JIPI (Jurnal Ilmiah Penelitian dan Pembelajaran Informatika)
Journal homepage: https://jurnal.stkippgritulungagung.ac.id/index.php/jipi
ISSN: 2540-8984
Vol. 10, No. 4, December 2025, Pp. 3313-3318

Smart Mobility: Mobility Services in Urban Area a Literature Review

Fikri Fathoni*[1)], Yuli A Prasetyo [2)], Iqbal Y Mukti [3)], Ari F Santoso [4)]

1. Information System, Faculty of Industrial Engineering, Telkom Universtiy, Indonesia
2. Information System, Faculty of Industrial Engineering, Telkom Universtiy, Indonesia
3. Information System, Faculty of Industrial Engineering, Telkom Universtiy, Indonesia
4. Information System, Faculty of Industrial Engineering, Telkom Universtiy, Indonesia

Article Info

Keywords: Smart Mobility, Mobility, Smart City, Systematic Literature Review

Article history:
Received 19 August 2024
Revised 30 September 2024
Accepted 17 October 2024
Available online 1 December 2025

DOI :
https://doi.org/10.29100/jipi.v10i4.6478

* Corresponding author.
Corresponding Author
E-mail address:
fikrifathoni@student.telkomuniversity.ac.id

ABSTRACT

Smart mobility is one of the important aspects for cities to implement the smart city concept. smart mobility is the use of information technology for urban transportation systems in order to create integrated, effective, sustainable, easily accessible transportation services to support mobility, and improve the quality of life of urban communities. The main focus of this research is to answer the research questions in order to compile and present a comprehensive understanding of the concept of intelligent mobility, with an emphasis on the latest developments and implementations of intelligent mobility in the scientific literature. This research uses the Systematic Literature Review method to identify terminology, services, functions, and technologies, that are elements in the implementation of smart mobility. There are 30 previous research articles with publication years 2018-2023 on smart mobility that contribute to this literature review. The results of this literature review provide in-depth insights into how information and communication technologies can improve sustainability and efficiency in urban transportation systems. By understanding previous research, this research provides a solid basis for the development and implementation of the concept of smart mobility.

.

I. INTRODUCTION

In the contemporary urban landscape, mobility remains a critical and rapidly evolving component. The challenges posed by continuous population growth and urbanization necessitate innovative solutions for efficient mobility management. How ever, while existing studies have explored various aspects of smart mobility, a specific gap persist concerning the comprehensive integration of terminology, services, and technologies that constitute smart mobility. This research aims to address this gap by conducting a Systematic Literature Review (SLR) to identify and analyze the core elements of smart mobility, particularly those overlooked by previous studies.

Smart mobility can be one of the solutions to improve and transform cities into modern. In the context of urban transportation, Smart Mobilty can be thought of as a broad term that encompasses a wide range of related transportation technologies. It represents a new approach to transportation, with a focus on building sustainable transportation systems, which can be continuously improved in the future [1]. By implementing smart mobility, cities are able to provide transportation systems that are integrated with information technology that are able to provide solutions in the form of services such as providing real-time information related to transportation and traffic which can be the key to shortening travel time and increasing efficiency, which in turn can save costs. In addition, focus is also given to improving the quality of transportation services, including the implementation of traffic management, and in line with its sustainability goal to reduce CO2 emissions produced by motor vehicles [2].

This research stems from the important need to comprehensively understand the scope of smart mobility which does not only discuss technical aspects related to the technology used and to encourage exploration of innovative solutions regarding smart mobility. This research makes a unique contribution by synthesizing a holistic understanding of smart mobility. This research combines various terminology, service functions, and current technological advances to provide a broader and more cohesive framework. This approach not only differentiates our research from similar studies, but also provides a foundation for future innovations in smart mobility.

In addition, its other goal is to uncover potential gaps in science that can guide research efforts and contribute to the comprehensive development of science in this dynamic field. Although much research has been conducted on smart mobility, there is a significant gap in terms of a thorough understanding of smart mobility terminology, services, and technologies. Not only summarizing the results of previous research, this study also provides a new perspective on the potential of the latest technology to improve the efficiency and sustainability of the city's transportation system.

