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PLANNING PRIORITIES FOR RAIL BALTICA REGIONAL STATIONS: A COMPARATIVE ANALYSIS OF PASSENGER AND EXPERT PERSPECTIVES ON COMFORT AND AMENITIES

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Abstract. Rail Baltica is a key sustainable transport project in the Baltic region. Its success depends on how effectively regional stations function and how well they are integrated into their surroundings. This study analyzes planning priorities for Rail Baltica regional stations based on survey results from both passengers and experts.

Researchers sought to identify essential features of regional stations through two separate surveys. The surveys covered four interrelated groups of station elements: core station building features, access and parking infrastructure, additional comfort elements, and digital and service-related solutions. The passenger survey indicated that comfort, accessibility, public transport integration, and safety are essential criteria. Passengers emphasized the need for public transport stops located close to stations, security measures, and easy-to-use payment options. In contrast, experts focused on long-term sustainability, opportunities for area development, different transport options, and reducing environmental impact. This included safe pedestrian crossings and digital information systems.

The analysis highlighted both shared and differing priorities between passengers and experts, revealing potential planning conflicts and areas where compromise may be necessary. For instance, both groups agreed that public transport integration is a top priority. However, they differed in their views on digital solutions and certain infrastructure features, such as pedestrian overpasses and mobile applications. Importantly, the study does not treat lower-ranked items as unimportant. Instead, it proposes a priority framework to guide the phased development of regional stations, largely determined by plot size and the spatial arrangement of objects within the site. This strategy allows essential passenger-focused solutions to be implemented first, while other important features can be added over time as resources become available.

The findings can inform the planning of Rail Baltica regional stations. The goal is to help balance user needs with the principles of sustainable and flexible infrastructure development.

Keywords: Rail Baltica, railway regional stations, passenger comfort, survey analysis, infrastructure planning.

1. Introduction

As vehicle flows continue to grow across both urban and rural areas, the resulting pressure on daily living conditions and the natural environment intensifies (Nieuwenhuijsen, 2020; Strien & Grêt-Regamey, 2025). In this context, a shift toward long-term mobility solutions becomes essential in the design of contemporary urban frameworks. In Lithuania, most residents prefer traveling by private car rather than using buses or trains, largely because they perceive personal automobiles as a more convenient option (Eurostat, 2025). Meanwhile, northern European cities such as Copenhagen, Berlin, and Stockholm demonstrate how integrated and multimodal networks – offering coordinated services across buses, rail, cycling, and other modes – can contribute to reducing traffic congestion and encouraging a modal shift away from private automobiles (Cats et al., 2020; Eurostat, 2025). Similarly, the Rail Baltica project aims to replicate these benefits by developing modern, multimodal regional stations designed to integrate high-speed rail with local buses, cycling infrastructure, and urban transport networks – positioning the Baltic region to adopt the same congestion-reducing and connectivity-enhancing principles seen in leading Northern European cities (RB Rail AS, 2025).

Overall, planning contemporary transit hubs requires smart integration of trains, buses, and individual travel modes. In the Baltic region, Rail Baltica stands out with its local stops functioning as central intermodal nodes. Travel behavior is strongly influenced by these locations, shaping both convenience and long-term environmental impact.

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This article examines findings from surveys conducted among passengers and transport and urban planning experts to identify the most important planning elements for regional rail stations. Comparative analysis reveals the priorities of different stakeholder groups and provides a foundation for phased station development solutions that account for limited economic resources and principles of sustainable infrastructure.

As transport flows increase and the need to reduce environmental impacts grows, well-designed multimodal hubs are becoming increasingly important—not only for promoting public transport use but also for enhancing the passenger experience. However, in the context of Rail Baltica, regional station planning faces challenges related to balancing diverse stakeholder needs with limited development resources. In this context, the study adopts a human-centered planning perspective, evaluating station design not only in terms of technical performance but also in relation to everyday user experience and perceived comfort.

