



Research paper

Road investments in Poland from a regional perspective: classification and profiling of regions based on 2024 road tender data

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Abstract: This article presents an analysis of regional differentiation in road investments in Poland based on public procurement data from 2024. The study covered 10,397 tender procedures related to design, construction, reconstruction, renovation, and maintenance of road infrastructure. In the first stage of analysis, investments were classified by task type (construction, reconstruction, renovation, maintenance, design, other) and road category (national, regional, county, municipal, other). Reconstructions (40.2%) and constructions (24.2%) had the largest share, with investments of undefined road category dominating (80.6%). Subsequently, spatial analysis of investment activity was conducted at the voivodeship level, considering the number, average, and total value of tenders. A typology of voivodeships was developed based on four-quadrant classification, and the *k*-means method was applied to identify four groups of regions with different investment profiles. The results indicate significant regional disparities – from investment leaders (Mazowieckie, Wielkopolskie, Małopolskie) to regions with limited activity (Opolskie, Lubuskie). The study provides valuable information for transport policy planning and allocation of public funds for road infrastructure development.

Keywords: road investments, public procurement, regional analysis, transport infrastructure, *k*-means classification

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1. Introduction

Infrastructure development is widely recognized as one of the most important factors determining a country's economic development [1]. A modern transport network affects the economy through a series of mechanisms: it reduces transport costs, increases worker mobility, expands markets for local businesses, and enhances the investment attractiveness of regions [2]. Well-planned transport (passenger, freight, as well as public transport) enables sustainable development that takes into account the needs and challenges of national, European, and international policy [3].

Road transport plays a dominant role in the Polish transport system. It accounts for nearly 85% of freight transport by weight and approximately 70% of transport considering transport work in Poland. In the case of passenger transport, its share is higher and constitutes over 90% of total personal mobility [4]. This state of affairs results primarily from the high availability of transport means (individual and collective), as well as the development of road infrastructure in the country. Additionally, significant investment expenditures on road infrastructure, as well as increased awareness of maintaining existing roads, has significantly improved accessibility for road vehicle users nationwide [5].

Following the systemic transformation after 1990, the Polish market was liberalized, causing an influx of many regulated goods from abroad, including passenger cars and trucks. The increased demand for these means of transport led to growing interest in developing the national road network. Despite significant development, there is still a need for modernization of existing infrastructure. Equally important, previous road construction projects have also resulted in many inequalities between different regions of the country, contributing to unfavorable phenomena such as lack of access to adequate infrastructure or transport exclusion [6].

Road investments, due to their financing from public funds, are subject to the obligation of implementation in accordance with the Public Procurement Law [7], which is justified by several fundamental premises. Above all, this system ensures transparency, fair competition, and promotes rational spending of public funds. The tender procedure enables the proper course of competitive struggle and the objective nature of its results, and ensures equal opportunities for all competing contractors to obtain a given contract [8,9]. The tender procedure has decidedly more advantages than disadvantages. The application of public procurement regulations is also a formal requirement for projects co-financed from European funds [10]. The European Commission requires adherence to rigorous tender procedures as a condition for obtaining co-financing, which is intended to ensure equal opportunities for contractors from across the European Union [11]. This system promotes innovation and competitiveness in the construction industry, stimulating technological development and raising performance standards. The adoption of statutory frameworks also allows for predictable cost estimation of the entire construction project with the possibility of quantifying them at individual stages of implementation [12,13].

The purpose of this article is to analyze tender proceedings announced in 2024 that were related to the design, construction, reconstruction, renovation, or maintenance of roads in Poland. Based on available data, the authors conducted a review of tenders announced by national public investors and presented synthetic factors that may influence the development of road networks in individual regions throughout the country. The result of the work is an analysis of the spatial distribution of road investments along with a classification of voivodeships according to dominant investment patterns.

2. Road investments in Poland

Road investments constitute the foundation of Poland's economic and social development, playing a key role in the country's modernization process and integration with the European transport network. As one of the most important elements of public infrastructure, the road system determines economic competitiveness, citizens' quality of life, and regional development opportunities [14].

According to the applicable Construction Law [15], construction works are defined as activities that should be understood as construction, reconstruction, assembly, renovation, or demolition of a building structure. The list of construction works can be supplemented with design work and maintenance. Bearing in mind also the fact that assembly is a specific method of erecting building structures, it can be included in the construction process. There are also a number of smaller works whose classification is difficult to determine precisely.