Based on several studies that have been conducted, smart mobility has several services, namely, in the form of Real-time traffic information and management, which is useful for getting real-time traffic information such as congestion, road accidents, and etc [3]. In addition to providing real-time traffic information, there is a real-time transportaton information system service, this service is useful for providing information about public transportation in real-time. The information provided is in the form of live tracking transport information, arrival and departure times of public transportation, transportation availability, and routes from the transportation [4]. To support these services more efficiently, there is an e-ticketing service that is useful for city people to purchase public transportation tickets that can be done on online platforms. In addition, there are other services such as Parking Management, in this service the public can get information about the availability of parking spaces in every public place for their vehicles [5]. To support the implementation of these services more efficiently, there is an e-parking service that is useful for making parking payments online which can be accessed through an online platform [6]. To support all these services, technology such as Intellegent Transportation System is needed as the transportation system information technology infrastructure to support the implementation of services provided by smart mobility, but to support the technology requires other technologies such as the Internet of Things, PTZ cameras, radio-frequency identification (RFID), Global Positioning Systems (GPS), mobile applications [5].

Previous research has often been limited to specific geographic scopes or only discussed specific technologies without considering the interconnectivity between various elements in the smart mobility ecosystem. This research aims to overcome these limitations by identifying factors that have not been thoroughly discussed, such as the influence of IoT and Big Data in optimizing transportation services in various urban contexts.

In addition, this study will provide answers to research questions that arise based on literature reviews conducted related to Smart Mobility. The following questions are the purpose of research on smart mobility.

1. What is the terminology of smart mobility that can be presented in the research?
2. What are the services provided by smart mobility and its functions that can be applied in urban areas?
3. What technologies are currently contributing to the implementation of smart mobility?

This article consists of several separate sections: Section 2 provides an explanation of previous research discussing smart mobility, Section 3 describes the methodology used in conducting literature reviews, Section 4 analyzes and provides answers to research questions based on literature reviews conducted, Section 5 provides an overview of the results of systematic literature reviews conducted.

II. METHODOLOGY

To conduct this research, an analysis of the latest scientific research and the application of the concept of smart mobility is needed. This research was conducted through 7 stages as shown in figure 3.1 of the Methodology of SLR. Using this methodology, researchers conduct a deeper search to identify the latest definitions, services, functions, and technologies that can help the application of smart mobility. The search conducted using a journal-based database search strategy in Scopus, Web of Science, and Google Scholar selected scientific literature consisting of Articles, Literature Reviews, Conference Papers, and others using the keywords Boolean "Smart City" AND "Smart Mobility" which can display all articles that have search keywords in the title, abstract, or keywords that can produce 166 documents with publication years between 2018-2023. After an in-depth analysis of the criteria set regarding the article about smart mobility, 30 relevant articles were obtained as references to provide answers to the Research Question. With the methodology used, the research conducted is able to provide a quality assessment of the articles created because it is able to discuss smart mobility which includes its definition, services, and technology. Thus, this article is able to provide new insights or significant contributions to the understanding of smart mobility, based on the diversity of perspectives presented by previous research.

JIPI (Jurnal Ilmiah Penelitian dan Pembelajaran Informatika)
Journal homepage: https://jurnal.stkippgritulungagung.ac.id/index.php/jipi
ISSN: 2540-8984
Vol. 10, No. 4, December 2025, Pp. 3313-3318



