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ORIGINAL PAPER
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PROGRESS AND RECENT RESEARCH OF URBAN TRANSPORTATION IN HALF OF ASIAN REGION: A SYSTEMATIC LITERATURE REVIEW

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ABSTRACT

Motives: Urban transportation is one of the most critical topics in transport geography due to the urbanization and growth of cities worldwide. The Asia Region is fascinating to study due to its rapid urbanization and urban growth compared to other regions.
Aim: This paper evaluates the progress and trends of research topics on urban transportation in half of the Asian region, focused on the East and Southeast Asian Region.
Results: This paper is a systematic literature review organized by the PRISMA approach. Search keywords were determined using the PICO method. The documents reviewed in this study were obtained from the Scopus database, with the criteria: journal articles, research results, English, and specific to East and Southeast Asia. A total of 1892 documents were collected. Of these documents, 103 articles were selected through the extraction process and continued with the review. The results of this study show that urban transportation studies recorded in the Scopus database have existed from 1972 to 2024. Still, the productivity of the authors has only occurred in the last decade. The development of urban transportation studies in the study area over the five decades is divided into four stages. There are four categories of topics in this study: (1) transportation and mobility, (2) transportation and land use, (3) transportation and urban spatial structure, and (4) transportation and disaster. The first topic continues to evolve through the four stages and influences the development of other issues. Meanwhile, the third topic only appeared in the third stage. The fourth topic only appeared in the fourth stage. In summary, this study offers alternative information and new insights into the trends and development of urban transportation studies in half of the Asian Region.

Keywords: urban transportation, transportation geography, urban mobility, Asian Region

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INTRODUCTION

Urban transportation is one of the most crucial topics in studying transportation geography. Pojani and Stead (2015) explained that urban transportation is not a simple problem. When education or health services improve as people's welfare increases, transportation problems worsen. Transportation problems in urban areas cannot be separated from the growth of cities triggered by urbanization. Increasingly complicated urban transportation problems are a challenge to continue improving in the future, considering various aspects. As economic growth and transportation problems become more complex, it is essential to review the achievements of various transportation studies. This will provide a basis for reviewing and rethinking future transportation treatments.

Among the world's various regions, Asia deserves more attention in studying urban transportation for at least two reasons. First, Asia is the most populous region. With a population of 4.7 billion, half of the world's population in 2023 will live in Asia (Kaneda et al., 2024). Second, large cities with dense populations developed in the Asian region. In 1850, megacities with populations above 500,000 were mainly in Europe, with a few in Asia and the Americas. However, by 2020, many megacities, with over 8 million, emerged in East, South, and Southeast Asia (Rodrigue, 2024). The Asian Development Bank (2012), in its Cities and Urbanization in Asia article, has even predicted that 55% of the Asian population will live in urban areas by 2030. East Asia and Southeast Asia are important parts of Asia in terms of urban transportation. Both regions have experienced a lot of urban transportation development in the past decade and continue to do so sustainably (Maudina & Purnomo, 2023; Morichi, 2009; Pojani, 2020). Thus, these two regions are the best representations of the development of urban transportation as alternative information for the discussion of this topic around the world.

The conditions above present an excellent opportunity for urban transportation studies in the East and Southeast Asia region. The characteristics of urban transportation in this region need to be addressed in the study to provide new insights into the complexity of urban transportation in a region where the urban area is experiencing rapid growth. Therefore, the study of urban transportation is increasingly crucial. To develop and manage urban transportation in the densely populated and growing East and Southeast Asia Region, it is necessary to review the achievements of urban transportation studies conducted in the region. A literature review is crucial, as literature plays a vital role in studying urban transportation by helping to identify research gaps, develop policy recommendations, and improve urban mobility (Büyüközkan & Ilıcak, 2022; Costa et al., 2017).

The problem is that it is still unclear to what extent transportation authors have addressed the issue of urban transportation in East and Southeast Asia. The progress and development of the study of urban transportation in this area are still not widely covered in the literature. Studies of previous studies that map the achievements and attention to urban transportation in East and Southeast Asia are relatively lacking compared to other regions. Aslan et al. (2019) conducted a literature review criticizing urban transportation in 30 European cities. Meanwhile, Karjalainen & Juhola (2021) conducted a cross-regional study worldwide. The lack of literature studies to provide a literature review that maps the development of urban transportation studies in Asia, particularly in the East and Southeast, is a scientific gap that needs to be filled with further studies. Also, studies that compare the development of studies in Asia with other regions are required to see how far the development of studies in Asia is compared to the different areas worldwide. This comparative information is under-discussed in the literature, suggesting a knowledge gap.

This paper presents the results of a literature review of previous studies on urban transportation in the East and Southeast Asia Region. This study had two specific objectives. First, to identify the achievements and contributors of urban transportation research in East and Southeast Asia, including the number

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of documents, authors, countries of origin, institutions, and publishing journals. Second, it evaluates the trends of urban transportation research topics in this region and classifies them into stages of development. This paper offers new insights into the development and current research on urban transportation in East and Southeast Asia, published in highly reputable international publication databases.

MATERIALS AND METHODS

This paper employs the systematic literature review (SLR) method. The stages in using the SLR method in this study begin with creating a research question. This study uses the PICO method to formulate research problems: "In the East and Southeast Asian Region, what is the progress of the research of urban transportation, comparing various regions?". Referring to the PICO framework (Table 1), the research question includes population, intervention, comparison, and outcome, as explained by Hosseini et al. (2024).

