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Literature Review: Development of an Integrated Transportation System in Palembang and Its Surrounding Areas (Agglomeration)

Fansyuri, F[1]., Buchari, E[2]*., and dan Agustien, M[3]
Department of Civil Engineering, Faculty of Engineering
Sriwijaya University
Indralaya 30662
Indonesia
fansyuriafans@gmail.com, corresponding author: erikabuchari@ft.unsri.ac.id
melawatyagustien@ft.unsri.ac.id

Abstract

This literature review examines the challenges of integrating the public transportation system in Palembang, including limited coverage, lack of intermodal connectivity, and suboptimal fare and information integration. The study aims to analyze the existing conditions, evaluate modal and operational integration, and design strategies for a more efficient, integrated, and sustainable transportation system. The research employs bibliometric analysis using VOSviewer, with data from Google Scholar, Scopus, ResearchGate, and Elsevier. Relevant articles are identified and analyzed through VOSviewer to map the relationships between articles, authors, and key research themes. The findings reveal research trends on integrated public transportation in Palembang, emphasizing policies, technology, and user experience. Research gaps are identified in modal integration, implementation approaches, and agglomeration connectivity. One underexplored aspect is the impact of policies on public transport integration, including regulations, incentives, and subsidies. This study highlights the importance of policy-based strategies, spatial planning, and technology to enhance public transport services. Additionally, a user-experience-driven approach is essential to developing a more integrated, efficient, and attractive public transportation system, encouraging a modal shift toward more sustainable mobility solutions.

Keywords

Integrated public transportation, Intermodal connectivity, Bibliometric VOSviewer, Transportation policy, Palembang agglomeration

1. Introduction

1.1. Background

Palembang has been selected as the focus of this study due to its characteristics as a rapidly developing metropolitan city that has implemented various mass transportation initiatives, including Light Rail Transit (LRT), feeder services, and Bus Rapid Transit (BRT). However, the integration of public transportation systems remains a significant challenge requiring further attention. One of the main issues is the low intermodal connectivity, attributed to limited physical integration, the absence of integrated terminals, and insufficient transfer facilities. Additionally, fare integration has not been comprehensively implemented, forcing passengers to pay separate fares for each mode of transport. Another critical issue is the suboptimal dissemination of information, particularly regarding schedules and routes, which leads to uncertainty for users in planning their trips.

The reality in various cities, including Palembang, indicates that the integration of public transportation systems remains suboptimal. As one of Indonesia's major cities experiencing rapid development, Palembang faces challenges in providing an efficient and integrated transportation system. Although multiple transport modes, such as LRT, BRT, urban transit, and feeder services, are available, intermodal integration still encounters several obstacles. The key issues in Palembang's public transportation system include limited service coverage, particularly in suburban areas, due to inefficient routes that do not fully accommodate the mobility needs of the community. Additionally, fleet conditions require improvements in terms of comfort and safety (Novita 2022). Furthermore, coordination among operators remains fragmented, leading to unhealthy competition and service duplication, which reduces operational efficiency.

Beyond operational aspects, the integration of the public transportation system in Palembang still faces challenges in terms of physical connectivity, fare structure, and information dissemination. The lack of adequate transfer facilities hampers the efficiency of intermodal transitions. Additionally, fare discrepancies between different transport modes remain a significant barrier to achieving a fully integrated system. Furthermore, the dissemination of information regarding schedules and routes is not yet optimal, making it difficult for users to plan their trips effectively. The rapid urbanization across various regions has led to a significant increase in the demand for population mobility and economic activities . However, this surge is often not accompanied by the availability of an adequately integrated public transportation system, resulting in negative consequences such as chronic traffic congestion, increased air pollution, and reduced societal productivity. The high dependency on private vehicles has become the primary preference for urban communities, ultimately exacerbating traffic conditions and contributing to environmental degradation (Kurniawan *et al.* 2021).

Numerous studies indicate that the development of an integrated transportation system can reduce congestion and enhance public mobility. According to Prof. Erika Buchari, an integrated transportation system has the potential to improve travel efficiency while reducing the burden on road infrastructure due to excessive private vehicle usage (Buchari, 2021). This perspective is reinforced by Melawati Agustien, who asserts that a well-structured transportation system can significantly enhance the overall quality of life (Agustien *et al.* 2022). Other studies also highlight that an integrated transportation system contributes to congestion reduction, improved air quality, and increased accessibility for all social groups (Primastuti and Puspitasari 2022). The integration of public transportation systems encompasses several key aspects, including physical integration (integrated terminals and well-designed bus stops), modal integration (connectivity between buses, trains, urban transport, and other modes), fare integration (unified ticketing system), and information integration (comprehensive dissemination of schedules and routes) (Wright 2003).