Figure 1 Methodology SLR

1. **Stakeholders:** Stakeholders in this literature review will be involved in the SLR process which will bring benefits in determining more appropriate review questions, expanding the scope of literature search, and evaluating results more critically.
2. **Review Question and Conceptual Framework:** This stage is the first step in performing an SLR, by defining a central topic. It is important to pay attention to variations in literature reviews, including the breadth, depth, and review strategies used. Reviews can be broader or more limited depending on the type of question you want answered. More open-ended questions lead to broader reviews, while more closed questions lead to narrower-scoped reviews, review strategies should also be considered according to the review questions that drive research. Once the topic is established, the next step is to clarify the review questions and determine the scope of the review through the development of a conceptual framework.
3. **Work Team:** The next step to conduct a systematic literature review is to determine team members, in SLR this is better done by a team. The quality of the review can be improved by involving two people who conduct an independent search and assessment of the study. The formation of the team should be adapted to the review questions, and the participation of experts can complement the technical and methodological knowledge. Although the team should have a fixed core group, experts may only participate in a few stages. Collaboration with information technology professionals, librarians, and statisticians can also enrich the review with appropriate knowledge and expertise.
4. **Research Strategy:** Research strategy, which refers to the method of approach applied in identifying, reviewing, and synthesizing relevant literature related to a defined research topic, plays a central role in the success of a study. This process describes the development of systematic and structured measures designed to search, evaluate, and filter appropriate sources of information, and integrate the findings into a comprehensive synthesis. The importance of choosing the right research strategy cannot be underestimated, because this guarantees the implementation of systematic literature reviews with efficiency, as well as producing relevant and reliable findings to develop knowledge in the field being researched.
5. **Search, Eligibility and Coding:** Once the strategy is determined, the next step in SLR is the search, feasibility assessment, and coding of the main study. This process begins by applying search terms to various selected sources to obtain a collection of studies that will then be archived and coded for future use. This stage will be screened to identify relevant studies. The screening stage requires checking each article found, starting with reading the titles and abstracts of these articles to determine their relevance to the review question. Articles deemed irrelevant are usually excluded, but are nevertheless archived and coded with the reason for exclusion. Studies that are considered relevant are then analyzed more in-depth by reading the entire content of the study.
6. **Quality Assessment:** Quality assessment involves two important aspects: evaluation of the selected primary study and evaluation of the review process as a whole. Primary study evaluation includes three main dimensions: the quality of study implementation, the relevance of the primary study to the review question, and the focus of the review. It is recommended that this evaluation be carried out independently by at least two members of the review team. Each study was given a numerical or categorical rating by team members based on all three dimensions. These evaluations are then combined to provide an overall assessment of each study. The quality of SLRs also depends on the quality of the overall review process, including the definition of review questions, the search process, article selection, and synthesis of results. It is important

to avoid publication, dissemination, and selection bias and ensure that synthesis of results is done appropriately prior to the results of the dissemination review.

7. **Synthesis of Results:** This stage is carried out to analyze and interpret the research that has been done by identifying how the research question that is the motivation for the research can be answered.
8. **Study Presentation:** At this stage, a presentation is carried out to convey the results of the research conducted to the audience or stakeholders related to the research.

III. RESULTS AND DISCUSSION

At this stage there will be an explanation of the answers to the Research Question derived from 30 article references obtained, 30 of these articles are articles that can contribute to the development of smart mobility in cities.

A. Terminology

In this modern era, the development of information technology is very significantly developed, because the development of the era of information technology can be integrated with transportation systems. In line with this sentence, according to Soumia Goumiri, et al smart mobility is optimizing existing infrastructure using ICT in a smart way. Smart mobility is one of the main blocks in the smart city concept [7]. It is implemented by integrating various modes of transportation and the use of digital platforms to provide transportation services. By implementing smart mobility that integrates information technology with transportation systems that can provide efficient mobility in a region and can also help improve the quality of life of the community, as it provides access to education, health, and social services, employment and business opportunities [8][9][10]. Smart mobility itself is applied to achieve urban goals, namely optimizing and improving the quality of existing transportation infrastructure, reducing congestion and emissions, increasing safety and accessibility, and improving the overall user mobility experience to improve the quality of life of urban communities [4], [11], [12]. To support the implementation of smart mobility, it needs support from several stakeholders consisting of the government, research institutions, transportation service providers, technology service providers, and most importantly urban communities as stakeholders who feel the benefits of implementing smart mobility [2], [6], [11], [13], [14]. In the definition of smart mobility terminology, there is an emphasis on the implementation of smart mobility which focuses on optimizing existing infrastructure and using smart technology to improve the efficiency of the transportation system, while there are also those that focus on multimodal integration and its impact on the accessibility of public services.

