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User Behavior in Public Transportation Mode Selection: A Systematic Literature Review

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Abstract

*Urban mobility in Indonesia faces major challenges due to rapid urbanization, increasing private vehicle ownership, congestion, and pollution. In regions like West Java, including Bandung Raya and Majalengka, these issues are compounded by user preferences driven by comfort, cost, and travel time, often favoring private vehicles. As a developing country, Indonesia also struggles with weak inter-agency coordination, low infrastructure investment, and public stigma toward public transportation. This study employs the Systematic Literature Review (SLR) method to collect, analyze, and synthesize findings from existing research on transportation modes. Data were sourced using the Publish or Perish (PoP) software, which conducts targeted searches on Google Scholar—chosen for its accessibility and diverse sources compared to databases like Scopus or Web of Science. A total of 1,000 publications from 2000 to 2025 were analyzed. Using **VOSviewer**, the study examined keyword correlations and trends in publication themes over time. The results indicate a notable rise in transportation mode research since 2010, peaking around 2020. Overlay Visualization from VOSviewer reveals the temporal progression of key terms, highlighting growing interdisciplinary interest in public transportation issues. These findings provide valuable insight into the academic development of transportation studies and support policy discussions on sustainable urban mobility in Indonesia.*

Keywords: Artificial Intelligence, Transportation, Public Transportation, Urban Transportation, Mobility

1. Introduction

Public transportation is one of the most important components, especially in developing cities [1]. With the increase in industrialization and urbanization over time, the demand for transportation has also increased proportionally [2]. Urban mobility in Indonesia faces serious challenges due to rapid urbanization, the growth of private vehicles, and high levels of congestion and pollution. Although the government has introduced public transportation modes such as MRT, LRT, BRT, and KRL, their utilization is still not optimal due to the low interest from the public. It is also important to consider cases where users can choose free modes of transportation, such as bicycles or motorcycles [3]. Promoting non-motorized alternatives, from public transportation to cycling, is an essential element in designing a low-carbon transportation system [4]. n the West Java region, including Bandung Raya and Majalengka, similar conditions occur where factors such as comfort, cost, and travel time influence user preferences, leading them to prefer private vehicles. Transportation infrastructure supports economic, social, and other activities [5]. The goal is to help people or groups reach their desired destination, or to send goods from the point of origin to the destination [6]. The field of transportation engineering must continue to adapt to safety, accessibility, environmental responsibility, and the complex requirements of young people as travel patterns evolve, thereby aiding the development of transportation systems that align with their preferences and desires [7].

The transportation network is a fundamental component of civil infrastructure and a key element of sustainable development, as well as being essential for the operation of an effective and reliable transportation system [8]. Public transportation plays a crucial role in reducing congestion, pollution, and improving community accessibility, especially in densely populated urban areas. Contemporary urban mobility is characterized by traffic congestion, pollution, time wastage, noise, and significant inefficiencies in terms of capacity and space consumption on the scale needed to enable the modern urban economy to function productively [9]. A sustainable transportation system is characterized by providing services and infrastructure to mobilize goods and people for

economic and social development, improving quality of life, and competitiveness [10]. Studies show that the success of public transportation depends on intermodal integration, punctuality, comfort, fare affordability, and government policy support. In a transportation system, both are essential needs [11]. Land transportation is very dominant in Indonesia compared to other modes of transportation, such as air and sea transport [12]. Improving accessibility is crucial to promoting the use of public transportation and reducing dependence on private vehicles, as it can significantly influence passenger mode choice decisions [13]. The development and improvement of public transportation have a positive impact on the economy of the city and the country [14]. However, in developing countries like Indonesia, challenges still arise due to weak inter-agency coordination, low infrastructure investment, and negative societal stigma towards public transportation modes.