The study conducted by (Lie 2020) highlights that a well-planned transportation system can enhance connectivity and improve the efficiency of public transport services. However, in the context of policy implementation, several challenges remain, particularly in terms of regulation and coordination between central and local governments, as well as transport operators. Discrepancies between national, provincial, and municipal policies often hinder the realization of a fully integrated transportation system. Moreover, transportation planning is frequently not accompanied by concrete policies to support its implementation. Various literature studies also indicate that the successful integration of transportation systems in several cities worldwide is supported by strict policies regulating connectivity, unified fare systems, and integrated transport data management.

Based on the identified issues, an in-depth study is required to analyze the current state of the public transportation system and the key factors influencing the success of intermodal integration in Palembang. This study aims to comprehensively understand the challenges faced by the transportation system in Palembang and to identify potential opportunities and strategies for enhancing the effectiveness of public transportation. Through this analysis, valuable insights and relevant recommendations are expected to be obtained to improve the efficiency and effectiveness of the public transportation system in Palembang and its surrounding areas. The study will also focus on the agglomeration aspect in providing better transportation services for the community. The findings of this study are expected to serve as a solid foundation for formulating effective strategies and action plans to enhance the public transportation system. By understanding the existing conditions and potential development of the public transportation system, cities can work towards establishing a more sustainable, efficient, and inclusive transportation network for all residents. This study aims to analyze public transportation integration in Palembang, evaluate research trends using bibliometric analysis with VOSviewer, identify gaps in modal integration and policy implementation, and formulate policy-driven, spatial planning, and technology-based strategies to enhance the efficiency, effectiveness, and sustainability of the public transportation system.

1.2. Literature Review

1.2.1. Concept of Integrated Public Transportation System

An integrated public transportation system connects various modes of transport to provide users with easier access. Research indicates that transport mode integration can enhance efficiency, reduce travel time, lower carbon emissions, and promote sustainability (Smith 2021). With proper integration, passengers can seamlessly switch between transport modes, minimize waiting times, and improve overall travel comfort.

One of the primary challenges in the current transportation system is the suboptimal scheduling of operations, leading to vehicle congestion and uncertainty for users. High passenger density during peak hours results in discomfort due to limited vehicle capacity and inadequate facilities. (Ibrahim and Alhassan 2020) highlights that random stops made by public transport operators are a major cause of travel delays. These unscheduled stops not only extend travel time but also reduce the operational efficiency of public transportation. Additionally, delays in public transport arrival times frequently disrupt passengers' daily schedules due to congestion, technical issues, or inefficient operational planning (Ibrahim and Alhassan 2020); (MacEdo *et al.*2023); (Ceder 2023); (Kutlimuratov and Mukhitdinov 2020).

This situation contributes to the low public interest in using public transport, as research indicates that only 4.95% of trips are made using public transport modes. A major contributing factor is the operational system of minibus services, which lack fixed schedules and only depart when full, creating uncertainty for passengers. An integrated public transportation system serves as a solution to enhance the efficiency and effectiveness of urban transport services. (Solecka and Zak, 2014) states that integration involves network, infrastructure, fare, and information aspects to improve the quality of public transportation services. One form of mass transportation system implementation that has been developed in various cities is the Bus Rapid Transit (BRT). BRT offers speed, comfort, and lower operational costs compared to conventional transportation modes (Toure, 2022). By implementing a BRT system integrated with other transport modes, such as Light Rail Transit (LRT) and minibuses, traffic congestion is expected to decrease, and public transport usage will increase significantly. Therefore, optimizing an integrated public transportation system is a strategic step toward creating more efficient and sustainable urban mobility.

1.2.2. Agglomeration and Its Impact on Transportation

Agglomeration refers to the concentration of population and economic activities in a particular region. According to Melawaty Agustien, agglomeration can influence travel patterns and the demand for transportation (Agustien *et al.* 2022). A study by (Sarjana 2021) indicates that agglomeration can enhance transportation efficiency but may also lead to congestion if not properly managed. According to the Indonesian Dictionary (Kamus Besar Bahasa Indonesia), the term agglomeration is defined as the tendency of various types of enterprises to cluster in a specific location to achieve economies of scale. Industries tend to agglomerate spatially and serve the entire market from a single location, creating linkages between economies of scale, transportation costs, and demand (Nainggolan 2024).