Research problem. Regional stations planned within the Rail Baltica project are evolving into key multimodal hubs, yet there is insufficient assessment of how different planning solutions address passengers' real needs and everyday convenience. Although infrastructure planning increasingly relies on technical and expert evaluations, passenger perceptions of safety, accessibility, comfort, and service availability are not always systematically analyzed or compared with expert assessments. This creates a risk that stations may be technically functional yet fail to attract passengers, particularly under phased development and constrained budgets.

Research objective. The aim of this research is to assess and compare the results of passenger and expert surveys to identify the planning elements of Rail Baltica regional stations that most contribute to passenger comfort, safety, and service availability, and to provide a basis for phased development solutions focused on user needs.

2. Rail Baltica regional stations in Lithuania

With a strong focus on integration, Rail Baltica represents a key transport infrastructure project in the Baltic region. Designed to connect Estonia, Latvia, and Lithuania directly to European rail framework, it is based on the 1435 mm track gauge. Unlike current lines that operate on broader 1520 mm gauge, this shift enables smoother cross-border movement. Existing networks face limitations due to outdated measurements, which slow both freight and travel (Grigonis et al., 2025). As construction progresses, improved accessibility between cities is expected to emerge over time. Transit efficiency may increase alongside improved environmental performance as trains replace less sustainable options. Overtime, the outcome might influence mobility patterns across northern Europe.

Lithuania hosts three international rail hubs within the Rail Baltica initiative: Vilnius, Kaunas, and Panevėžys. High-speed cross-border passenger services will operate through these nodes (see Figure 1). Serving broader accessibility needs, regional stations support mobility across surrounding districts. Their presence facilitates the integration of the new route into everyday commutes. Along the corridor from Kaunas to the Latvian border, seven such regional stations are planned, serving smaller urban centers and rural populations alike.

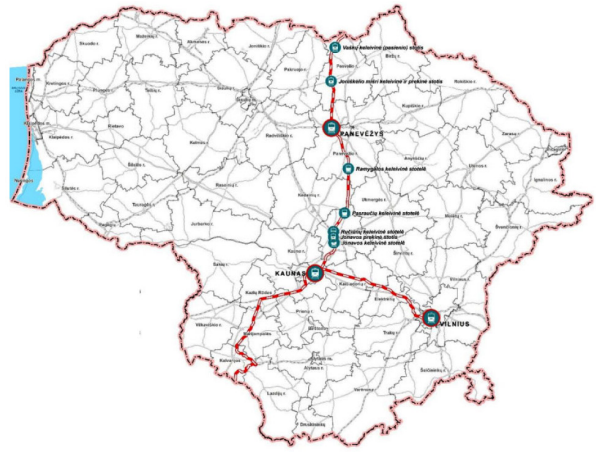

Figure 1. Planned Rail Baltica regional railway stations and stops (source: Ministry of Transport and Communications of the Republic of Lithuania, 2023)

According to the Rail Baltica design guidelines, railway stations are classified into four types, ranging from international stations to small regional stations. This study focuses on type II and type III regional stations and stops, which are oriented toward daily passenger flows and typically serve a limited number of passengers. Within this corridor, this covers the Vaškai stop serves passengers near the border. Moving northward, Joniškėlis handles both cargo and travelers by rail. Further along the route, smaller stops such as Ramygala and Pasraučiai serve local needs. Southward, Ručiūnai functions for passengers. In addition, plans include upgrading the infrastructure in Jonava to support both freight and passenger mobility. All these stations are located along the Rail Baltica section connecting Kaunas with the Lithuanian-Latvian border (Ministry of Transport and Communications of the Republic of Lithuania, 2024).

With limited financial resources, planners approach each Rail Baltica stop differently, depending on its role across regions. These stops are intended to integrate buses, bicycles, pedestrian routes, cars, and traveler needs in one place. As not all locations require full range of features at once, updates can be implemented slowly. Actual usage will shape what gets built later. Later development depends on local demand.