Therefore, in engineering practice, it is accepted that construction projects involving road infrastructure can be classified into 6 basic types of work: Construction, Reconstruction, Renovation, Maintenance, Design, Other (remaining).

Each of the mentioned projects involves interference with the road infrastructure being built or operated. This infrastructure, in accordance with applicable technical and organizational regulations [16] and adopted transport policies (national and international) [17], fulfills specific objectives. This also results from the way road traffic is conducted, the use of road infrastructure, as well as its role in the national transport network. The layout of the road network is presented in Figure 1.

Road infrastructure in Poland is divided into public and non-public roads. The vast majority of roads are public roads. Following administrative reforms introduced in 1999 [18], public roads were divided into appropriate categories and placed under the management of appropriate administrators.

Road infrastructure in Poland serves an integrating function for the country's economy, enabling efficient flow of goods, services, and people between regions. Modern roads and highways not only shorten travel time, but primarily reduce transport costs, increase traffic safety, and contribute to reducing exhaust emissions through route optimization. On a macroeconomic scale, every kilometer of new expressway or highway generates development impulses for local economies, attracting investors and stimulating the creation of new jobs [19].

The implementation of ambitious plans for modernizing the road network in Poland would not be possible without financial support from the European Union [20]. The scale of investment needs far exceeds the capabilities of the state budget, making European funds not so much an option as a necessity. Structural funds and the Cohesion Fund constitute the main source of financing for the largest infrastructure projects, enabling the implementation of investments worth tens of billions of zloty. EU co-financing often reaches 85% of project costs, which radically changes the profitability and feasibility of infrastructure projects [21].

Multi-annual programs allow for long-term financial planning, which is particularly important in the context of the cyclical nature of European funds and the need to ensure own contribution [22]. Thanks to a systematic approach, it is also possible to better predict investment needs and coordinate actions of different levels of public administration. Local plans at the municipal and county level complement national programs, ensuring that investments are adapted to the specific needs of local communities.



Fig. 1. National road network

3. Materials and methods

The analysis was based on a precompiled dataset of public procurement procedures related to road infrastructure, provided by the commercial analytical service Pressinfo.pl (www.pressinfo.pl), which specializes in monitoring the public procurement market in Poland.

The dataset included 10,397 tender procedures announced and awarded in 2024, all categorized under road construction. Each record contained information such as project type, location, estimated and awarded value, contracting authority, and a description of the contract subject. Although the dataset was domain-specific, a technical verification was carried out to ensure data integrity. This included checking for duplicate records and confirming the presence of key attributes necessary for classification and analysis (e.g., contract scope, location, value).

Classification of investment tasks was performed along two dimensions. First, projects were grouped into six categories: construction, reconstruction, renovation, maintenance, design, and other (including tasks with mixed or unclear scopes). Second, each project was assigned

to a road category: national, regional (voivodeship), county, municipal, or “other” - the latter including internal, urban, or unclassified roads. In addition, a value-based classification was applied to further explore the distribution of contract sizes. All tenders were grouped into four value classes based on predefined monetary thresholds: (i) up to PLN 1 million, (ii) PLN 1-10 million, (iii) PLN 10-100 million, and (iv) above PLN 100 million.

To capture regional variation in investment activity, the data was aggregated by voivodeship (province), taking into account three key indicators: (i) the number of tenders (as a measure of investment intensity), (ii) the average value per project (as a measure of project scale) and (iii) the total value of tenders (as an indicator of financial commitment at the regional level). Based on these indicators, a four-quadrant typology was developed using two national reference thresholds: (i) 650 tenders as the average number of procedures, and (ii) PLN 2.32 million as the average unit value of investments. This approach allowed the identification of four basic types of regions, differing both in the intensity of investment activity and in the nature of the projects (volume-based vs. value-based).

In the next stage, the *k*-means clustering method was applied to further segment the voivodeships based on four contextual indicators. The *k*-means algorithm groups observations (in this case, voivodeships) into a pre-defined number of clusters (*k*) in such a way that each observation belongs to the cluster with the closest centroid, minimizing the sum of squared distances to the cluster center [23]. In this analysis, the number of clusters was set at *k* = 4.