Research on public transportation is highly necessary due to its vital role in supporting community mobility amidst rapid urbanization. Motorcycles are the most widely used vehicles by the majority of the Indonesian population [15]. The methodology used in this research is based on identification information from various research journals worldwide [16]. This method has the potential to enhance accuracy and reduce researcher bias in scientific literature reviews by incorporating perspectives from various academics in the field [17]. On one hand, the layout of transportation infrastructure can affect the local traffic flow of motorized and non-motorized vehicles, thereby influencing pollutant emissions and precursors from traffic sources [18]. An effective public transportation system can reduce dependence on private vehicles, thereby alleviating traffic congestion and air pollution. Public transportation can play an important role in the travel chain, which shows that every journey starts from the user's origin (e.g., their home) and ends at the final destination [19]. However, there are still many obstacles in developing countries like Indonesia, including inadequate infrastructure, inconsistent services, and negative public perception. Cities have experienced a surge in demand and supply for bike/car sharing since it was introduced about ten years ago [20]. Therefore, an in-depth study of the determinants of public transportation success is crucial for formulating inclusive and sustainable transportation development policies and strategies.

The objective of the research above is to understand how public transportation systems can be designed and managed to reduce congestion, enhance comfort, and meet the mobility needs of the community in an inclusive and sustainable manner. The success of development is greatly influenced by the role of transportation as the lifeblood of political, economic, socio-cultural, and defense and security life. Public transportation is an important element in urban traffic [21]. The transportation system is an inseparable part of daily life [22]. Barriers related to the use of public transportation include social and cultural norms, a higher dependence on private vehicles, and low fuel prices [23]. In addition, transportation facilities affect regional productivity by connecting various areas with each other and enabling the exchange of goods and services among them [24]. Micromobility has the potential to help solve many transportation-related problems faced by cities around the world today and could drive a significant shift in transportation modes away from private motor vehicles [25]. Satisfaction with public transportation is closely correlated with the level of service [26]. Thus, it is expected that relevant and applicable recommendations for improving public transportation services can be formulated.

2. Research Method

2.1. The method used in the research

This research uses the Systematic Literature Review (SLR) method, which is a scientific approach used to gather, analyze, and conclude results from various previous studies in an organized and comprehensive manner. This is due to the fact that researchers must present search strategies and criteria for including or excluding any studies in the review [27]. Due to the rapid growth of publications in this scientific database, timely reviews and systematic reviews of the current state in specific research domains have become more challenging [28]. In this study, SLR is utilized to understand user behavior in determining public transportation modes. Urban planning in relation to available and emerging mobility options is another factor that has driven research interest in mobility [29]. Although there is a consensus on the perception of SLR as a set of procedures, academics often include it in their literature review studies with a transparent explanation of the type and methodology of their literature review [30]. Responding The usefulness of Pop and VOSviewer, researchers have conducted various training sessions for students, teachers, and lecturers to support their skills in composing publication articles [31]. This helps gather all publications and related documents that meet the predetermined inclusion criteria to answer specific research questions [32]. The advancement and development of technology in all areas of life occur so rapidly and are inevitable [33]. This method is considered effective because it can provide broad insights into the factors influencing user decisions, such as convenience, cost, time efficiency, ease of access, and perceptions of safety. By reviewing various credible sources, SLR provides an in-depth understanding of the different perspectives of

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previously conducted research. This is supported by the accreditation assessment of the writing style evaluation section, where the use of citation applications received the highest score [34]

The implementation of the SLR method begins with formulating specific research questions and establishing inclusion and exclusion criteria to filter relevant articles. Although these frameworks suggest different approaches to writing an SLR, they share the same goal: to facilitate the integration and synthesis of research within a domain [35]. The literature was then collected from various scientific databases such as Scopus, ScienceDirect, Google Scholar, and SpringerLink using keywords relevant to the topic. Publish or Perish is a phrase that is already familiar to all surgeons, from interns to leading professors at various educational institutions [36]. This process ensures that only relevant and high-quality articles are selected for further analysis. After the articles are collected, selection and analysis are conducted based on quality and relevance to the research focus. The success of development is greatly influenced by the role of transportation as the lifeblood of politics, economy, socio-culture, and defense security [37]. After the data is obtained, it is processed using the VOSViewer software [38].

