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Exploring Trends in Transportation Management: A Review of Scientific Papers on Dimension AI Database from 2020-2024

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Abstract

This qualitative study explores contemporary trends and advancements in sustainable transportation management practices, focusing on articles published between 2020 and 2024 and sourced from sustainability journals. A comprehensive search strategy using the Dimension AI database with the keywords "Transportation" and "Management". Articles were first screened by their title, abstract, and keywords, from which 63 manuscripts were chosen for thematic analysis. The key findings were the importance of sustainable traffic management systems, including congestion measures, infrastructure resilience, and environmental impact assessment. Another strand that emerged was data-driven approaches for smart city traffic management, which included novel techniques for effective decision-making. The study has especially highlighted the requirements of strategies that would set up the innovation in modeling techniques and resilience frameworks for transportation management. This study offers significant insight into modern trends in sustainable transportation management, which should be of immense value to policymakers, urban planners, and transportation professionals in seeking ways to overcome the problems associated with modern urban mobility while ensuring environmental sustainability.
Keywords: management, review, transportation, trend

Introduction

Transportation Management encompasses the strategic planning, execution, and optimization of the movement of goods and people. It begins with planning and scheduling, which involves determining the most efficient routes and schedules while selecting appropriate transportation modes to balance cost and demand (Okdinawati, Simatupang, & Sunitiyoso, 2015). Execution involves the operational aspects of transporting goods or passengers, including logistics management and regulatory compliance. Optimization is a continuous process where performance data is analyzed to enhance efficiency, reduce transit times, and lower costs using technologies like GPS and route optimization software (Amin & Shahwan, 2020). Monitoring and control ensure real-time tracking and management of transportation activities to adhere to plans and address any issues that arise (Verma, Singh, & Zahidi, 2024). Effective cost management focuses on reducing expenses through carrier negotiations and operational improvements. Transportation management is crucial for several reasons, significantly impacting both operational and economic aspects (Musau, Namusonge, Makokha, & Ngeno, 2017). It enhances operational efficiency by optimizing the movement of goods and people, ensuring that resources are utilized effectively, which in turn reduces overall operational costs. By strategically managing logistics, routes, and transportation modes, it also helps in minimizing expenses related to fuel, labor, and vehicle maintenance. Effective transportation management is essential for customer satisfaction, as it ensures timely and reliable deliveries, fostering customer loyalty (Umair, Zhang, Han, & Haq, 2019).

Research in Transportation Management encompasses various critical areas, each addressing distinct aspects of logistics, efficiency, sustainability, and technology (Sumbal, Ahmed, Shahzeb, & Chan, 2023). Route optimization is a major focus, where studies develop algorithms and models to find the most efficient paths, reducing travel time, fuel consumption, and costs through techniques like the Vehicle Routing Problem (VRP) and Geographic Information Systems (GIS). Sustainable transportation is another key area, exploring ways to minimize environmental impacts by reducing emissions and incorporating alternative fuels. Research also delves into the integration of advanced technologies, such as autonomous vehicles and IoT, to enhance operational efficiency and safety (Biswas & Wang, 2023). Additionally, studies on transportation policy and regulation aim to improve compliance and streamline processes, while resilience and risk management research seeks to bolster transportation networks against disruptions (Wana, Yang, Zhanga, Yana, & Fana, 2017). Collectively, these research efforts contribute to more efficient, sustainable, and resilient transportation systems.

In the extensive research landscape of Transportation Management, a systematic approach is crucial to comprehensively analyze and synthesize existing knowledge. This can be effectively achieved through a bibliometric study, which quantitatively evaluates academic publications to uncover patterns, and trends. In this context, the following research question was developed to address the patterns and trends.

1. What are the publication trends observed in transportation management manuscripts from 2020 to 2024?
2. Who is the major author based on citations in transportation management manuscripts?
3. Which country is the major publisher of transportation management manuscripts?
4. What are the major organizations contributing to transportation management research?
5. What keywords are commonly used in the titles of transportation management manuscripts?
6. What are the main themes highlighted in transportation management manuscripts during the specified period?

Research Methodology

Data Collection: The data for this study were retrieved from the Dimension AI database on May 19, 2024. This database was selected due to its comprehensive coverage and advanced search capabilities, which are crucial for identifying relevant scientific manuscripts (Mahat, Karki, Neupane, Shrestha, & Shrestha, 2024).