The classification was based on the following four relative indicators: (i) number of investments per 1 km² of area, (ii) number of investments per 1,000 inhabitants, (iii) number of investments per 1 km of road network and (iv) value of investments per 1 km of road network. These indicators were calculated using statistical data from Statistics Poland (GUS) [24, 25].

Since the indicators differed in scale and units, they were standardized using the *z*-score method, which involves transforming each value by subtracting the mean and dividing by the standard deviation. This converts all variables into a distribution with a mean of 0 and a standard deviation of 1 [26]. As a result, each variable contributes equally to the clustering process, regardless of its original scale.

4. Results

4.1. Structure of investment projects

In the analyzed set of 10,397 tenders in the field of road construction, six types of tasks were distinguished: construction, reconstruction, renovation, maintenance, design, and other tasks, which due to multi-scope or ambiguous descriptions of the contract subject could not be unambiguously assigned to one of the basic categories. Table 1 presents the distribution of quantities and values of tenders according to the type of investment task, while the graphical presentation is shown in Figure 2.

As shown in the data presented in Table 1, the largest share consisted of reconstructions (4,179 tenders, 40.2%), followed by construction (24.2%) and renovations (17.8%). Although maintenance and design tasks occurred rarely (6.0% combined), their presence confirms the diversity of tender procedure scopes. In terms of total values, the largest share fell to reconstructions (over 11.4 billion PLN) and construction (7.5 billion PLN). It is worth noting

Table 1. Characteristics of tenders by type of projects

Type of task	Construction	Reconstruction	Renovation	Maintenance	Design	Other
Quantity	2 512	4 179	1 853	54	574	1 225
%	24,2	40,2	17,8	0,5	5,5	11,8
Value (PLN) – sum	7 534 562 194	11 476 994 514	2 260 741 331	58 818 236	1 093 071 648	1 747 809 078
Value (PLN) – average	2 999 428	2 746 349	1 220 044	1 089 227	92 234	1 426 783

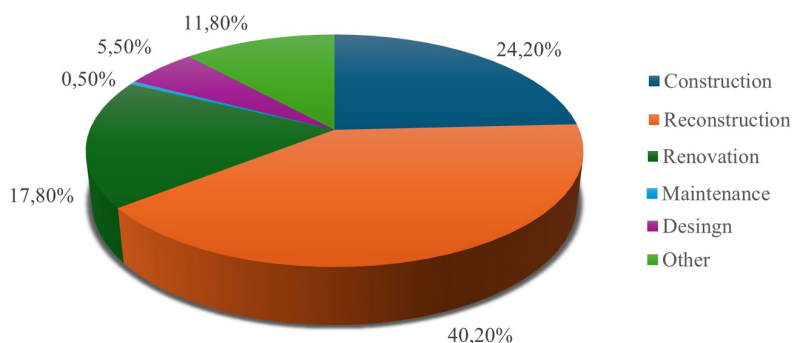


Fig. 2. Division of tenders by the type of projects

that the average tender value for construction was the highest (approximately 3.0 million PLN), while design was characterized by the lowest average (approximately 92 thousand PLN). The total value of all tenders in the analyzed set amounted to 24,171,997,002 PLN.

Further analysis of tender data was conducted in relation to the road category covered by the contract. Analysis of the distribution of investment task types broken down by road categories reveals significant differences in the nature of conducted investments. For voivodeship and county roads, the dominant type of tasks were renovations, which constituted approximately 50% and 35% of all investments in these categories, respectively. This indicates the need for ongoing maintenance of existing infrastructure of regional and local significance, with a limited number of development-oriented investments. In the case of municipal roads, national roads, and the "other" category, reconstructions clearly predominated, constituting from approximately 40% to 50% of registered procedures. This may indicate more intensive adaptation of these roads to changing traffic conditions and technical standards, especially in urbanized areas or those covered by larger investment programs. Additionally, for national roads, a relatively high share of construction-type tasks was also observed, indicating continuation of activities related to the expansion of the highest category road network.

Table 2 presents the division of all tender procedures concerning road investments in Poland in 2024 into four classes, distinguished according to contract value. The conducted research shows that over half of the tenders (53.2%) concerned investments with a value not exceeding 1 million PLN, and another 44.2% fell within the range of 1 to 10 million PLN. This means that as many as 97.5% of all procedures were low-budget or medium-budget in nature,

typical for investments implemented by local government units. Only 2.6% of tenders exceeded the 10 million PLN threshold, indicating a limited number of large and strategic investments implemented in the analyzed period, including only 6 tenders (0.1%) that exceeded the value of 100 million PLN.