2.2. Research Database

This research utilizes Google Scholar as the primary source in the search for relevant literature, particularly within the period from 2000 to 2025. The research team conducting the review must be able to perform online searches using a set of search systems aligned with the objectives, which will enable the researchers to search for and identify all relevant available research in a procedurally unbiased manner [39]. Google Scholar was chosen because it has a wide range of publications, including journal articles, conference proceedings, scientific books, theses, and academic documents from various disciplines. Focusing on scientific documents, Google Scholar subsequently examines the content of these documents to extract the number of individual researcher citations, which are numerous [40]. he search results are ranked based on relevance, which is a value automatically calculated by the search engine [41]. It should be noted that Google Scholar should be used with caution because it sometimes only provides accurate or comprehensive results [42]. The data generated is linked to the research topic using Publish or Perish to assist us in data collection [43]. his bibliometric analysis can also gather data conducted through indexed publication searches using the Publish or Perish application [44]. Compared to other databases like Scopus or Web of Science, Google Scholar offers advantages in terms of accessibility and source diversity, making it more flexible for interdisciplinary studies.

Support data collection, the Publish or Perish (PoP) software is used to conduct targeted searches on Google Scholar and gather metadata such as author names, citation counts, journal titles, and abstracts. The process of selecting research factors is determined based on the results of literature related to journals that discuss factors of transportation services, then several factors are selected that are used as considerations for the influence on increasing public interest in public transportation [45]. By utilizing VOSviewer and Publish or Perish 8, this research aims to make a significant contribution to a comprehensive understanding of collaboration dynamics, citation distribution, and publication impact in the relevant literature [46]. Scientific publications are usually considered an important metric for academic performance [47]. The quantity of research performance is measured by counting the number of publications in peer-reviewed scientific journals, which are often listed in journal directories [48]. The collected data is then exported in RIS format and further analyzed using VOSviewer software. The information generated will ultimately be elaborated on in several more specific aspects [49]. Additionally, we will discuss the publications and authors that are most frequently cited during the research period [50].

2.3. Data Analysis

The data used in this study were collected using the Publish or Perish (PoP) software, which retrieves metadata from the Google Scholar database by entering the keywords "artificial intelligence," "transportation," "public transportation," "urban transportation," and "mobility." The authors used Publish or Perish to search for data, and then they used VOSviewer
[51]. The increasing importance of software in the scientific process drives the perception of software for scientific purposes as a distinct research product [52]. The growth of papers produced using software such as CiteSpace and VOSviewer cannot be minimized [53]. The metadata is exported in the Research Information System (RIS) format, which includes various important information such as the author's name, article title, number of citations, publication year, keywords, abstract, and journal source. The distribution of bibliometric map data includes keyword associations, the total number of studies published per year, keyword density, research by publisher and type, and the origin of research by continent [54]. This RIS format allows the bibliometric analysis process to be

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conducted efficiently and systematically, and facilitates integration with visualization software such as VOSviewer. All information is exported to Research Format Information Systems (RIS) for analysis purposes using VOSviewer software [55]. In this case, the research will use bibliometric evaluation to map the literature review and the desired facts [56].

In conducting data analysis using VOSViewer, we need to prepare several applications [57]. Then the analysis continued with literature mapping using VOSviewer, which produced visualizations in the form of networks of relationships between articles based on co-occurring keywords, co-citation, and co-authorship. This program can map the relationships between keywords, authors, and citations [58]. VOSviewer has zoom, pan, and search functions that make it easier to [59]. The papers were selected based on their transparency and synthesis, allowing for a comprehensive assessment of the research findings [60]. User demand grows along with technological advancements [61]. The selection of relevant journals and appropriate keywords is crucial to obtain a more focused picture of the topic, such as the effectiveness of transportation design or user preferences for certain modes. With the large number of transportation that crosses this area, an integrated system between transportation modes is needed [62] Therefore, the government has set a target to make public transportation a basic necessity for the community [63].