In the context of transportation, agglomeration reflects areas with high population density served by various integrated public transportation modes. Public transport infrastructure creates agglomeration effects through transportation externalities, enhancing accessibility and mobility efficiency. Agglomeration also plays a role in shaping transportation policies to regulate vehicle movement within a region (Rahman, Mudiyono and Wibowo 2023). Agglomeration policies are expected to modernize public transportation and drive regional development (Priyanto, 2018). The key factors contributing to transportation agglomeration include efficiency, accessibility, economic centers, global connectivity, and innovation (Tohir, Primadi and Alfarisy 2023). Major cities such as New York, Tokyo, and London exemplify regions with high transportation agglomeration, enabling the swift and efficient movement of people and goods through the integration of various transport modes.

1.2.3. Case Study of Public Transportation Systems in Other Cities

The implementation of an integrated public transportation system has the potential to enhance community mobility and reduce urban congestion. Studies indicate that intermodal transportation integration can increase public transport ridership, reduce carbon emissions, and support green economic strategies that emphasize energy efficiency and environmental sustainability (Yulistarini, Fansyuri and Fartzie 2025). This integration also facilitates the shift from private vehicle use to public transport through the organization of network systems, infrastructure, fare structures, and service information

Several cities worldwide have successfully developed integrated public transportation systems. A study by PUSTRAL UGM (2023) reported that such services increased the shift to commuter rail by 38% and reduced vehicle emissions by up to 5,057 tons per year. In Yogyakarta, the integration at Tugu Station between Trans Jogja buses and the commuter rail has significantly increased passenger numbers on certain routes (Bintang *et al.* 2024). However, implementing an integrated system requires meticulous planning and collaboration among various stakeholders, including the government, transportation operators, and the public (Yulistarini *et al.* 2022). Adequate infrastructure support, such as complementary facilities at bus stops or stations and accurate information systems, is also a crucial factor. In high-mobility agglomeration areas, modal integration serves as a solution to reduce dependence on private vehicles, which contribute to congestion and air pollution. Furthermore, an integrated transportation system can enhance accessibility and stimulate economic growth by improving connectivity across various regions.

1.2.4. Transportation Policy in Indonesia

Transportation policies in Indonesia, including in Palembang, have undergone various changes to improve service quality. According to (Buchari 2021), policies supporting the development of an integrated transportation system are crucial for achieving sustainable development goals. The development of an integrated public transportation system requires a strategic approach involving multiple stakeholders. Transportation solutions do not solely rely on infrastructure development but also on service quality improvements to ensure system effectiveness (Arifianto 2019). The operational performance of transportation must be enhanced through an integrated multimodal approach (Yamin, 2009). Intermodal integration creates a functional environment that facilitates transportation policy evaluation and service optimization (Boile 2000).

Accessibility is a key factor in transportation systems, influencing mobility and sustainability. Public transportation that provides "door-to-door mobility" plays a crucial role in improving people's quality of life (Saif, Zefreh and Torok, 2019). Furthermore, modal integration aims to facilitate seamless transfers, reduce waiting times, and enhance network and payment system cohesion (Biomantara and Herdiansyah 2019). The core components of an integrated public transportation system include synchronized schedules, electronic payment systems, information centers, and technology-based applications for real-time updates (Raihannabil 2024). Implementing this system contributes to reducing congestion and air pollution while promoting more efficient public transportation usage. Urban mobility management strategies encompass the concept of Transit-Oriented Development (TOD), integrated terminals, and cross-sector collaboration in policy formulation (E. Buchari 2015), (Friedrich 2020).With optimal system improvements, public transportation in urban and metropolitan areas can serve as a sustainable mobility solution.

1.2.5. Bibliometric Analysis Using VOSviewer as a Literature Review Tool

VOSviewer is a software tool used to visualize and analyze information derived from scientific publications and bibliometric data. This tool is designed to construct and display bibliometric networks, such as relationships between authors, journals, or keywords extracted from scientific literature. According to the study (Rahman 2023), VOSviewer provides in-depth insights into research developments across various fields, including transportation.

In the context of this literature study, VOSviewer plays a crucial role in helping researchers identify research trends, collaboration patterns among authors, and relationships between relevant topics. By utilizing data from scientific databases such as Google Scholar, Scopus, or Web of Science (WoS), researchers can create a research map that reflects relevant publications, scientific collaboration patterns, and emerging themes in transportation studies.