Table 2. Number and share of road tenders by contract value range

Tender value class (PLN)	Number of tenders	Share (%)	Cumulative percent
up to 1M	5 534	53,2	53,2
from 1M to 10M	4 600	44,2	97,4
from 10M to 100M	257	2,5	99,9
over 100M	6	0,1	100,0

4.2. Spatial analysis of tender differentiation by voivodeship

The purpose of this part of the analysis was to show the regional differentiation of public sector investment activity in Poland. In this regard, data concerning the number, average, and total value of public tenders implemented in 2024 were compiled by voivodeship (Table 3).

The first analyzed criterion is the number of investments, treated as a measure of the intensity of investment activities and the activity of public finance sector units. The conducted analyses show that the largest number of tenders was recorded in the Mazowieckie voivodeship (1,343), which constituted approximately 13% of the total number of procedures in the country. The following places were occupied by the Wielkopolskie (985) and Małopolskie (923) voivodeships. High investment activity in these regions may be related to both the large number of local government units and the developed urban and economic infrastructure.

The group of voivodeships with medium-level investment activity includes the Śląskie (828), Podkarpackie (794), and Dolnośląskie (748) voivodeships. These regions are characterized by a high degree of urbanization and strong infrastructure development, which translates into a significant number of implemented investments – both local and supra-regional.

The lowest number of tenders was recorded in the Opolskie (254), Lubuskie (343), Podlaskie (411), and Zachodniopomorskie (417) voivodeships. The relatively low investment activity of these voivodeships may be a consequence of limited budgets of local government units, lower levels of urbanization, or lower saturation with contracting institutions.

The second criterion of analysis was the average tender value, which can be treated as an important indicator for assessing the scale of individual projects implemented by the public sector. In the studied sample, the national average was 2,324,901 PLN, however, there are significant regional differences that allow for the identification of three groups of voivodeships: those with high, medium, and low investment values. In the analyzed period, the highest average investment values were recorded in the Warmińsko-Mazurskie, Podlaskie, and Pomorskie voivodeships. The high unit value of tenders in these regions may indicate the implementation of strategic projects, often co-financed from European Union funds or the state budget. This may also reflect the specificity of the investment structure, dominated by linear projects with broad territorial scope.

Table 3. Characteristics of tenders by voivodeship

Voivodeship	Number of investments	Average value (PLN)	Sum (PLN)
Mazowieckie	1 343	2 139 248	2 873 009 521,8
Wielkopolskie	985	1 927 113	1 898 206 645,3
Małopolskie	923	1 603 973	1 480 467 076,9
Śląskie	828	2 493 480	2 064 601 701,3
Podkarpackie	794	1 898 844	1 507 681 843,8
Dolnośląskie	748	2 249 533	1 682 650 453,9
Lubelskie	644	2 680 317	1 726 124 157,7
Łódzkie	644	2 273 143	1 463 904 101,6
Kujawsko-pomorskie	604	2 353 613	1 421 582 169,5
Pomorskie	559	3 170 363	1 772 232 844,3
Warmińsko-mazurskie	473	4 003 739	1 893 768 469,0
Świętokrzyskie	427	1 529 569	653 125 984,8
Zachodniopomorskie	417	2 319 055	967 045 921,6
Podlaskie	411	3 553 587	1 460 524 309,0
Lubuskie	343	2 227 252	763 947 287,1
Opolskie	254	2 138 285	543 124 514,2
Total	10 397	2 324 901	24 171 997 001,6

The second group consists of voivodeships with average tender values oscillating around the national average. Their investment profile can be defined as balanced, both in terms of the number of procedures and their unit value. This most numerous group includes the following voivodeships: Kujawsko-Pomorskie, Zachodniopomorskie, Łódzkie, Dolnośląskie, Lubuskie, Opolskie, and Mazowieckie. These voivodeships are characterized by relative balance between the number of investments and their value, which may indicate the maturity of the local public procurement market, well-developed structure of local government units, and efficient use of available financial resources.