3. Results and Discussion

3.1. Development of Transportation Mode Publications

The Development of Transportation Mode Publications shows a trend in the number of scientific publications obtained through the Publish or Perish software from 2000 to 2025. The graph indicates a significant increase in publications on transportation modes from 2010 to 2020, reaching its peak. This indicates that researchers are increasingly interested in public transportation issues and user behavior because many regions require efficient and sustainable transportation systems.

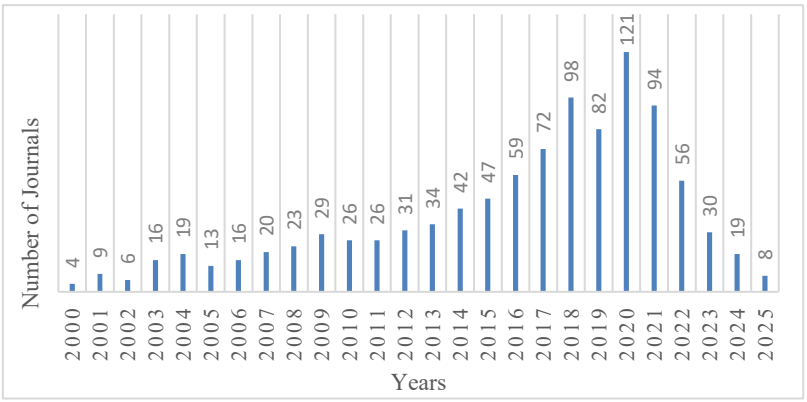

Figure 1. Graph of Publication Development by Year

The graph presents the annual number of journal publications from 2000 to 2025. It can be seen that publications began to experience a significant increase since 2010, with the highest number recorded in 2020 at 121 journals. This condition indicates that research topics in the field of transportation have become increasingly relevant and have received greater attention over the past ten years.

After the year 2020, the number of publications tended to decline, with 94 journals in 2021, 56 journals in 2022, and only 8 journals in 2025. This decline is most likely due to incomplete data for the most recent years. Overall, the graph reflects a significant growth in interest in transportation research and related technologies, with the highest publication activity occurring in 2020.

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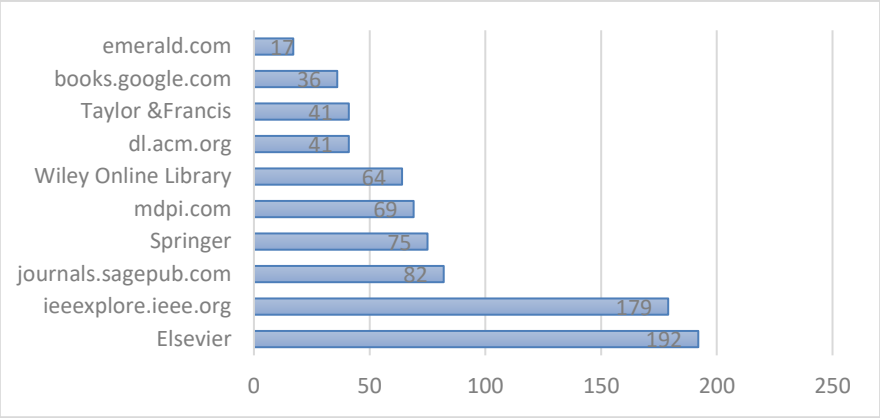

Figure 2. Number of Research Studies by Publisher

The graph shows that Elsevier is the most dominantly used source, with a total of 192 article references. This indicates that Elsevier serves as the main database providing a wealth of high-quality and relevant literature in the field of research being studied. Followed by ieeexplore.ieee.org with 179 articles. This indicates the importance of IEEE in providing highly relevant technology and engineering articles, especially in the fields of engineering and information systems. journals.sagepub.com and Springer each contributed 82 and 75 articles, respectively, indicating that these two publishers also play an important role in supporting scientific literature, particularly in the fields of social sciences, engineering, and applied sciences. Platforms such as mdpi.com (69), Wiley Online Library (64), as well as Taylor & Francis and dl.acm.org (each 41) also make quite significant contributions. This indicates that the literature review is conducted extensively and covers various reliable sources. Meanwhile, books.google.com and emerald.com have fewer references, namely 36 and 17 respectively. This could be due to the limited topics that align with the research focus or the lack of access to complete content.