In research on the development of an integrated public transportation system, previous studies have examined key aspects that support transportation efficiency and sustainability. (A. C. S. Kamilaa *et al.* 2024) employed bibliometric analysis using VOSviewer to identify publication trends and the complexity of topics related to sustainable transportation, focusing on keyword distribution, collaboration networks among authors, and citation relationships between articles. Through bibliometric analysis with VOSviewer, (Sarjana 2022) highlighted the concept of Transit-Oriented Development (TOD) as an approach to integrating public transportation modes with urban spatial planning, aiming to enhance accessibility and cohesion in urban planning. Meanwhile, (Rahman 2023) emphasized the importance of public transportation efficiency, which correlates with service quality and accessibility, and how policy fragmentation becomes a major obstacle in evidence-based transportation system innovation. On the other hand, (Ginting and Ratnasari 2022) asserted that sustainable transportation policies and data-driven regulations play a crucial role in alleviating congestion and establishing a more integrated public transportation system.

With these various perspectives, previous studies provide valuable insights into the challenges and opportunities in developing a more efficient and connected transportation system. However, research gaps remain, particularly in the context of implementing an integrated public transportation system in specific regions, such as Palembang and its surrounding agglomeration areas.

Table 1. Results of variable and concept analysis in previous studies using Vos viewer

Researcher	Variables Used in VOSViewer	VOSViewer Analysis Results
A. C. S. Kamilaa et al. (2024)	Keyword Distribution in Integrated Public Transport Research - Collaborative Network Among Authors - Citation Relationship Among Articles	Bibliometric analysis using VOSviewer to identify publication trends and the complexity of topics related to sustainable transportation
Sarjana (2022)	- Transit-Oriented Development (TOD) Concept – The Relationship Between Public Transport Mode Integration and Urban Spatial Planning	TOD as an Approach to Integrating Transportation Modes with Urban Development
H. Rahman (2023)	- Public Transportation Efficiency - Service Quality and Accessibility - Transportation Policy Fragmentation	The Relationship Between Transportation System Efficiency, Traffic Congestion Reduction, and Environmental Impact - Evidence-Based Policies to Support Innovation in Transportation
Ginting & Ratnasari (2022)	- Sustainable Transportation Policy - Data-Driven Regulation - Impact of Urban Congestion	The Role of Policy in Developing Sustainable Integrated Transportation

Table 1 presents the results of the VOSViewer analysis on previous studies.

Table 2. Comparison of studies using VOSviewer in previous research

Comparative Aspects	A. C. S. Kamilaa et al. (2024)	Sarjana (2022)	H. Rahman (2023)	Ginting & Ratnasari (2022)
Study Focus	Trends in Integrated Public Transportation Research	TOD integration with public transportation system	Transportation Efficiency and Its Impact on Congestion and the Environment	Sustainable Transportation Policy and the Role of Regulation
Approach	Bibliometric Data Analysis	Concept and theoretical study of bibliometric analysis	Bibliometric Data Analysis	Regulatory Analysis and Transportation Sustainability
Key Findings	Increasing Publication Trends, Evolving Topic Complexity	TOD can enhance the integration of public transport modes	Policy Fragmentation Remains a Major Barrier to Transportation Efficiency	Data-Driven Policy and Long-Term Regulation as Key Factors for Transport Mode Integration
Strengths	Identifying Emerging Research Trends	Provides an understanding of tod and public transport integration	Linking Transportation Efficiency with Evidence-Based Policy	Emphasizing the Importance of Long-Term Policies in Supporting Transportation Systems
Weaknesses / Limitations	Does Not Address Direct Implementation in	Has not examined the technical and	Lack of Elaboration on the Technological Aspects in Enhancing	Does Not Discuss Specific Cases in Particular Regions

	Specific Urban Transportation Systems	policy aspects of tod implementation	Transportation System Efficiency	

While these studies have made significant contributions to understanding integrated public transportation, differences exist in their research focus, approaches, and key findings. Reference (A. C. S. Kamilaa *et al.*2024) highlights research trends through bibliometric analysis, whereas (Sarjana 2022) focuses more on the concept of Transit-Oriented Development (TOD) and its relationship with public transportation systems. Meanwhile, (Rahman 2023) discusses transportation efficiency and policy barriers in its implementation, while (Ginting and Ratnasari 2022) emphasizes the importance of sustainable transportation policies and data-driven regulations to support mode integration. A more detailed comparison of the research aspects covered in each study is presented in Table 1 below.