B. Services of Smart Mobility

TABLE I.
SERVICES OF SMART MOBILITY

No.	Function	Services	References
1.	Provide efficiency and effectiveness in an adaptable and affordable travel transportation system.	Mobility as A Service	[5], [9], [13], [14], [15], [16], [17], [18], [19]
2.	Provision of real-time transportation information such as arrival time, departure time, and live tracking of the transportation.	Real-time transport information Systems	[13], [14], [18], [19], [20], [21]
3.	Make it easier for transportation users to find a vehicle parking space by providing information on parking availability somewhere.	Carpark Management	[5], [8], [16], [20]
4.	Provides information on traffic conditions and can provide real-time travel navigation.	real-time traffic information and navigation systems	[5], [8], [13], [16], [18], [20], [21], [22], [23]
5.	Reduce traffic congestion by reducing the use of private vehicles.	Sharing Transportation	[5], [12], [17], [24], [25], [26], [27]

C. Technology

Based on the literature review that has been done, some researchers say that the use of information technology in smart mobility is very important. Technologies that can support the application of smart mobility are Internet of Things, Big Data, radio-frequency identification (RFID), Global Positioning Systems (GPS), mobile applications

[5], [8], [14] [28]. The Internet of things is one of the key elements of the application of smart mobility, this technology is used to provide information and help exchange data on every element that works in the smart mobility infrastructure [2], [17]. In addition, Big data technology is also used in the hope that it can help streamline the application of smart mobility, the benefits of using Big Data are to help calculate the number of vehicle volumes in the city and are also useful for providing predictions of weather, traffic, and driving route guidance based on data that has been owned [8], [14][28]. Then to support the application of smart mobility according to some researchers can utilize Radio Frequency Indetification (RFID) technology, the technology can be a sensing tool that helps exchange data while on mobility [8], [29]. Meanwhile, to support services such as real-time transport information systems require Global Positioning Systems (GPS) technology to help vehicles navigate and users do live tracking of the whereabouts of available transportation vehicles, besides that it is also able to help provide estimated arrival times of the vehicle [3], [5], [8], [27]. And finally there is mobile applications technology. According to several previous studies, for example, there are several benefits of using mobile applications in supporting the application of smart mobility in several countries to provide real-time traffic condition information, as a driving navigation tool, and also able to provide information on the availability of parking spaces for private vehicles [8], [22], [29], [30]. In addition, there is the application of mobile applications that support smart mobility in the country of Qatar. Mobile applications in the country have the same value to be used as a medium for making trip planning, providing real-time information about the existence of transportation vehicles and the routes they pass, in addition to being able to provide the location of the bus stop [5][6], [29].

In this Results and Discussion section, it is able to show that smart mobility that integrates information with transportation systems can significantly improve mobility and quality of life in cities. The application of smart mobility has the potential to reduce congestion and emissions, improve safety and accessibility, and improve user mobility in general. The implication of these results is the need to adopt advanced technologies more widely and embrace a systematic approach that involves various stakeholders, including governments, transportation service providers, and the community.

IV. CONCLUSION

This literature review highlights the importance of smart mobility implementation in addressing the challenges of modern urban mobility. Smart mobility includes various transportation technologies integrated with information technology, aiming to improve the efficiency, safety, comfort, and sustainability of urban transportation. With this literature review, it can explain comprehensively about the elements contained in smart mobility, such as the services provided, namely real-time information about transportation and traffic, as well as focusing on traffic management and reducing CO2 emissions, and smart mobility can improve the quality of life in crowded cities. This study aims to identify smart mobility teminology, services, and supporting technologies for smart mobility. It is hoped that this research can contribute to the development of in-depth science in the field of dynamic smart mobility, and can be the basis for subsequent innovations in the development of services and technology that support the application of smart mobility.

REFERENCES

[1] A. Khashoggi and M. F. M. Mohammed, "Smart Mobility in Smart City: A Critical Review of the Emergence of the Concept. Focus on Saudi Arabia," in *Springer Proceedings in Complexity*, Springer Science and Business Media B.V., 2023, pp. 233–241. doi: 10.1007/978-3-031-19560-0_18.