A total of 1000 relevant scientific publications were found during the search for research publications on transportation modes from 2000 to 2025. Of this number, five publications were identified as the most widely used by other researchers. These publications demonstrate works that have a significant impact in the field of transportation, both in terms of theory, methodology, and application. The following table shows the list and details of the five publications with the highest number of citations.

Table 1. Publication with the Most Citations

Author	Title	Number of Citations
J Gubbi, R Buyya, S Marusic, M Palaniswami (2017)	Internet of Things (IoT): A vision, architectural elements, and future directions	17390
M Sheller, J Urry (2018)	The new mobilities paradigm	9271
IH Sarker (2021)	Machine learning: Algorithms, real-world applications and research directions	5601
R Siegwart, IR Nourbakhsh, D Scaramuzza (2019)	Introduction to autonomous mobile robots	5533
V Albino, U Berardi, RM Dangelico (2016)	Smart cities: Definitions, dimensions, performance, and initiatives	5521

The publication by J. Gubbi et al. (2017) titled "Internet of Things (IoT): A vision, architectural elements, and future directions" ranks first with 17,390 citations. The high citation count indicates that the Internet of Things (IoT) has become a key component in intelligent transportation systems (ITS). IoT is used in traffic data collection,

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vehicle management, and real-time integration of transportation modes. In second place, the publication by M. Sheller and J. Urry (2018) titled "The new mobilities paradigm" received 9,271 citations. This work is important because it introduces a new approach in the study of mobility that highlights the social, cultural, and technological aspects of the movement of people and goods, as well as its relevance to contemporary transportation governance.

Next, IH Sarker (2021) through his publication "Machine learning: Algorithms, real-world applications and research directions" achieved 5,601 citations. This article serves as a foundation for the utilization of machine learning algorithms for transportation optimization, such as traffic prediction, smart route mapping, and autonomous vehicle systems. R. Siegwart et al. (2019) through their work "Introduction to autonomous mobile robots" with 5,533 citations, emphasize the importance of robotics and autonomous vehicle systems in the future of transportation, especially for unmanned public transport and automated logistics. Finally, V. Albino et al. (2016) in "Smart cities: Definitions, dimensions, performance, and initiatives" received 5,521 citations. This article positions the concept of smart cities as an integrative framework, where transportation systems are an inseparable part of information technology-based urban management.

3.2. Publication Topics by Keyword

Comparison between the number of occurrences and the relevance level of several main keywords found in the scientific literature, the analysis results were conducted using the VOSviewer software.