From the four studies presented in Table 2, it can be concluded that VOSviewer is an appropriate tool for identifying dominant references on transportation. However, certain aspects have not been explored in depth, presenting a research gap in sustainable transportation policy to support mode integration.

2. Research Methodology

2.1. Methods

The research methodology employed in this study is bibliometric analysis using VOSviewer. The data were collected from various sources, including Scopus, ResearchGate, and Elsevier. The data collection process involved identifying relevant articles related to developing an integrated public transportation system. Once the data were gathered, VOSviewer was utilized to visualize the relationships among articles, authors, and frequently occurring keywords in the literature. This method is widely used to provide an overview of a set of scholarly documents (Jiang, Bhat and Lam 2020).

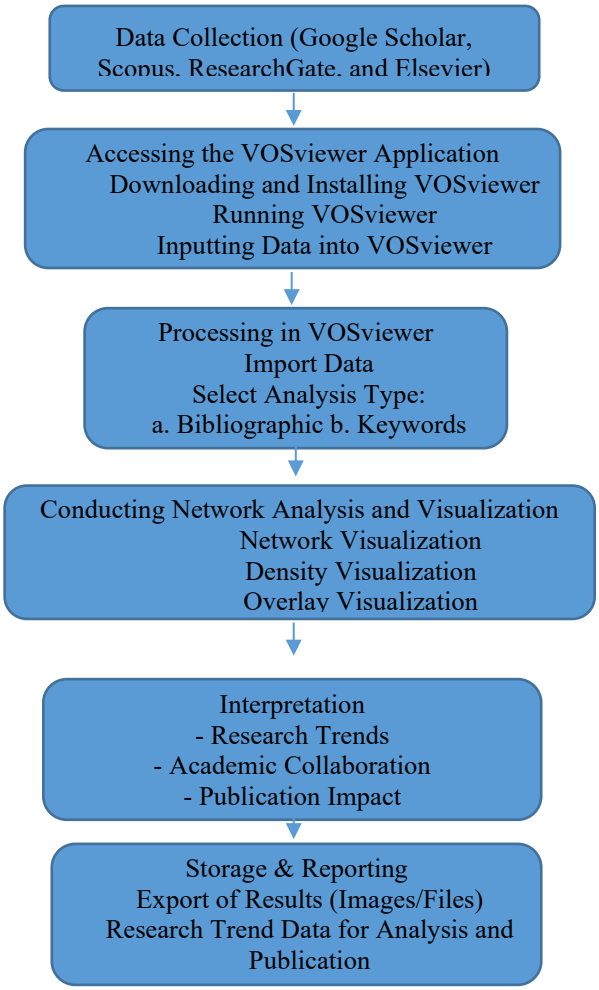

Figure 1. Flowchart of Analysis Using VOSviewer

2.2. Data Collection

The bibliometric analysis using VOSviewer in this study aims to identify the relationship patterns among concepts in the literature on integrated public transportation. The generated data visualization provides insights into keyword distribution, author collaboration, and citation relationships between articles. Through network mapping, this study reveals key trends, dominant topics, and research gaps that can be further explored. The analysis results are categorized into several clusters representing major research domains, enabling an in-depth evaluation of the development trajectory of integrated public transportation research. This discussion will elaborate on the mapping results based on keyword relationships, thematic distribution, and the academic and practical implications of the findings.

The analysis using VOSviewer software, as illustrated in Figure 2, presents a network visualization indicating that transportation-related research is categorized into five main clusters: transportation policy and development, passenger satisfaction and service quality, travel time and information technology, transportation modes and accessibility, and statistical data on transportation users.

The keyword "transport" serves as the central theme, highlighting the dominance of this topic in the analyzed literature. These findings suggest that transportation research not only focuses on infrastructure and policy aspects but also considers user experience, travel efficiency, and the application of information technology to optimize services. This analysis provides valuable insights for policymakers, academics, and transportation service providers in enhancing a sustainable, efficient, and user-centered transportation system.