The last group consists of voivodeships with relatively low average tender values, suggesting the dominance of numerous but small public contracts, most often of local, modernization, or renovation character. This group includes: Świętokrzyskie, Małopolskie, Podkarpackie, and Wielkopolskie. The high number of procedures – particularly visible in voivodeships such as Małopolskie (923) or Wielkopolskie (985) – with relatively low unit value, indicates an investment model based on a large number of fragmented tasks. This may be the result of a strongly decentralized local government structure and budget constraints of lower-level units. This may also indicate that in these regions, investment needs are primarily of a maintenance and modernization character rather than expansive.

The third criterion of analysis was the total value of tenders, treated as a measure of the overall scale of financial involvement of voivodeships in the implementation of investment tasks. This indicator takes into account both the number of conducted procedures and their unit value, reflecting the total expenditures incurred by the public sector in a given voivodeship. In this approach, the following voivodeships dominate: Mazowieckie, Śląskie, Warmińsko-Mazurskie, Wielkopolskie, and Lubelskie. High positions in this category are occupied by both regions with a large number of tenders (e.g., Mazowieckie – 1,343 procedures) and those dominated by contracts with high unit values (e.g., Warmińsko-Mazurskie – on average over 4 million PLN per project). This differentiation indicates the existence of different investment models: some voivodeships implement many small-scale projects (extensive model), while others focus on fewer costly investments with broader scope (intensive model).

The lowest sum of tender values was recorded in the Opolskie, Świętokrzyskie, and Lubuskie voivodeships. The limited financial scale of projects in these regions may result from several factors, including: lower revenues of local government units, limited investment potential, and low absorption of external funds, including EU funds.

4.3. Typology of voivodeships by number and value of investments

In order to better understand the dynamics of investment processes at the voivodeship level, a comparative analysis was conducted, taking into account the number and scale of implemented tasks. This allowed for the identification of characteristic investment profiles in different parts of the country.

In the first stage, a typology of voivodeships was developed based on a four-field classification, aimed at capturing fundamental differences in the scale and intensity of investment activities. The analysis was based on two main dimensions: the number of investments and their average unit value, with additional consideration of the total value of tenders. Voivodeships were assigned to one of four types based on their position relative to national average values, which enabled the identification of four groups of voivodeships differing in both investment intensity and the scale of implemented projects (Fig. 3).

Type A consists of investment leaders, i.e., voivodeships characterized by both a high number of road investments and high total value of implemented tasks. These regions constitute the core of the national road procurement system – they are distinguished by the largest volume of investments, which results from their economic importance, level of urbanization, and developed transport network. The large number of procedures includes construction, expansion, and modernization of roads of regional and national significance.

Type B includes voivodeships with a smaller number of tenders, but very high average unit value of road investments. Projects of large financial scale dominate here, often of strategic character, including, for example, construction of new sections of voivodeship roads, bridges, or modernization of key transport nodes. The high unit value indicates concentration of funds on selected, costly projects of supra-local significance.

Type C represents voivodeships defined as quantitative performers. They are characterized by a relatively large number of road tenders, but with low average unit value. In these regions, the

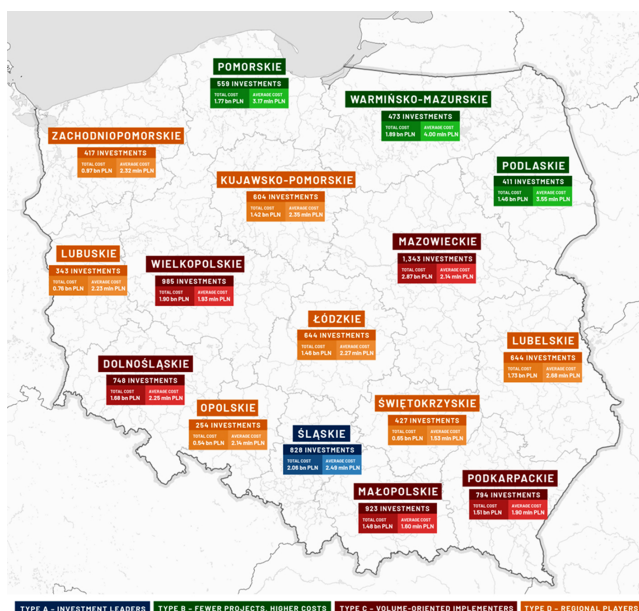


Fig. 3. Division of voivodeships into investment types according to the number and value of road tenders

segment of contracts of local and renovation character dominates, including surface modernization, intersection reconstruction, improvement of drainage or signage. This model indicates a dispersed investment structure, focused on current road user needs.