[2] M. Wawer, K. Grzesiuk, and D. Jegorow, "Smart Mobility in a Smart City in the Context of Generation Z Sustainability, Use of ICT, and Participation," *Energies (Basel)*, vol. 15, no. 13, Jul. 2022, doi: 10.3390/en15134651.

[3] S. Šurdonja, T. Giuffrè, and A. Deluka-Tibljaš, "Smart mobility solutions-necessary precondition for a well-functioning smart city," in *Transportation Research Procedia*, Elsevier B.V., 2020, pp. 604–611. doi: 10.1016/j.trpro.2020.03.051.

[4] R. Battarra, C. Gargiulo, M. R. Tremiterra, and F. Zucaro, "Smart mobility in Italian metropolitan cities: A comparative analysis through indicators and actions," *Sustain Cities Soc*, vol. 41, pp. 556–567, Aug. 2018, doi: 10.1016/j.scs.2018.06.006.

[5] S. Tahmasseby, "The Implementation of Smart Mobility for Smart Cities: A Case Study in Qatar," *Civil Engineering Journal (Iran)*, vol. 8, no. 10, pp. 2154–2171, Oct. 2022, doi: 10.28991/CEJ-2022-08-10-09.

[6] G. Cepeliauskaite *et al.*, "Smart-mobility services for climate mitigation in urban areas: Case studies of baltic countries and Germany," Apr. 02, 2021, *MDPI AG*. doi: 10.3390/su13084127.

[7] S. Goumiri, ıd Yahiaoui, and S. Djahel, "Smart Mobility in Smart Cities: Emerging Challenges, Recent Advances and Future Directions," PRE-SUBMISSION.

[8] F. Alanazi, "Development of Smart Mobility Infrastructure in Saudi Arabia: A Benchmarking Approach," *Sustainability (Switzerland)*, vol. 15, no. 4, Feb. 2023, doi: 10.3390/su15043158.

[9] S. A. M. Agriesti, R. M. Soe, and M. A. Saif, "Framework for connecting the mobility challenges in low density areas to smart mobility solutions: the case study of Estonian municipalities," *European Transport Research Review*, vol. 14, no. 1, Dec. 2022, doi: 10.1186/s12544-022-00557-y.

[10] I. Mavlutova, D. Atstaja, J. Grasis, J. Kuzmina, I. Uvarova, and D. Roga, "Urban Transportation Concept and Sustainable Urban Mobility in Smart Cities: A Review," Apr. 01, 2023, *MDPI*. doi: 10.3390/en16083585.

[11] R. Wolniak, "European Union Smart Mobility–Aspects Connected with Bike Road System's Extension and Dissemination," *Smart Cities*, vol. 6, no. 2, pp. 1009–1042, Apr. 2023, doi: 10.3390/smartcities6020049.

[12] C. B. Prajeesh and A. S. Pillai, "Indian Smart Mobility Ecosystem - Key Visions and Missions," in *AIP Conference Proceedings*, American Institute of Physics Inc., Oct. 2022. doi: 10.1063/5.0124596.