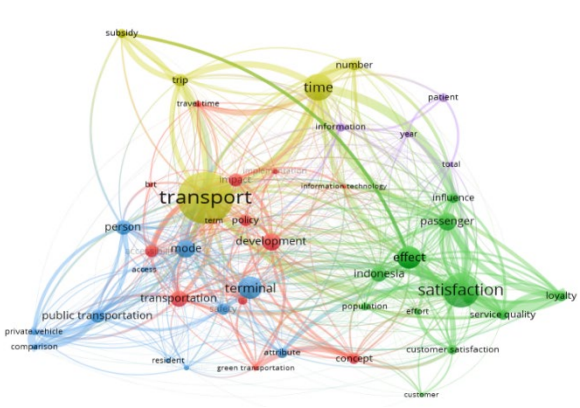

Figure 2. Overlay visualization results from VOSviewer

Figure 2 presents the Overlay Visualization results from VOSviewer, illustrating the evolution of transportation research from 2014 to 2020. The initial focus was on policy and infrastructure, which later shifted towards the use of information technology and eventually emphasized user satisfaction and service quality. These findings indicate that the transformation of the transportation system relies not only on physical development but also on enhancing user experience and satisfaction as key elements in sustainable transportation.

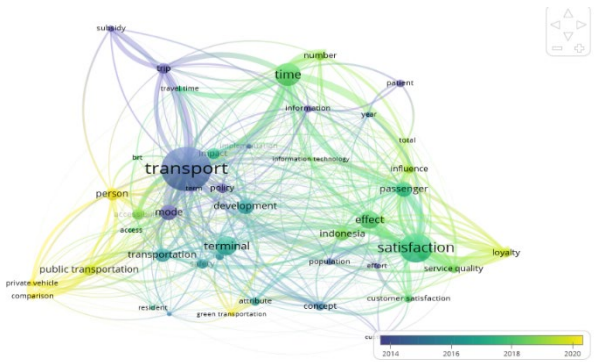

Figure 3. Overlay visualization results from VOSviewer

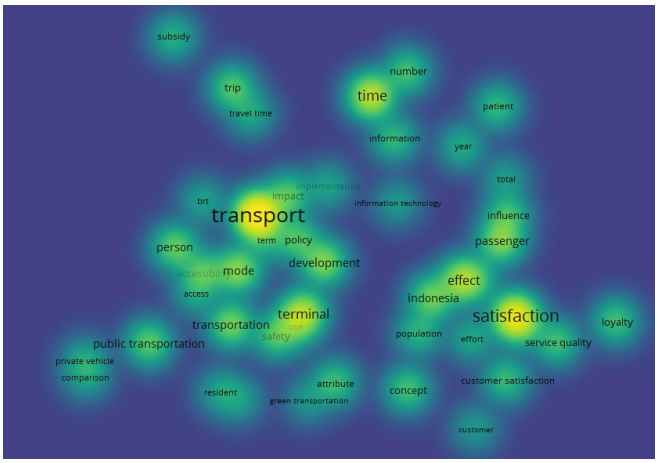

Figure 4. Density Visualization of Articles Based on VOSviewer

Figure 4 presents the results of the Density Visualization from VOSviewer, indicating that current transportation research primarily focuses on user satisfaction, transportation impact, and service effectiveness. In contrast, aspects such as green transportation and subsidy policies remain underexplored. With the increasing adoption of technology in transportation, future research can place greater emphasis on the development of technology-based services and sustainable transportation concepts.

The bibliometric analysis using VOSviewer reveals that transportation research is categorized into five main clusters: policy aspects, user satisfaction, travel efficiency, transportation mode accessibility, and user statistical data. The research trend from 2014 to 2020 suggests a shift in focus from infrastructure and policy issues to the implementation of information technology and the enhancement of service quality based on user experience. However, the Density Visualization analysis highlights the limited attention given to green transportation and subsidy policies in existing studies.

This research gap underscores the need for further development of an integrated public transportation system, emphasizing improved intermodal connectivity, technology utilization in transportation management, and a sustainability-driven approach to enhance efficiency and the attractiveness of public transport. Additionally, comprehensive strategies and planning should be formulated to ensure more efficient intermodal integration, improve accessibility, and optimize technology for transportation management. Consequently, the developed transportation system will not only be more environmentally friendly and efficient but also better equipped to meet societal mobility needs more inclusively and sustainably.

3. Results and Discussion

Based on a review of previous studies and bibliometric analysis using VOSviewer, the advantages, limitations, and research gaps can be identified as a foundation for further research to address the established research questions. The VOSviewer analysis results highlight several frequently occurring key terms in related studies, such as public transport, integration, management, sustainability, and ITS-based systems. The relationships among these keywords indicate a strong research focus on evaluating public transportation systems; however, gaps remain in the aspects of technology implementation and more measurable operational standards.