Search Strategy: A targeted search strategy was employed to gather relevant literature. The search terms used were "Transportation" AND "Management." This combination was chosen to capture a wide range of manuscripts that address various aspects of transportation management.

Sample: The search yielded a total of 63 scientific manuscripts that met the inclusion criteria for this research. These manuscripts were selected for further consideration based on their relevance to the research topic and their contribution to the field of transportation management.

Data Analysis: The selected manuscripts were subjected to detailed analysis using VOSviewer and Excel. VOSviewer was utilized to perform bibliometric analysis, creating visualizations of the research landscape, while Excel was used for data organization and preliminary statistical analysis (Mahat & Kumar, 2024).

Ethical Considerations: To ensure academic integrity and protect intellectual property rights, proper citations and acknowledgments of sources were strictly observed throughout the research process. This adherence to ethical standards is essential in maintaining the credibility and validity of the research findings.

Findings

Publication trends in Transportation Management

The line graph illustrates the publication trends in Transportation Management from 2020 to 2024. Starting in 2020, there were 6 publications, indicating a relatively low level of research activity.
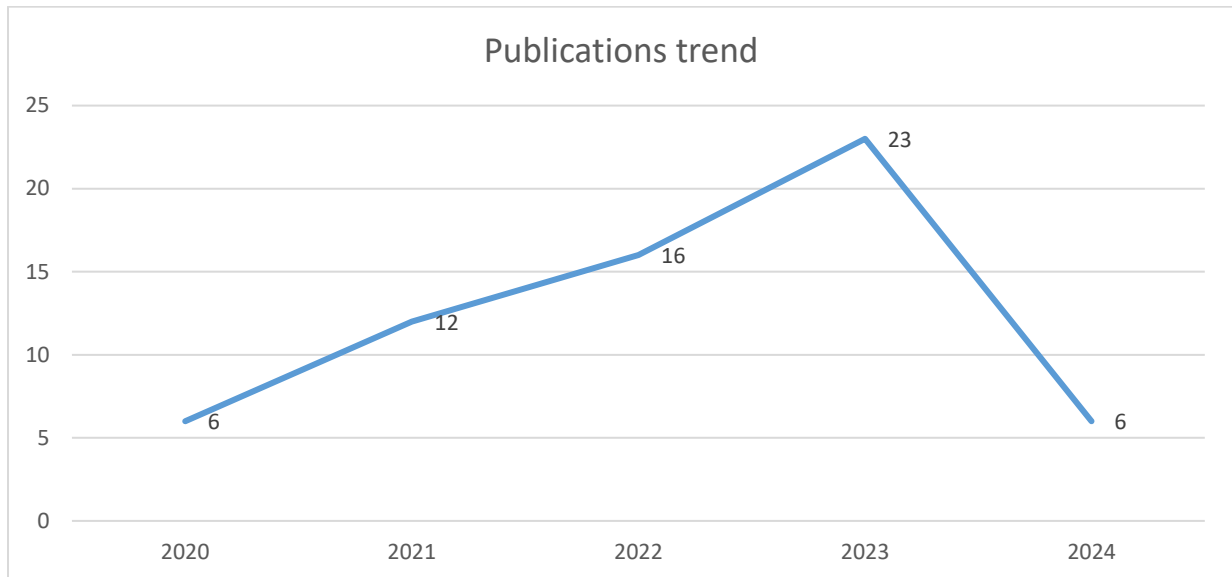
Figure 1: Publication trends

In 2021, the number of publications doubled to 12, showing a growing interest in the field. This upward trend continued into 2022, with 16 publications, suggesting sustained and possibly increasing research efforts. The peak occurred in 2023, with 23 publications, reflecting a significant surge in scholarly activity and interest. However, 2024 saw a sharp decline back to 6 publications, matching the 2020 level. Overall, the trend demonstrates an initial period of growth and heightened interest, followed by a notable decrease in publication activity.