In this context, assessing passenger comfort and comparing it with expert evaluations becomes particularly

important. Analysis of passenger and expert surveys helps identify which station features are most critical for everyday use and provides a foundation for rational, user-focused, and sustainable planning solutions for Rail Baltica regional stations.

3. Expert and passenger survey methodology

To determine which elements of Rail Baltica regional stations are most important for everyday users, two complementary surveys targeting experts and passengers were conducted. Both surveys were designed using the same structure, enabling meaningful comparison, though the quantification of responses differed slightly between the two groups. This approach ensures that professional recommendations are considered alongside the actual preferences of station users.

Before preparing the questionnaires, a literature review was conducted and experts were consulted to identify the key aspects of regional stations. This process resulted in the identification of four main categories of station elements (International Union of Railways [UIC], 2017; Brons et al., 2009; Hale & Miller, 2012; Otsuka & Reeve, 2024; Gehl, 2010):

- Primary station elements – including public toilets, waiting areas or shelters, ticket machines, information screens, vending machines, information centers, and pedestrian overpasses or tunnels. These elements were selected for their direct impact on passenger experience and station functionality.
- Access and parking facilities – such as car parking, bicycle racks or storage, electric vehicle charging stations, accessibility features for people with disabilities, safe and well-lit pedestrian and bicycle paths, and nearby public transport stops. This category emphasizes seamless integration of different transport modes and convenience for passengers arriving by car, bicycle, or bus.
- Additional comfort elements – including seating, green areas, lighting, surveillance and safety systems, device charging stations, drinking water points, and smoking areas. These features are intended to enhance comfort, safety, and overall satisfaction while waiting at or passing through the station.
- Digital and service features – such as free Wi-Fi, ATMs, contactless payment options, parcel terminals, and mobile applications providing train schedules and ticketing services. These elements reflect contemporary expectations for connectivity and convenience.

Each category and element was clearly described in the questionnaires to ensure respondents understood their purpose and function. Experts and passengers were asked to evaluate each element in the context of everyday station use, highlighting those that contribute to safer, faster, and more comfortable travel. Additionally, experts were provided with an open-ended question to suggest any other features that could improve passenger experience but were not explicitly included in the structured assessment.

Experts were selected based on their experience, education, and professional responsibilities, with at least 5–10 years of relevant experience and a Master's degree or higher. They represented Lithuanian Railways, the Ministry of Transport and Communications, Tyréns Lietuva, including Swedish experts.

In the survey, experts were asked to rank elements within each category from most to least important using a scale from 1 to n, where n is the number of elements in the category. The consistency of expert judgments was first calculated separately for each of the four criteria categories, following the principles of Kendall's rank-based methods (Abdi, 2007). The statistical significance of Kendall's coefficient of concordance was tested using the χ^2 criterion at a significance level of 0.05, consistent with recommended procedures for assessing concordance and trend effects (McLeod, 2005). Across all categories, the calculated χ^2 values exceeded the corresponding critical values, indicating that expert opinions were statistically consistent and suitable for further analysis. Agreement among experts was assessed separately for each of the four criteria categories, all of which demonstrated statistically significant consistency of expert judgments.

After confirming the agreement among expert evaluations, the significance weights of individual station elements were calculated using a rank normalization procedure based on Kendall's method. The resulting weight values reflect the relative importance of each element from the expert perspective and provide a basis for their comparative assessment.

It should be noted that due to the chosen evaluation scale – where higher numerical values represent greater importance – the most significant elements are characterized by lower normalized weight values. For clarity and interpretability, the final rankings of station elements were therefore determined based on the ascending order of the calculated weights.

To better capture user-oriented priorities, a passenger survey was conducted alongside the expert assessment. The passenger questionnaire was structured to mirror the expert survey in terms of categories and evaluated elements, ensuring methodological consistency and enabling subsequent comparison. The survey targeted individuals who use or potentially plan to use railway transport and was administered online via the apklausa.lt platform.