The bibliometric analysis using VOSviewer has identified relevant articles, presented in the matrix in Table 3, which were selected due to their relevance to the topic of public transport integration in Palembang. Many of these studies focus on multimodal systems, transportation policies, and service efficiency. The diverse methodologies employed, such as descriptive analysis and multimodal modeling, provide a comprehensive overview of the challenges and

opportunities in transportation development in Palembang. This analysis underscores the urgent need for research on the development of an integrated public transportation system in Palembang and its surrounding agglomeration areas to address the region's mobility demands.

By adopting a location-specific approach, this study does not solely rely on general theories or experiences from other cities but instead offers recommendations tailored to the actual conditions in Palembang. The findings are expected to serve as a basis for local governments and stakeholders in designing policies and implementing practical solutions to enhance transportation services in the agglomeration area.

Table 3. Matrix of transportation article analysis

Article Title	Authors	Research Phenomenon	Research Parameters	Research Method	Analysis Results
Multimodal Public Transport: A Sustainable Alternative for Transportation Planning	(Buchari, 2008)	Multimodal Public Transportation System	Integration of Transport Modes, Service Efficiency	Multimodal Modeling,	Academic Manuscript and Public Transport Evaluation
A Multimodal Public Transport Planning Guidance For Sustainable Transport In Developing Countries	(Buchari, 2009)	Multimodal Transportation System Planning	Multimodal System Guidelines, Environmental Impact	Formulation of Regulations and Multimodal Guidelines	Structured MMPT System
Policies to Mitigate Traffic Congestion Through Peak-Hour Time-Sharing	(Buchari, 2014)	Traffic Congestion and Mode Shift to LRT	Multimodal Transport Demand, Hierarchical Services	Descriptive Analysis, Matrix, Multimodal	Multimodal Demand Remains Low (21.66%)
Transportation Demand Management: A Park and Ride System to Reduce Congestion in Palembang City Indonesia	(Buchari, 2015)	Acceptance of the Park and Ride System	Shift of Private Vehicle Users to Park and Ride	Descriptive Analysis, Matrix, Multimodal	Potential Shift of Private Vehicle Users
Characteristics of Transportation in Banyuasin Regency, a Buffer Area of Palembang City	(Buchari, Hidayat and Arliansyah, 2015)	Interregional Mobility Between Buffer Areas and the Main City	Travel Purpose, Transportation Mode	Travel and Transportation Network Analysis	Dominated by Work Trips (30.1%), Distance > 20 km
Development of Rural Public Transport Through the Concept of Multimodal Public Transportation	(E. Buchari, 2015)	Development of Multimodal Public Transport in Rural Areas	Multimodality Level, Public Transport Load Factor	Multimodal Analysis (Six Multimodal Components)	Low Load Factor (39.37%), Requires Development Policies
Potential Users of Park and Ride at the Light Rail Transit Station of Asrama Haji, South Sumatra Province	(Mardyah, Buchari and Fitriani, 2017)	Potential Utilization of Park and Ride at LRT Stations	Cost Factors and Parking Availability	Descriptive Analysis, Binary Logit Model	Increased Park and Ride Utilization if Parking is Limited

Article Title	Authors	Research Phenomenon	Research Parameters	Research Method	Analysis Results
Public Awareness and Assistance on the Importance of Utilizing Public Transport for the People of Palembang City	(Kadarsa *et al.*, 2017).	Public Awareness of Public Transportation	Congestion Understanding, Public Awareness	Traffic Management, Field Research	51 Participants Willing to Disseminate Information, Some Resistance
Hierarchical Service For Integrating Multimodal Public Transport System In Palembang, Indonesia	(Buchari, 2018)	Multimodal Integration with Hierarchical Services	Multimodal Transport Demand, Service Hierarchy	Descriptive Analysis, Cross-Tabulation, Multimodal	Low Multimodal Demand, Suboptimal Mode Integration
Public Awareness on Teman Bus Service as an Effort to Increase Public Interest in Using Public Transport in Palembang City	(Agustien *et al.*, 2022)	Increasing Public Interest in Public Buses	Load factor, waktu headway, kecepatan perjalanan	Community Outreach	Load factor 24%, headway 8 menit, kecepatan 20-30 km/jam
Evaluation Study on the Integration of Infrastructure Networks, Service Networks, and Urban Transportation Services in Palembang	(Buchari, 2021)	Integration of Transportation Networks in Palembang	Feeder Network, Main Mode Connectivity	Identifikasi Regulation Identification, Existing Condition Analysis	Feeder Does Not Support Main Network, Travel Pattern Changes
Public Awareness on the Implementation of Buy The Service for Urban Public Transport (Angkot) on the Asrama Haji–Sematang Borang Route	(Agustien *et al.*, 2022)	Utilization of LRT Musi Emas Feeder Minibuses	Reliability, Physical Evidence, Service Assurance	Satisfaction Survey, Operational Characteristic Observation	Average Rating 57%, Load Factor 107.06% 4o

