa Fe, Albuquerque, San Diego, and Colorado Springs, which have experienced growth due to the presence of military bases, academies, and laboratories. Other

notable examples are Los Angeles, Silicon Valley, and Seattle, which have benefited from the presence of weapons factories. Additionally, cities such as Madison, Ann Arbor, Sacramento, Austin, and Boulder have seen growth due to the presence of state universities. A notable feature of modern ports is the development of industrial zones in pre-existing port areas. Almost all major ports in Europe currently have plans for territorial development. These include the ports of Antwerp, Rotterdam, Hamburg, Wilhelmshaven, Bremerhaven, Le Havre, and in the Baltic Sea, Gdańsk, Riga, Hamina-Kotka, Klaipėda, Ust-Luga, and the Port of St. Petersburg, among others.

4. Environmental impact.

The following environmental impacts of port development are distinguished:

- impact on the coastal ecosystem, fish and mammal populations;
- impact of dredging operations on water currents and water circulation;
- impact on water runoff and groundwater;
- reduction of nitrogen-retaining marshland;
- soil pollution;
- release of pollutants deposited in bottom sediments;
- emissions into the atmosphere from the port and transport activities;
- emissions into water from the port and transport activities;
- accidental spills from cargo, bunker fuel, and other liquids from ships;
- noise;
- visual "pollution of the environment" (appearance, night lighting).

We classify this impact as a direct negative impact of port activities. The above factors should be considered in the environmental impact assessment when determining the construction of a port. (Metreveli & Dakhva, 2022)

5. Load on the road network (deterioration of the road surface).

The load on the regional road network can be attributed to an indirect negative impact. This circumstance is related to the fact that a significant portion of the cargo from the port is exported by road transport. (Metreveli & Ramishvili, From the series of monographs "Globalization and Modern Challenges of Business", 2023)

On trucks, which have a destructive impact on the road surface. For example, in 2015, 56.7% of the hinterland container cargo was exported from the port of Hamburg by road transport, while 41% of the cargo was transported by rail.

Conclusion

In this paper, we considered classical and modern theories of the spatial distribution of economic activity. The key role in determining the location of the enterprise (i.e., the category of place) is played by the category of distance. This requirement is best satisfied by the effects of connections that can be measured in terms of transport costs. Thus, the transport complex has a direct impact on the regional economy.

We determined that the seaport has a direct impact on the region's development. How maritime transport enterprises have an ambiguous effect on regional development: their influence can be both direct and indirect, with both positive and negative, as well as vague, consequences. At the same time, from the perspective of spatial geography, the deepening of globalization and the action of centripetal forces on economic entities have led to ports being characterized by an attractive location for the establishment of industrial production enterprises.

References

1. Aschauer, D. (2018, September). *Is the public capital stock too low? Example for productivity: Building infrastructure*.
2. Barnov, T., Metreveli, M., & Antidze, T. (2024). *Customer demands in accommodation facilities in the direction of Georgian culture*. Tbilisi: Georgian Technical University. https://doi.org/10.36073/978-99
3. Bierman, H., & Smidt, S. (2024). *The capital budgeting decision: Economic analysis and financing of investment projects*. New York, NY: Macmillan Publishing Co., Inc.
4. Clark, C. (1942). *Regional and urban location*. New York, NY.
5. Dijkstra, E. W. (2019). A note on two problems in connection with graphs. *Numerische Mathematik*, (1).
6. Drezen, J., & Stern, N. (2017). The cost–benefit analysis. In A. Auerbach & M. Feldstein (Eds.), *Handbook of public economics* (Vol. II). Amsterdam, Netherlands: North-Holland.
7. Johnston, J., & DiNardo, J. (2024). *Econometric methods*. New York, NY: McGraw-Hill Companies, Inc.
8. Metreveli, M., & Dakhva, V. (2022). Study of the development prospects of ferry services in Georgia and its importance in the maritime, logistics, and tourism industries. In *Proceedings of the 1st International Scientific and Practical Conference "Problems of Sustainable Development of the Marine Industry" (PSDMI-2021)*. Retrieved from https://ksma.ks.ua/?page_id=2114 and https://ksma.ks.ua/wp-content/uploads/2021/11/PSDMI-2021.pdf
9. Metreveli, M., & Dolidze, T. (2024). Comparative analysis of marketing communication strategies in the hotel industry: A study of Georgia, Armenia, and Azerbaijan. In *Proceedings of the International Tourism Congress (ITC)*. Tbilisi: Georgian Technical University.
10. Metreveli, M., & Ramishvili, L. (2024). Globalization and ways of booking services for tourists. In *XV International Tourism Congress, EsACT – School of Public Management*. Tbilisi. ISBN 978-972-745-334-4. Retrieved from http://hdl.handle.net/10198/19858
11. Metreveli, M., & Ramishvili, L. (2023). *Globalization and ways of booking tourism services*. Tbilisi: Georgian Technical University. https://doi.org/10.36073/978-9941-28-963-7
12. Pollack, M., & Wiebenson, W. (2020). *Solution of the shortest-route problem*. Vienna, Austria: Ops.Res.
13. Weisbrod, G., & Weisbord, B. (2017). Assessing the economic impact of transportation projects: How to select the appropriate technique for your project. *Transportation Research Circular (No. 477)*.