Publication trends base on subject

The bar graph provides an overview of the number of publications in Transportation Management across various research categories from 2020 to 2024.
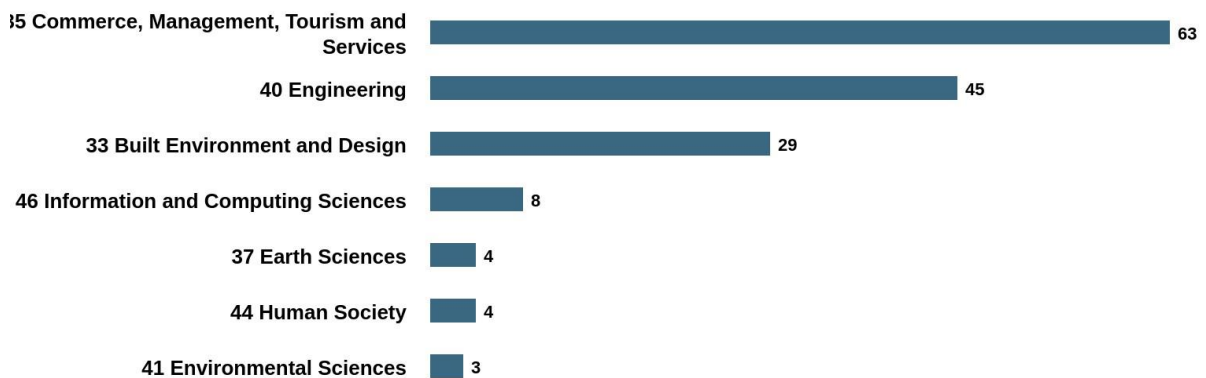
Source: https://app.dimensions.ai
Exported: May 19, 2024
Criteria: 'Road AND transportation AND management ' in title and abstract; Publication Year is 2024 or 2023 or 2022 or 2021 or 2020; Fields of Research (ANZSRC 2020) is 35 Commerce, Management, Tourism and Services; Publication Type is Article; Source Title is Sustainability.

Figure 2: Publication trends base on subject

The data reveals that the highest number of publications, 63, falls under the category of Commerce, Management, Tourism, and Services, indicating a significant focus on the economic and service-oriented aspects of transportation. Engineering follows with 45 publications, reflecting substantial research on the technical and infrastructural components. The Built Environment and Design category has 29 publications, highlighting research on planning, design, and construction aspects of transportation systems. In contrast, Information and Computing Sciences has only 8 publications, suggesting a more limited but notable focus on computational and IT aspects. Earth Sciences and Human Society each have 4 publications, pointing to some interest in the geological, environmental, and social factors of transportation management. Environmental Sciences has the fewest publications, with just 3, indicating minimal research focus on environmental impacts and sustainability.

Major author base on citation in Transportation Management

In the field of Transportation Management, the citation counts for various authors. Afrin (2020) emerges as the major author with the highest citation count of 219, indicating a significant impact and recognition in the field.

Table 1: Major authors base on citation

id	document	citations
3	justo-silva (2021)	44
8	afrin (2020)	219
10	tachaudomdach (2021)	25
19	zou (2021)	32
23	megnidio-tchoukouegno (2023)	15
24	surya (2020)	21
25	rathore (2021)	20
31	kaiser (2022)	32
43	abdullah (2023)	15
48	cruz (2021)	15

Source: Dimension AI

In the field of Transportation Management, the citation counts for various authors. Afrin (2020) emerges as the major author with the highest citation count of 219, indicating a significant impact and recognition in the field. Justo-Silva (2021) follows with 44 citations, showing substantial influence but less than Afrin. Zou (2021) and Kaiser (2022) each have 32 citations, reflecting notable contributions to the field. Tachaudomdach (2021) has 25 citations, while Surya (2020) has 21 citations, demonstrating moderate impact. The authors with the lowest citation counts are Megnidio-Tchoukouegno (2023), Abdullah (2023), and Cruz (2021), each with 15 citations. This distribution highlights Afrin's leading position in terms of citation impact, with other authors also contributing valuable research to the field of Transportation Management.

Major country publication of document and citation in transportation management

The analysis of publication and citation data in Transportation Management reveals the United States stands out as the leading contributor, with 6 documents and a total of 83 citations, indicating a high level of research output and impact.