Type D consists of voivodeships defined as regional players. These are regions with a small number of road tenders, as well as lower investment value – both in total and per unit. Their investment profile indicates limited scale of investment activity in road infrastructure. In the analyzed period, investments of local character and relatively low budget dominated there, which may reflect limited financial capabilities of local government units or different prioritization of development priorities.

4.4. Classification of voivodeships using the k-means method

In the next stage of analysis, the k-means classification method was applied to identify groups of voivodeships with similar investment profiles, based on a set of four standardized relative indicators: (i) number of investments per 1 km², (ii) number of investments per 1,000 inhabitants, (iii) number of investments per 1 km of road network, (iv) investment value per 1 km of network. The data was previously standardized using the z-score method and then classified using the k-means algorithm with an assumed number of clusters $k = 4$. This approach enabled the recognition of differentiated investment patterns, independent of the nominal sizes of voivodeships, such as area or population.

As a result of the classification, four groups of voivodeships with different profiles of intensity and structure of investment activities were identified.

To graphically present the characteristics of individual groups, a radar chart (Fig. 4) was developed, showing normalized (on a scale of 0–1) average values of four indicators for each of the identified groups. Normalization enabled comparison of variables with different scales and units, allowing for visualization of the complete investment profile for each class.

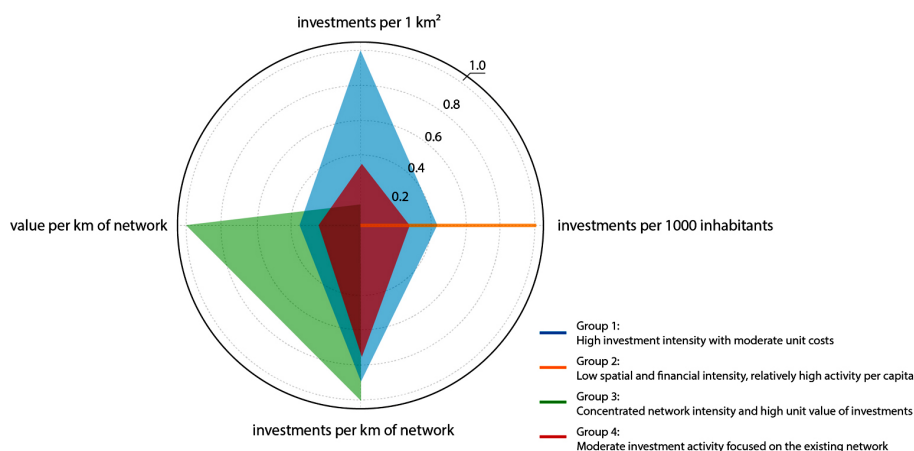


Fig. 4. Profile of four investment indicators in groups of voivodeships identified using the k-means method

Group 1 represents voivodeships characterized by high intensity of investment numbers with moderate unit costs. This most numerous group includes 11 voivodeships, including Dolnośląskie, Mazowieckie, Wielkopolskie, and Śląskie. They are distinguished by relatively high investment indicators per km² and per km of network, which indicates an intensive approach to road infrastructure development. Importantly, these are most often voivodeships with large populations, extensive road networks, and significant urban infrastructure, which means that despite significant territorial sizes, they achieve relatively high relative indicators. At the same time, the unit value of investments remains moderate, suggesting the dominance of local, renovation, or moderately-scoped financial tasks. They can be defined as regions with a balanced, mature investment model.

Group 2 consists of voivodeships with low spatial and financial intensity, but with relatively high activity relative to population. The group consists of two voivodeships: Podlaskie and Świętokrzyskie. Investment indicators per area and road network length are the lowest in the country here, resulting from the limited number of implemented projects. However, the indicator of number of investments per 1,000 inhabitants reaches relatively high values - which can be explained by the small population in both voivodeships. Moreover, these are regions with extensive area and quite long road networks relative to the number of investments, which statistically reduces their relative intensity. This profile may indicate a selective, economical investment approach, often resulting from structural and budgetary conditions.

Group 3 is characterized by concentrated network intensity and high unit value of investments. The Pomorskie voivodeship formed an independent cluster due to very high

indicators of number of investments and their value per length of road network. Indicators per km² and per 1,000 inhabitants are clearly lower than in other groups – even compared to group 2. Such an arrangement may result from the fact that the voivodeship has a short, concentrated road network relative to its area and population. This region is not characterized by an extensive network, but intensively exploits existing infrastructure, investing selectively but intensively and expensively. This is a profile typical for regions with heavy internal traffic, such as the Tri-City metropolitan area.