In addition to evaluating station elements, the questionnaire collected anonymous socio-demographic information, including age group, employment status, anticipated frequency of using regional Rail Baltica services, and the primary mode of access to regional stations. This information was used to describe the sample and to assess the representativeness of respondents.

Passengers were asked to evaluate the same elements as experts by assigning scores that reflected their perceived importance. Unlike the expert survey, which relied on ordinal ranking, passenger responses were processed by calculating the percentage distribution of ratings assigned to each element within a given category. Based on these distributions, average scores and corresponding ranks were derived for each element, allowing passenger priorities to be expressed in a comparable ranked format.

The reliability of the collected data was evaluated by calculating the statistical margin of error (ε) at a 95% confidence level. This step was undertaken to assess how accurately the survey results reflect the characteristics of the target population and to justify their suitability for further analysis.

The margin of error was calculated using a standard statistical formula that accounts for population size, sample size, and probability distribution, following established survey sampling methodology (Lohr, 2021):

$$\varepsilon = \sqrt{\frac{N \times 1.96^2 \times p \times q - n \times 1.96^2 \times p \times q}{n(N-1)}}, \quad (1)$$

where: N is the population size. According to Lithuanian statistics data, the population of Lithuania at the beginning of 2025 was approximately 2,890,664 residents (State Data Agency, 2026); n is the sample size, corresponding to the number of respondents who completed the passenger survey (n = 117); 1.96 is the z-value associated with a 95% confidence level in the standard normal distribution; p is the estimated probability that a given characteristic occurs within the population. A conservative value of p = 0.5 was adopted, representing the worst-case scenario and ensuring a cautious reliability estimate; q is the complementary probability ($q = 1 - p = 0.5$); ε is the resulting margin of error.

Based on these parameters, the calculated margin of error for the passenger survey was ε = 0.09, indicating that the survey results may deviate from the true population values by no more than 9 percentage points. Although this margin of error exceeds the commonly preferred ±5% threshold used in large-scale population surveys, it is considered acceptable for the objectives of this study.

The analysis focuses on identifying dominant tendencies and general patterns in passenger preferences rather than producing precise population-level estimates. Given the large size of the national population and the relatively limited proportion of railway transport users within it, a sample of 117 respondents provides a sufficient basis for exploratory analysis and comparative assessment.

Consequently, the passenger survey results are considered reliable for exploratory analysis and for comparative evaluation alongside expert-based assessments. The calculated margin of error supports the use of the collected data to examine passenger expectations regarding comfort, accessibility, and functionality of regional Rail Baltica stations.

Although experts and passengers applied slightly different scoring approaches, the identical structure of categories and elements allows for a consistent comparison of priorities at the level of functional station components rather than individual design solutions. This methodological framework enables the identification of areas where passenger expectations align with or diverge from expert evaluations, providing a robust basis for user-centered and professionally informed planning of regional Rail Baltica stations.

4. Survey results and comparative analysis

This section compares the ranking results obtained from the expert survey and the passenger survey. Although the two groups often prioritize different elements, these differences are generally moderate rather than contradictory. The comparison highlights how passengers tend to focus on immediate comfort and usability, while experts emphasize long-term safety, accessibility, and system-level functionality (see Table 1).

Table 1. Comparison of expert and passenger survey results for regional station elements

Category/Element	Expert Rank	Passenger Rank
1. Station Building Category		
Pedestrian overpass/tunnel across railway	1	4
Public toilets	3	1
Waiting area/shelter	3	3
Information screens showing train schedule	4	2
Ticket machine	5	5
Information center	6	6
Coffee and food vending machines	7	7
2. Parking and Access Category		
Public transport stop near the station	1	1
Spacious and convenient car parking	2	4
Bicycle stands/storage	4	5
Accessibility features for people with disabilities (e.g., lift access, automatic doors, Braille signage)	4	2
Safe, well-lit pedestrian/cyclist path from station to PT stop or parking	5	3
Electric vehicle charging points	6	6
3. Additional Comfort Category		
Lighting (for safety and comfort)	1	2
Video surveillance/security call points/ defibrillator	2	1
Benches/seating around the station	3	4
Landscaping/green areas	4	6
Phone charging points/USB stations	5	5
Drinking water stations	6	3