Table 2: Major country publication of document and citation in transportation management

id	country	documents	citations
3	china	15	31
5	egypt	2	25
9	india	2	24
16	malaysia	2	22
20	portugal	2	59
23	saudi arabia	6	54
28	south korea	2	27
30	thailand	5	38
32	united kingdom	4	30
33	united states	6	83

Source: Dimension AI

Following closely is China, which has published 15 documents with 31 citations, reflecting a substantial amount of research but a relatively lower citation rate compared to the United States. Saudi Arabia, with 6 documents and 54 citations, and Portugal, with 2 documents and 59 citations, also show strong contributions to the field, though with different publication and citation patterns. The United Kingdom has 4 documents and 30 citations, while South Korea, Thailand, Egypt, and India each have 2 documents, with varying citation counts ranging from 22 to 27. Malaysia's 2 documents and 22 citations round out the list.

Major organization involve in transportation management research

The top affiliations in Transportation Management research exhibit a diverse range of contributions from various institutions.

Table 3: Major organization involve in transportation management research

id	organization	documents	citations
2	al jouf university	2	23
9	bridges to prosperity, denver, co 80205, usa	1	32
11	cairo university	1	20
14	chiang mai university	1	25
22	ramco institute of technology	1	20
27	university bosowa,	1	21
32	chiang mai university,	1	25
40	hamad bin khalifa university	1	20
49	kyungpook national university	1	20

92	universitas bosowa	1	21
96	university of coimbra	1	44
97	university of colorado boulder	1	32
101	university of new brunswick	1	20
106	university of tartu	1	20
116	virginia tech	2	44

Source: Dimension AI

Virginia Tech stands out with 2 documents and a total of 44 citations, indicating significant research impact in the field. The University of Coimbra follows with 1 document and 44 citations, reflecting a notable influence despite the smaller volume of published work. The University of Colorado Boulder and Bridges to Prosperity, Denver, each have 1 document and 32 citations, showcasing meaningful contributions from their respective perspectives. The University of Tartu and the University of New Brunswick, with 1 document and 20 citations each, contribute valuable insights but with less impact relative to the leading institutions. Other notable affiliations include Chiang Mai University (with 2 entries and 25 citations in total), Al Jouf University, and Kyungpook National University, each contributing to the field with 1 document and 20 to 25 citations.

Keyword use in transportation management research

Figure 3: Keywords

In Transportation Management research, keyword usage reveals key areas of focus and interest. The terms Transportation and Traffic are the most prevalent, each appearing 19 times, underscoring their central role in studies related to vehicle movement and system efficiency.

The keyword Road, with 15 occurrences, highlights the significance of road infrastructure in transportation research. Management appears 13 times, reflecting a strong emphasis on the strategic and administrative aspects of transportation systems. The term using (12 occurrences) suggests a focus on the practical application of methods and technologies. Analytical approaches are also prominent, with Analysis and Based both appearing 9 times, indicating a reliance on data-driven methodologies. Urban (8 occurrences) points to the importance of studying transportation within urban environments, while Data and Flow, each with 7 occurrences, emphasize the role of data collection and traffic flow analysis in optimizing transportation systems.

Major Key themes based on the top ten cited authors in Transportation Management

Pavement Management
Effective pavement management requires the use of sophisticated Pavement Performance Prediction Models (PPPMs). These models, which can be either deterministic or probabilistic, help predict pavement deterioration and schedule maintenance activities within limited budgets.

Traffic Congestion and Management
Understanding and measuring traffic congestion accurately is essential for developing sustainable and resilient traffic management systems. Analyzing the variations and trends in congestion measures can provide insights for improving traffic flow and reducing congestion.

Infrastructure Resilience
The robustness of transportation infrastructure, particularly in response to natural disasters like floods, is critical. A detailed analytical framework helps quantify resilience and plan for recovery, ensuring that transportation systems can withstand and quickly recover from disruptions.

Impact of Various Factors on Traffic Accidents
Both climate-related variables (e.g., temperature, precipitation) and non-climate factors (e.g., beer consumption, vehicle performance) significantly influence traffic accident rates. Identifying these factors is crucial for developing strategies to enhance road safety.

Environmental Quality and Pollution
Transportation activities, population mobility, and land use changes have a profound impact on environmental quality, particularly air pollution. Effective transportation planning must address these impacts to mitigate environmental degradation.