[13] D. Müller-Eie and I. Kosmidis, "Sustainable mobility in smart cities: a document study of mobility initiatives of mid-sized Nordic smart cities," *European Transport Research Review*, vol. 15, no. 1, Dec. 2023, doi: 10.1186/s12544-023-00610-4.
[14] R. D'Alberto and H. Giudici, "A sustainable smart mobility? Opportunities and challenges from a big data use perspective," *Sustainable Futures*, vol. 6, Dec. 2023, doi: 10.1016/j.sftr.2023.100118.
[15] I. Lopez-Carreiro, A. Monzon, and E. Lopez, "MaaS Implications in the Smart City: A Multi-Stakeholder Approach," *Sustainability (Switzerland)*, vol. 15, no. 14, Jul. 2023, doi: 10.3390/su151410832.
[16] S. Tarek and T. Ibrahim Nasreldin, "Towards applying smart mobility solutions in Egypt: An integrative framework and a case study application," *Ain Shams Engineering Journal*, vol. 14, no. 7, Jul. 2023, doi: 10.1016/j.asej.2022.101987.
[17] D. Szpilko, K. Budna, H. Drmeyan, and A. Remiszewska, "SUSTAINABLE AND SMART MOBILITY – RESEARCH DIRECTIONS. A SYSTEMATIC LITERATURE REVIEW," *Economics and Environment*, vol. 86, no. 3, pp. 31–61, Dec. 2023, doi: 10.34659/eis.2023.86.3.584.
[18] A. Al-Rahamneh *et al.*, "Enabling Customizable Services for Multimodal Smart Mobility with City-Platforms," *IEEE Access*, vol. 9, pp. 41628–41646, 2021, doi: 10.1109/ACCESS.2021.3065412.
[19] T. Paalosmaa and M. Shafie-Khah, "Feasibility of innovative smart mobility solutions: A case study for vaasa," *World Electric Vehicle Journal*, vol. 12, no. 4, Dec. 2021, doi: 10.3390/wevj12040188.
[20] S. Šurdonja, T. Giuffrè, and A. Deluka-Tibljaš, "Smart mobility solutions-necessary precondition for a well-functioning smart city," in *Transportation Research Procedia*, Elsevier B.V., 2020, pp. 604–611. doi: 10.1016/j.trpro.2020.03.051.
[21] C. Bıyık *et al.*, "Smart mobility adoption: A review of the literature," *Journal of Open Innovation: Technology, Market, and Complexity*, vol. 7, no. 2, Jun. 2021, doi: 10.3390/joitmc7020146.
[22] A. Prakash, "Smart Mobility Solutions for a Smart City," *IEEE Potentials*, vol. 40, no. 1, pp. 24–29, Jan. 2021, doi: 10.1109/MPOT.2020.3023539.
[23] C. Olaverri-Monreal, "Autonomous Vehicles and Smart Mobility Related Technologies," 2016.
[24] C. Amendola, S. La Bella, G. P. Joime, F. M. Frattale Mascioli, and P. Vito, "An Integrated Methodology Model for Smart Mobility System Applied to Sustainable Tourism," *Adm Sci*, vol. 12, no. 1, Mar. 2022, doi: 10.3390/admsci12010040.
[25] J. Mageto, H. Twinomurinzi, R. Luke, S. Mhlongo, K. Bwalya, and S. Bvuma, "Building resilience into smart mobility for urban cities: an emerging economy perspective," *Int J Prod Res*, 2022, doi: 10.1080/00207543.2022.2139866.
[26] P. Rodrigues, E. Real, I. Barbosa, and L. Durães, "Rethinking Smart Mobility: A Systematic Literature Review of Its Effects on Sustainability," in *Smart Innovation, Systems and Technologies*, Springer Science and Business Media Deutschland GmbH, 2023, pp. 219–232. doi: 10.1007/978-981-19-9099-1_15.
[27] A. Khamis, *Smart mobility: Exploring foundational technologies and wider impacts*. Apress Media LLC, 2021. doi: 10.1007/978-1-4842-7101-8.
[28] P. A. M. S. A. Munhoz *et al.*, "Smart mobility: The main drivers for increasing the intelligence of urban mobility," *Sustainability (Switzerland)*, vol. 12, no. 24, pp. 1–25, Dec. 2020, doi: 10.3390/su122410675.
[29] N. P. Rocha, A. Dias, G. Santinha, M. Rodrigues, A. Queirós, and C. Rodrigues, "Smart Mobility: A Systematic Literature Review of Mobility Assistants to Support Multi-modal Transportation Situations in Smart Cities," in *Lecture Notes in Networks and Systems*, vol. 136, Springer, 2021, pp. 303–312. doi: 10.1007/978-3-030-49264-9_27.
[30] M. E. López-Pérez, M. E. Reyes-García, and M. E. López-Sanz, "Smart Mobility and Smart Climate: An Illustrative Case in Seville, Spain," *Int J Environ Res Public Health*, vol. 20, no. 2, Jan. 2023, doi: 10.3390/ijerph20021404.