Group 4 is characterized by moderate investment activity with concentration on the existing network. The group consists of two voivodeships with moderate or low values in all indicators except one – the number of investments per 1 km of road network. Both spatial indicators (per km²) and demographic indicators (per 1,000 inhabitants), as well as unit investment value, remain below national averages. However, the high investment indicator per km of network suggests that activities focus on investing in dense, local infrastructure, typical for regions with compact settlement patterns and well-developed regional road networks. As a result, these voivodeships present a profile of local, repetitive investment activity of small financial scale, resulting rather from spatial-communication structure than from budgetary potential.

5. Conclusions

The analysis was based on a dataset of public procurement procedures related to road infrastructure, announced and awarded in Poland in 2024.

The analysis of regional differentiation in road investments in Poland based on 10,397 tenders from 2024 enabled the identification of characteristic investment activity patterns and significant spatial disparities in the public sector, confirming previous observations regarding uneven infrastructure development in Poland [27].

The structural analysis revealed the dominance of reconstructions (40.2%) and constructions (24.2%), reflecting parallel needs for modernizing existing infrastructure and expanding the road network [28]. The concerning low share of maintenance tasks (0.5%) may lead to future increases in investment costs, consistent with observations regarding neglect in transport infrastructure maintenance. Spatial analysis revealed clear differentiation in investment activity between voivodeships. The leaders were regions with the greatest economic potential: Mazowieckie, Wielkopolskie, and Małopolskie, confirming the relationship between economic development and infrastructure investment activity [29]. The application of four-quadrant classification and *k*-means method enabled the identification of four voivodeship types with different investment profiles, representing an innovative approach in regional road infrastructure analysis.

The study results indicate the need for a differentiated approach to investment policy and improvement of the road investment monitoring system. A limitation of the study is its cross-sectional character, indicating the necessity for further multi-year analyses considering European financing cycles [30]. Additionally, the high share of tenders categorized as “other” due to insufficient detail in tender documentation and possible inconsistencies in projects descriptions may have affected the accuracy of task classification, highlighting the need for improved data standardization in public procurement reporting. The observed dominance of

renovation projects could suggest a structural focus on maintaining existing infrastructure rather than developing new assets, potentially indicating stagnation in long-term strategic investment.

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Inwestycje drogowe w Polsce w ujęciu regionalnym: klasyfikacja i profilowanie województw na podstawie przetargów drogowych z 2024 roku

Słowa kluczowe: inwestycje drogowe, zamówienia publiczne, analiza regionalna, infrastruktura transportowa, klasyfikacja k-means

Streszczenie:

Niniejszy artykuł przedstawia analizę regionalnego zróżnicowania inwestycji drogowych w Polsce w oparciu o dane z zamówień publicznych z 2024 roku. Badanie objęło 10 397 postępowań przetargowych związanych z projektowaniem, budową, przebudową, remontem i konserwacją infrastruktury drogowej. W pierwszym etapie analizy inwestycje zostały sklasyfikowane według typu zadania (budowa, przebudowa, remont, konserwacja, projektowanie, inne) oraz kategorii drogi (krajowa, wojewódzka, powiatowa, gminna, inne). Największy udział miały przebudowy (40,2%) i budowy (24,2%), przy czym dominowały inwestycje o nieokreślonej kategorii drogi (80,6%). Następnie przeprowadzono analizę przestrzenną aktywności inwestycyjnej na poziomie województw, uwzględniając liczbę, średnią i łączną wartość przetargów. Opracowano typologię województw opartą na klasyfikacji czteropolowej, a także zastosowano metodę k-średnich w celu identyfikacji czterech grup regionów o różnych profilach inwestycyjnych. Wyniki wskazują na znaczące dysproporcje regionalne – od liderów inwestycyjnych (mazowieckie, wielkopolskie, małopolskie) po regiony o ograniczonej aktywności (opolskie, lubuskie). Badanie dostarcza cennych informacji dla planowania polityki transportowej i alokacji środków publicznych na rozwój infrastruktury drogowej.

Received: 2025-07-17, Revised: 2026-05-10