Technological Integration for Smart Transportation
The use of advanced technologies such as cyber-physical systems, sensor networks, and big data analytics is vital for creating smart transportation systems. These technologies enable real-time data processing and decision-making, optimizing traffic flow and improving overall transportation efficiency.

Rural Transportation Infrastructure

Enhancing rural transportation infrastructure is beneficial for rural communities, but it requires a holistic approach that integrates transportation with other sectors. This ensures that improvements in rural transport contribute to broader rural development goals.

Pandemic Response and Transportation

The COVID-19 pandemic highlighted the need for flexible and adaptive transportation management strategies. The varying impacts on different types of vehicles and locations underscore the importance of prioritizing safety while maintaining service continuity during crises.

Conclusion

These results underline the need for sustainable traffic management systems, resilience frameworks, and environmental impact assessment. Further, data-driven strategies for traffic control in smart cities were presented, providing innovative ways of decision-making. These results, therefore, call for increased efforts in terms of modeling techniques and resilience frameworks that can be used in transportation. Planning, maintenance, and adaptation of data-driven technologies are critical strategies toward the efficient and sustainable management of transportation systems. These results further have huge implications for policymakers, urban planners, and transportation engineers while guiding efforts in navigating the complexity of modern urban mobility, keeping the environment sustainable.

References

Amin, H. M., & Shahwan, T. M. (2020). Logistics management requirements and logistics performance efficiency: the role of logistics management practices – evidence from Egypt. *International Journal of Logistics Systems and Management, 35*(1), 1-27. doi:10.1504/IJLSM.2020.103859

Biswas, A., & Wang, H.-C. (2023). Autonomous Vehicles Enabled by the Integration of IoT, Edge Intelligence, 5G, and Blockchain. *Sensors, 23*(4), 1963. Retrieved from https://doi.org/10.3390/s23041963

Mahat, D., & Kumar, A. P. (2024). Mapping the Landscape of Artificial Intelligence Applications in Human Resources Management: A Bibliometric Analysis. *International Journal of Management, Accounting & Economics, 11*(7), 951-973. Retrieved from https://doi.org/10.5281/zenodo.12754185

Mahat, D., Karki, T. B., Neupane, D., Shrestha, D. K., & Shrestha, S. (2024). Decolonization in Focus: A Bibliometric Analysis of Scientific Articles from 2010 to 2023. *Nepal Journal of Multidisciplinary Research, 7*(1), 1-21. Retrieved from https://doi.org/10.3126/njmr.v7i1.65142

Musau, E. G., Namusonge, G., Makokha, E. N., & Ngeno, J. (2017). The Effect of Transport Management on Organizational Performance Among Textile Manufacturing Firms in

Kenya. *International Journal of Academic Research in Business and Social Sciences*, 1015-1031. Retrieved from http://dx.doi.org/10.6007/IJARBSS/v7-i11/3542

Okdinawati, L., Simatupang, T. M., & Sunitiyoso, Y. (2015). Modelling Collaborative Transportation Management:Current State And Opportunities For Future Research. *Journal of Operations and Supply Chain Management*, 96-119. Retrieved from http://dx.doi/10.12660/joscmv8n2p96-119

Sumbal, M. S., Ahmed, W., Shahzeb, H., & Chan, F. (2023). Sustainable Technology Strategies for Transportation and LogisticsChallenges: An Implementation Feasibility Study. *Sustainability, 15*(21). Retrieved from https://doi.org/10.3390/su152115224

Umair, A. S., Zhang, W., Han, Z., & Haq, S. H. (2019). Impact of Logistics Management on Customer Satisfaction: A Case of Retail Stores of Islamabad and Rawalpindi. *American Journal of Industrial and Business Management, 9*, 1723-1752. doi:10.4236/ajibm.2019.98113

Verma, R., Singh, B. K., & Zahidi, F. (2024). *Intelligent Transportation System and Advanced Technology.* doi:10.1007/978-981-97-0515-3_11

Wana, C., Yang, Z., Zhanga, D., Yana, X., & Fana, S. (2017). Resilience in transportation systems: a systematic review and future directions. *Transport Review*. Retrieved from https://doi.org/10.1080/01441647.2017.1383532