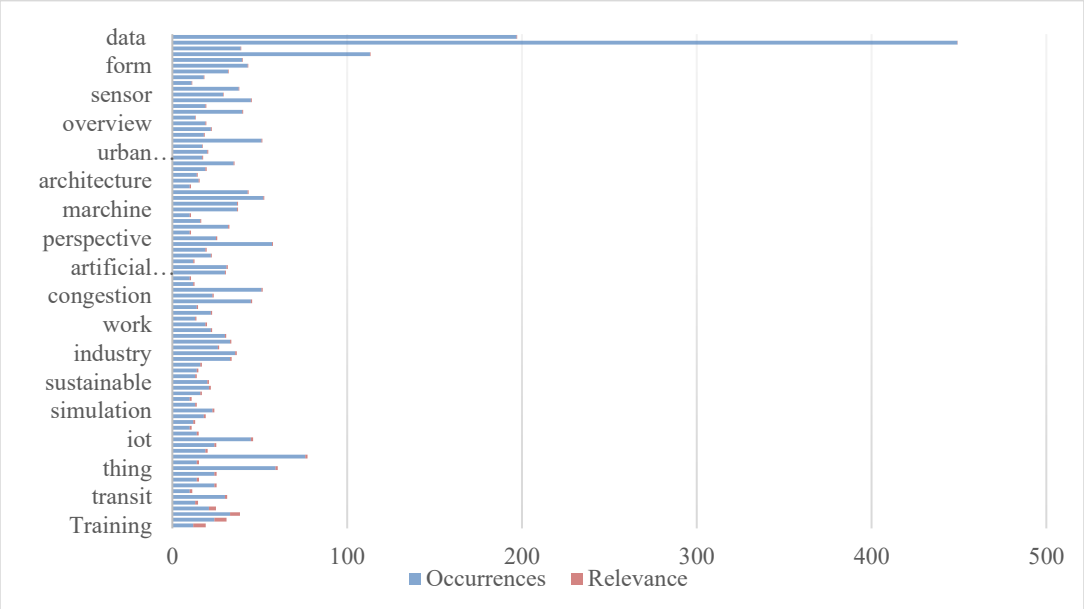

Figure 3. Keyword Occurrence Graph

Based on the graph, the keyword "data" has the highest occurrence, indicating that a data-driven approach has become the main foundation in transportation research. Other keywords relevant to the study's focus, such as "artificial intelligence," "transportation," "public transportation," "urban transportation," and "mobility," also appear with considerable frequency. The emergence of the term "artificial intelligence" indicates an increased utilization of smart technology in transportation systems, particularly for user behavior analysis, travel pattern prediction, and the development of intelligent transportation systems. Meanwhile, the keywords "transportation" and "public transportation" indicate the primary focus of research on public transportation systems and their infrastructure. The keywords "urban transportation" and "mobility" reflect researchers' attention to the dynamics of movement in urban areas and the importance of managing community mobility in creating efficient and sustainable transportation systems. Overall, this graph reflects that the combination of technological approaches and a focus on public transportation has become an important pillar in the development and study of modern transportation literature.

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3.3. Network Visualization

Visualization of the correlation analysis results between keywords obtained from 1000 scientific publications using the Publish or Perish software and visualized through VOSviewer. This analysis uses main keywords such as Artificial Intelligence, Transportation, Public Transportation, urban transportation, mobility. VOSviewer then maps the relationships between keywords that frequently appear together in the literature and displays them in the form of a visual network as shown in the following image.

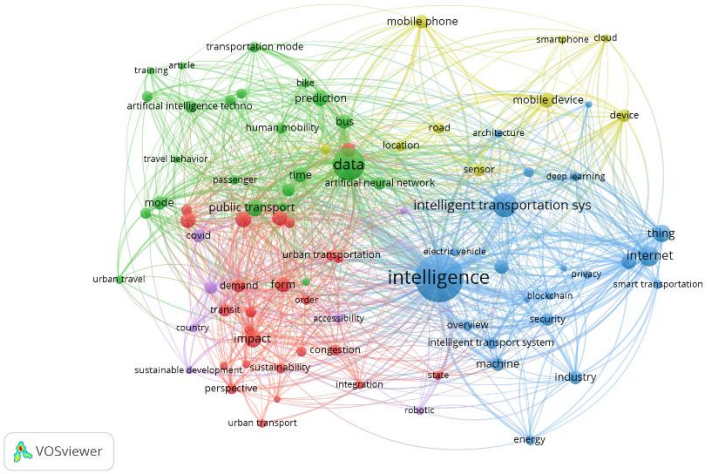

Figure 4. Network Visualization

The image from the VOSviewer Network Visualization shows a map of keyword relationships in smart transportation research. There are several colored clusters that illustrate the focus of the research themes. The blue cluster centers on technologies such as AI, IoT, and smart transportation systems. The red cluster highlights social issues such as public transportation, sustainability, and their impact on society. The green cluster relates to data usage and mobility behavior prediction, while the yellow cluster focuses on mobile technology and sensors. Keywords such as intelligence, data, and public transport are central because they often appear together. This map shows that smart transportation research is multidisciplinary and rapidly evolving.

3.4. Overlay Visualization

The Overlay Visualization display created by the VOSviewer software shows the temporal development of keyword emergence in scientific publications. In the visualization, the blue color indicates keywords that appeared earlier, and the yellow color indicates newer keywords that have developed in recent years.