End of Table 1

Category/Element	Expert Rank	Passenger Rank
Smoking zone/pavilion	7	7
4. Digital and Service Category		
Information app/mobile service integration	1	3
Free Wi-Fi at the station	2	2
Contactless payment options (card/phone)	3	1
Parcel terminal (e.g., LP Express, Omniva, DPD)	4	5
ATM	5	4

4.1. Station Building Category

Experts ranked pedestrian overpass/underpass as the most important element, reflecting their emphasis on long-term safety and the elimination of at-grade crossings. Passengers, by contrast, placed this element in fourth position, likely because many existing Lithuanian stations still rely on level crossings (e.g., Klaipėda), which may reduce everyday awareness of the safety benefits associated with grade-separated solutions.

It should be emphasized that the lower passenger ranking does not imply that such infrastructure is unnecessary. Rather, its inclusion in the survey serves to identify latent safety needs that may not be fully recognized by users, yet remain critical from a planning and regulatory perspective. The results therefore indicate that pedestrian overpasses or underpasses constitute a non-negotiable safety requirement, for which lower user prioritization should not be interpreted as justification for cost reduction or omission in state-funded infrastructure projects.

Passengers assigned the highest priority to elements supporting basic comfort and waiting conditions, such as public toilets, timetable information screens, and sheltered waiting areas. While experts also acknowledge the importance of these features, their evaluations place greater emphasis on structural, operational, and safety-related components that ensure long-term functionality and compliance, even if these aspects are less visible or less immediately valued by users.

4.2. Parking and Access Category

This category shows the strongest alignment between expert and passenger opinions. Both groups ranked a public transport stop next to the station as the top priority, demonstrating a shared understanding of the importance of multimodal connectivity.

Differences emerge in secondary priorities. Experts emphasize accessibility features for people with disabilities, reflecting regulatory and universal design considerations. Passengers, by contrast, assign higher importance to safe, well-lit pedestrian and cycling paths, as they directly affect their daily mobility and perceived safety.

4.3. Additional Comfort Category

Both groups agree that safety-related features are essential, although they emphasize different aspects. Experts ranked lighting as the most important comfort-related element, as it contributes to both safety and usability. Passengers, however, prioritized video surveillance, emergency call systems, and defibrillators – features that enhance perceived personal security.

These differences are complementary rather than conflicting: lighting helps prevent incidents, while surveillance and emergency systems support response and reassurance.

4.4. Digital and Service Category

This category shows the most pronounced divergence. Experts ranked the station's integration with a digital information application as the top priority, reflecting a systems-level view of digital mobility services. Passengers, however, placed this element third.

Passengers ranked contactless payment options as the most important digital feature. This likely reflects expectations of purchasing tickets on-site rather than through an app, making simple and fast payment methods more relevant to their travel experience.

The observed differences between expert and passenger rankings can be explained by the distinct roles and perspectives of the two groups. Experts tend to prioritize long-term infrastructure performance, safety, universal accessibility, and integration into wider transport and territorial systems. In contrast, passengers focus more strongly on immediate comfort, clarity of information, convenience, and personal safety experienced during their journey. These perspectives should not be viewed as contradictory; instead, they represent different layers of station functionality. When considered together, the combined insights provide a more holistic understanding of regional station requirements, supporting planning solutions that balance professional standards with user-centered needs.

5. Discussion: implications for human-centered and spatially integrated planning of regional stations

This study examined planning priorities for Rail Baltica regional stations by comparing expert assessments with passenger evaluations of station comfort and amenities. The results confirm that, while experts and passengers often assign different levels of importance to individual station elements, their priorities are largely complementary rather than conflicting.