Source: Analysis Results (2025)

Table 4. Identified research gaps

No	Research Gap	Explanation
1	Limited Location-Specific Studies	Previous studies have discussed transportation integration in a general or global context; however, no specific studies have focused on Palembang City and its surrounding agglomeration areas.
2	The Need for an Implementation-Based Approach	Most research has primarily concentrated on concepts, policies, and research trends, yet there is still a lack of implementative and applicative studies for developing an integrated public transportation system.
3	Lack of Integration Between Spatial Planning, Policy, and Technology in Public Transportation Systems	Earlier studies have examined Transit-Oriented Development (TOD) and transportation policies separately but have not explored how the integration of spatial planning, transportation policies, and digital technology can be specifically applied in an agglomeration public transportation system.

4	Absence of Studies on Public Transportation Development Strategies in Urban Agglomeration Areas	Research on TOD and transportation policies has mostly addressed systems within a single city, whereas the integration of transportation in agglomeration areas (covering multiple cities or regencies) remains an underexplored topic.

Source: Analysis Results (2025)

Thus, research on the development of an integrated public transportation system in Palembang and its surrounding areas (agglomeration) can fill the research gap and be further explored in future studies. Table 4 below presents the research gaps identified from previous studies.

The literature review results indicate that the development of an integrated public transportation system in the Palembang agglomeration area is of high urgency to address transportation needs covering Palembang and its surrounding regions. This study emphasizes the importance of a locally contextualized approach, considering spatial planning, transportation policies, and customer satisfaction. The recommendations derived from this study are expected to serve as a foundation for the government and stakeholders in formulating policies and implementing a more efficient and sustainable transportation system.

4. Conclusion

Based on the results of the literature review and bibliometric analysis using VOSviewer, several research gaps need further investigation to enhance transportation system efficiency and customer satisfaction. The key findings are as follows:

1. One major aspect that has received limited attention is the impact of policies on public transportation integration, including regulations, incentives, and subsidies that can encourage public transport usage.
2. Improving customer satisfaction is a crucial focus in transportation system development, particularly through the implementation of information technology, service quality enhancement, and optimization of intermodal connectivity.
3. Greater emphasis should be placed on policy strategies that support sustainable transportation and user experience-based approaches to create a more integrated, efficient, and appealing public transportation system.

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Biographies

Erika Buchari was born in Palembang on October 30th, 1960. She received her Master's Degree in Highway and Transport from City University, London, UK, in 1990. She got her PhD in Multimodal Transportation from Liege University, Liege, Belgium, in 2008. Since 2011, she has been a full Professor at Sriwijaya University, South Sumatera Province, Indonesia. Her research interests are in Highway, Port Management, Public Transport, and Multimodal Transport.
Email: erikabuchari@ft.unsri.ac.id

Melawaty Agustien is a faculty member in the Department of Civil Engineering, Faculty of Engineering, Sriwijaya University, Indralaya, Indonesia. She holds a Ph.D. in Civil Engineering with a specialization in transportation and infrastructure planning from ITB (Institut Teknologi Bandung). Her research focuses on the development of sustainable transportation systems, road network planning. She is involved in consulting projects with government agencies and private sectors to develop more efficient and environmentally friendly transportation infrastructure. She is an active member of professional organizations in civil engineering and transportation

Fansyuri is a professional working at the Department of Transportation of South Sumatra Province. He is actively involved in managing and developing the regional transportation system, with a particular focus on public transport integration, transportation policy, and improving the efficiency of public transit services. Fansyuri earned a Bachelor's degree in Civil Engineering from Sriwijaya University. He later pursued a Master's degree in Transportation from the same institution. His academic background provides a strong foundation in planning, analysis, and data-driven policy implementation, with an emphasis on sustainable transportation development. In addition to his professional career in the public sector, Fansyuri is actively engaged in research and the development of transportation systems. He collaborates with academics on various projects related to urban mobility and has been involved in several strategic initiatives aimed at enhancing connectivity and transportation efficiency in Palembang and its surrounding areas.