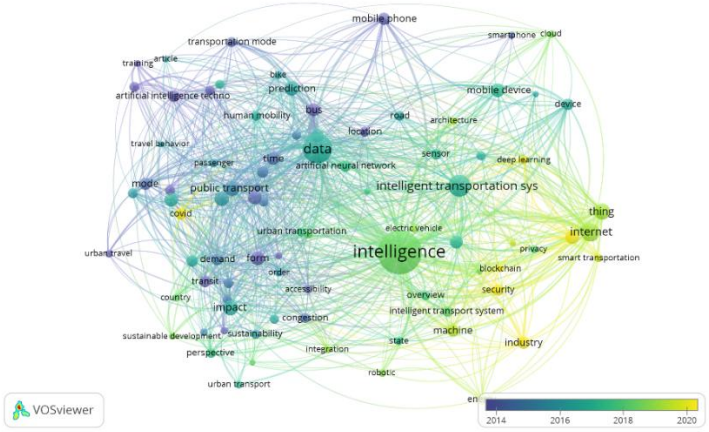

Figure 5 Overlay Visualization

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The Overlay Visualization image from VOSviewer shows the development of smart transportation research topics over time. The blue color represents the dominant keywords in the early years (2014–2016), such as public transport, impact, and sustainability. Meanwhile, the yellow keywords like internet, blockchain, and smart transportation show newer and rapidly developing topics in recent years. This visualization illustrates the shift in research focus from traditional issues towards the utilization of digital technology in transportation systems.

3.5. Density Visualization

The results of the Density Visualization using the VOSviewer software, which shows the density of keywords based on their frequency of occurrence in the scientific literature. The yellow color indicates keywords with the highest occurrence rate, while the green to blue colors signify lower frequencies. This visualization provides an overview of the main focus of research in the field of transportation and related technologies.

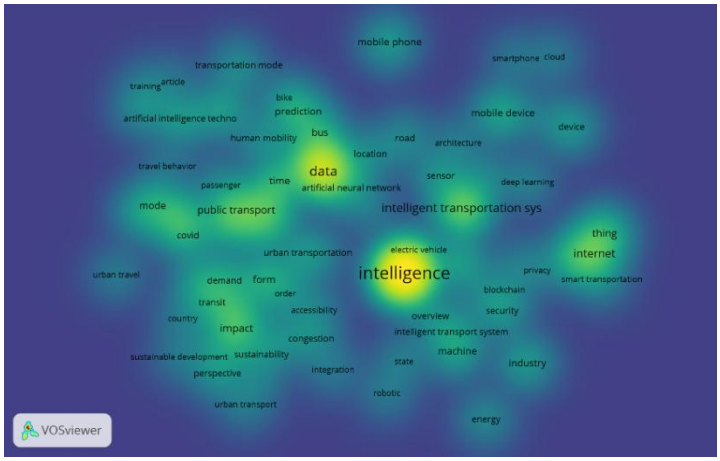

Figure 6. Density Visualization

This image shows a keyword density map in smart transportation research. Keywords such as "intelligence" and "data" are bright yellow, indicating high frequency and a central role in the research. While words like blockchain, robotic, and cloud appear in the blue area, indicating lower frequency. This visualization depicts the main topics that are most frequently discussed as well as opportunities for developing other themes.

4. Conclusion

Analysis of 1000 scientific publications shows that transportation mode research has increased since 2010 and will peak in 2020. Smart technology, public transportation, and urban mobility have become the main focus. Most of the reliable reference sources are publications such as Elsevier and IEEE. The five most-read publications highlight the importance of the Internet of Things, artificial intelligence, autonomous vehicles, and smart cities in building modern transportation systems. Keywords such as data, artificial intelligence, and public transportation frequently appear, reflecting research trends on how technology is integrated into transportation. Additionally, the visualization shows that these topics are highly interconnected, indicating that this research is multidisciplinary and continuously evolving.

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