Experts consistently emphasized elements related to long-term safety, accessibility, and system performance, such as grade-separated pedestrian crossings, integrated station layouts, and digital system compatibility. These

emphases closely mirror earlier findings that highlight safety, accessibility, and system coherence as fundamental components of effective station planning (UIC, 2017; Hale & Miller, 2012). These priorities reflect professional responsibility for regulatory compliance, operational reliability, and future-proof infrastructure. Passengers, on the other hand, placed greater emphasis on elements that directly shape everyday station use, including public toilets, clear timetable information, sheltered waiting areas, and perceived personal safety. This user-centred focus aligns with passenger experience studies emphasizing comfort, clarity, and spatial quality in station environments (Brons et al., 2009; Gehl, 2010). These findings highlight the importance of addressing immediate user needs to ensure station attractiveness and usability.

The comparative analysis demonstrates that passenger rankings should not be interpreted as a rejection of structurally critical or safety-related elements. Rather, they reflect differences in awareness and daily experience. For example, passengers may assign lower importance to grade-separated crossings due to familiarity with existing at-grade solutions, whereas experts identify such elements as essential for long-term safety and risk mitigation. Such expert–user divergence is consistent with research showing gaps between lay perceptions and professional assessments in station and transport facility design (Otsuka & Reeve, 2024). This discrepancy reinforces the role of professional planning judgment, particularly in preventing cost-driven omissions of safety-critical infrastructure. It also indicates that certain safety-related spatial solutions should be treated as mandatory components of station territory planning, independent of short-term user perceptions.

From a planning perspective, the results support a priority-based and phased development approach for regional stations. Elements that strongly influence passenger comfort and usability should be implemented at early stages in order to ensure a positive user experience and encourage rail use. This aligns with prior research arguing that user-visible improvements play a key role in encouraging public transport adoption (Brons et al., 2009; Gehl, 2010). At the same time, expert-identified infrastructure and safety components must be incorporated from the outset, even when their benefits are less immediately visible to users. Consistent with UIC (2017) and Hale & Miller (2012), these elements form the backbone of safe and future-proof station environments.

Importantly, the prioritization presented in this study should be understood as a sequencing mechanism rather than a justification for exclusion. Lower-ranked elements remain relevant within the overall station concept and can be introduced in later development phases as financial and operational conditions allow. The combined expert and passenger perspectives therefore effectively constrain opportunities for cost reduction at the expense of essential amenities or safety requirements.

In conclusions, integrating passenger comfort considerations with expert-led infrastructure planning enables a balanced definition of planning priorities for regional Rail Baltica stations. Such an approach supports the development of stations that are functional, safe, and accessible, while also responding to user expectations. This balance corresponds to the integrated planning perspectives recommended in previous research on station spatial design and multimodal hubs (UIC, 2017; Gehl, 2010). This alignment is critical for ensuring that regional stations operate not only as transport nodes but also as user-oriented public spaces within the broader Rail Baltica network.

Building on the identified priority structure, future research will focus on developing a micro-scale spatial framework for regional Rail Baltica station territories. This framework will examine the allocation and interaction of station zones in relation to dominant origin–destination patterns.

6. Conclusions and recommendations

The comparative analysis of expert and passenger evaluations reveals that both groups share several core priorities for Rail Baltica regional stations, particularly the need for strong public transport integration, essential comfort elements, and a safe station environment. Differences in emphasis reflect the distinct roles of each group: passengers focus on immediate usability and personal comfort, while experts prioritize long-term safety, accessibility, and system-level integration. These perspectives are complementary and together provide a balanced foundation for planning regional stations that are both user-friendly and future-proof.

Based on the findings, several recommendations can be formulated. First, early development phases should prioritize elements that directly influence everyday user experience, such as public toilets, sheltered waiting areas, clear timetable information, and safe pedestrian access. Second, safety-critical infrastructure—particularly grade-separated crossings and adequate lighting—should be implemented regardless of lower passenger ranking, as these features are essential for long-term operational safety. Third, multimodal connectivity must be strengthened by ensuring that public transport stops are located close to stations and that pedestrian and cycling routes are safe and well-lit. Fourth, digital solutions such as mobile information services and contactless payments should be integrated early to support efficient and modern station operations. Finally, a phased development approach is recommended, allowing secondary comfort and service features to be added as demand and resources evolve.