UDC 332-1
SCOPUS CODE 2001
https://doi.org/10.36073/1512-0996-2025-3-231-243

რეგიონის გარე ურთიერთობები და სატრანსპორტო კომპლექსის როლი მათი წარმატების უზრუნველყოფაში

მარინა მეტრეველი ტურიზმისა და მარკეტინგის დეპარატმენტი, საქართველოს ტექნიკური უნივერსიტეტი, საქართველო, 0160, თბილისი, მ. კოსტავას 68ა
E-mail: metrevelimarina11@gtu.ge

რეცენზენტები:

ლ. კოჭლამაზაშვილი, სტუ-ის ბიზნესტექნოლოგების ფაკულტეტის პროფესორი
E-mail: l.kochlamazashvili@gtu.ge
მ. ჩეჩელაშვილი, სტუ-ის ბიზნესტექნოლოგების ფაკულტეტის ასოცირებული პროფესორი
E-mail: m.chechelashvili@gtu.ge

ანოტაცია. XVIII საუკუნის მეორე ნახევარში ა. სმიტი აღნიშნავდა: „რადგან წყლის ტრანსპორტი, იძლევა ახალი ბაზრების ათვისების შესაძლებლობას ნებისმიერი ინდუსტრიისთვის, ვიდრე ეს სახმელეთო ტრანსპორტით არის ხელმისაწვდომი, წარმოების ნებისმიერი სფერო ბუნებრივად იწყებს დანაწევრებას და გაუმჯობესებას, ზღვის სანაპიროებისა და მდინარეების გასწვრივ. ამ ნაწილში, თეორიული ანალიზის საფუძველზე, განვსაზღვრავთ სატრანსპორტო კომპლექსის წვლილს რეგიონის საგარეო ურთიერთობების უზრუნველყოფაში. მრავალი მკვლევარი იძლევა თეორიულ დასაბუთებას სატრანსპორტო კომპლექსის როლის რეგიონულ ეკონომიკურ განვითარებაში და გარე ეკონომიკური ურთიერთობების ჩამოყალიბებაში. ეს თეორიები შეიძლება დაიყოს მათი გამოყენების ფარგლების, საწყისი წინაპირობის, მათემატიკური ხელსაწყოების გამოყენებისა და სხვა ფაქტორების მიხედვით. სტატიაში განვიხილავთ რეგიონში ეკონომიკური საქმიანობის ცენტრის არსებობას, როგორც კლასიფიკაციის საფუძველს. პირველი ჯგუფი წარმოადგენს სივრცითი განლაგების კლასიკურ გერმანულ სკოლას, რომელიც ითვალისწინებს რეგიონული ეკონომიკური აქტივობის კონკრეტულ ცენტრს.

საკვანძო სიტყვები: რეგიონული ურთიერთობები; სატრანსპორტო კომპლექსი; საწარმოების გაადგილება; ტვირთის გადაადგილება.

The date of review 7.04.2025
The date of submission 25.04.2025
Signed for publishing 25.09.2025