References

Abdi, H. (2007). The Kendall rank correlation coefficient. *Encyclopedia of Measurement and Statistics*, *2*, 508–510.

Brons, M., Givoni, M., & Rietveld, P. (2009). Access to railway stations and its potential in increasing rail use. *Transportation Research Part A*: *Policy and Practice*, *43*(2), 136–149. https://doi.org/10.1016/j.tra.2008.08.002

Cats, O., Susilo, Y. O., & Reimal, T. (2020). Intermodality in European metropolises: The current state of the art, and the results of an expert survey covering Berlin, Copenhagen, Hamburg and Paris. *Transport Policy*, *94*, 109–122. https://doi.org/10.1016/j.tranpol.2020.04.011

Eurostat. (2025). *Modal split of passenger transport*: *European Union* (*inland passenger-kilometres*). Eurostat Database. https://ec.europa.eu/eurostat/databrowser/view/TRAN_HV_PSMOD/default/table?lang=en

Gehl, J. (2010). *Cities for people*. Island Press.

Grigonis, V., Kaušylas, M., & Palevičius, V. (2025). Advancing sustainable interoperability between standard and broad-gauge railway systems. *Sustainability*, *17*(18), Article 8336. https://doi.org/10.3390/su17188336

Hale, C., & Miller, M. (2012). Amenity and opportunity at rail stations. *Australian Planner*, *50*(1), 44–54. https://doi.org/10.1080/07293682.2012.703679

International Union of Railways. (2017). *Smart stations in smart cities*. https://uic.org/IMG/pdf/smart_stations_in_smart_cities.pdf

Lohr, S. L. (2021). *Sampling*: *Design and analysis*. Chapman and Hall/CRC. https://doi.org/10.1201/9780429298899

McLeod, A. I. (2005). Kendall rank correlation and Mann-Kendall trend test. *R package Kendall*, *602*, 1–10. https://doi.org/10.32614/CRAN.package.Kendall

Ministry of Transport and Communications of the Republic of Lithuania. (2023). *Explanatory memorandum for the Rail Baltica regional stations and engineering infrastructure development plan*. https://sumin.lrv.lt/uploads/sumin/documents/files/RB_RS_EBI_Aiskinamasis%20rastas.pdf

Ministry of Transport and Communications of the Republic of Lithuania. (2024). *Engineering systems and regional stations infrastructure development plan for the Rail Baltica railway line Kaunas–Lithuanian–Latvian border*. https://sumin.lrv.lt/media/viesa/saugykla/2024/3/uIxXLP0vBzM.pdf

Nieuwenhuijsen, M. J. (2020). Urban and transport planning pathways to carbon neutral, liveable and healthy cities: A review of the current evidence. *Environment International*, *140*, Article 105661. https://doi.org/10.1016/j.envint.2020.105661

Otsuka, N., & Reeve, A. (2024). Railway stations as public space: How to promote rail journeys via multi-functional railway stations. *European Planning Studies*, *32*(5), 973–1009. https://doi.org/10.1080/09654313.2023.2246508

RB Rail AS. (2025). *Rail Baltica global project progress in 2025*. Rail Baltica. https://www.railbaltica.org/news/rail-baltica-global-project-progress-in-2025/

State Data Agency. (2026). *Statistical indicators analysis* [Interactive data analysis page]. Official Statistics Portal. https://osp.stat.gov.lt/statistiniu-rodikliu-analize?hash=103cad31-9227-4990-90b0-8991b58af8e7

Strien, M. J., & Grêt-Regamey, A. (2025). Global expansion of the ecological impact of extra-urban road traffic. *Nature Sustainability*, *8*(11), 1294–1303. https://doi.org/10.1038/s41893-025-01637-2