The next step is to determine the electronic search step in the database. This step was determined based on the keywords identified from the problem formulation and the PICO framework created earlier. The keywords used in this study are urban transportation, urban mobility, Asian Region, East Asia, Southeast Asia, Japan, China, Korea, Taiwan, Singapore, and Indonesia. From these keywords, Boolean operations were determined for searching in the database, namely: "Urban Transportation" OR "Urban Mobility" AND "Asian Region" OR "East Asia" OR "Southeast Asia" OR "Japan" OR "China" OR "Korea" OR "Taiwan" OR "Singapore" OR "Indonesia".

Furthermore, the criteria for inclusion and exclusion were determined. The requirements include research articles, articles published in journals, and articles published in English. At this stage, it must be ensured that the articles discuss urban transportation topics, namely transportation and urban spatial structure, transportation and urban land use, and urban mobility. The article is not used or excluded if it does not meet these criteria. There are two stages of exclusion. First, articles that are completely irrelevant because the topic is not appropriate or because the study was conducted outside East and Southeast Asia. This kind of article is not immediately used in the first screening stage.

In the second stage, the selected articles were rechecked. Articles that had been chosen but could not be accessed were included in the exclude criteria at this stage. The data source for obtaining articles in this study was Scopus, which was used to obtain high-quality study results. The review procedure was conducted using the PRISMA method (Fig. 1). Data analysis in this study was performed using the VOSviewer tool. Overall, this study implements established methods in document acquisition and screening. However, this study uses a unique perspective in the analysis, where we use a spatial approach to discuss the problem. Much of the information submitted is spatially referenced in the context of both countries and regions.

Table 1. Framework PICO for formulating study problems

P	I	C	O
Population	Intervention	Comparison	Outcome
Research on urban transportation in the East and Southeast Asian region	Urban transportation research achievements from the East and Southeast Asian region	Various types of urban transportation are the subject of research in the East and Southeast Asian region	Summary of progress in urban transportation research in the East and Southeast Asian region
How is urban transportation in the East and Southeast Asian region? Which regions were selected as study sites?	What is the progress of urban transportation research in the East and Southeast Asian region?	How has research on various urban transportation been conducted over time?	How has the study of urban transportation in the East and Southeast Asian region been accomplished?

Source: own elaboration based on Hosseini et al. (2024).

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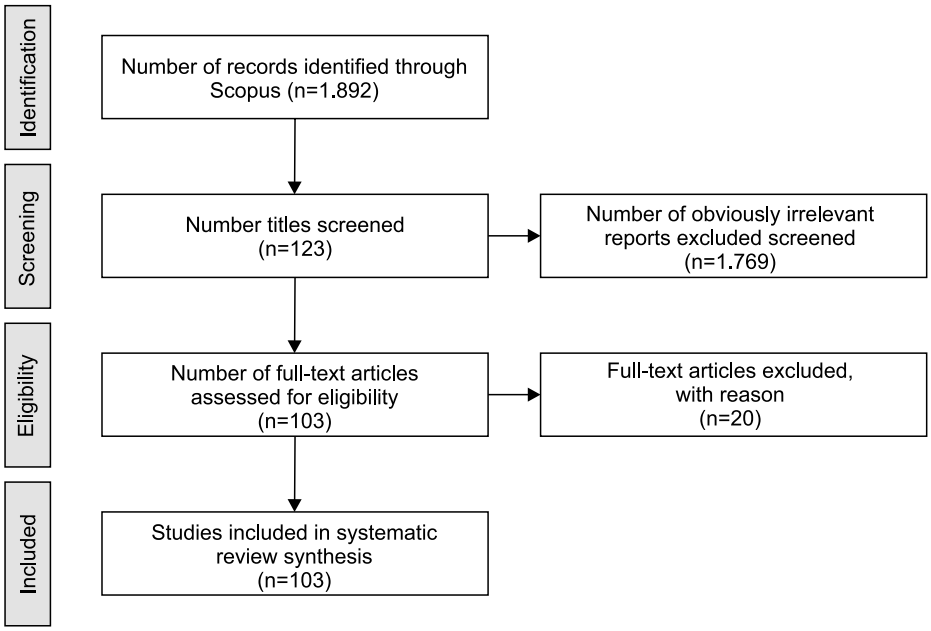

Fig. 1. PRISMA flowchart of systematic literature review procedure
Source: own elaboration based on (Pollock & Berge, 2018).

RESULTS

Achievements and Contributors of Urban Transportation in East and Southeast Region Research

This section describes the achievements and contributors of urban transportation in East and Southeast Asia research based on documents obtained from the Scopus database. Outcomes and contributors include information on the number of records per year produced, the names of contributing authors, the country of origin of the first author, the institution of origin of the first author, and the journal that was published. The total number of documents obtained from the search results in the Scopus database is 1,892. All of these documents were published between 1972 and 2024. Only 103 articles were studied in this study based on the screening results. The data collection process was carried out in May 2024, so the 2024 documents used are still limited to publications from several months in the first half of this year.

The analysis shows that the urban transportation study in East and Southeast Asia has been conducted for more than five decades between 1972 and 2024. However, it turns out that significant publication achievements in this field have only occurred in the last decade or so. This is indicated by the number of published articles that increased sharply from 2017 to 2024. Although it fluctuates and tends to be unstable from year to year, since 2017, the number of articles produced has been enormous, which indicates the high achievement during this decade compared to the previous era (Fig. 2).

The number of countries of origin of the first authors contributing to publications on Urban Transportation in East and Southeast Asia is 14. China contributes the highest number of publications, with 72 documents. Other countries in the top three contributors list are China, the Republic of Korea, and Singapore (Fig. 3). All countries in the top three contributors produced 83% of the documents. The country that contributed in the first two decades was Japan. During this period, very few publications were made. Meanwhile, in the last decade, more countries contributed, with China as the top contributor. China is also the country that has experienced the most significant growth

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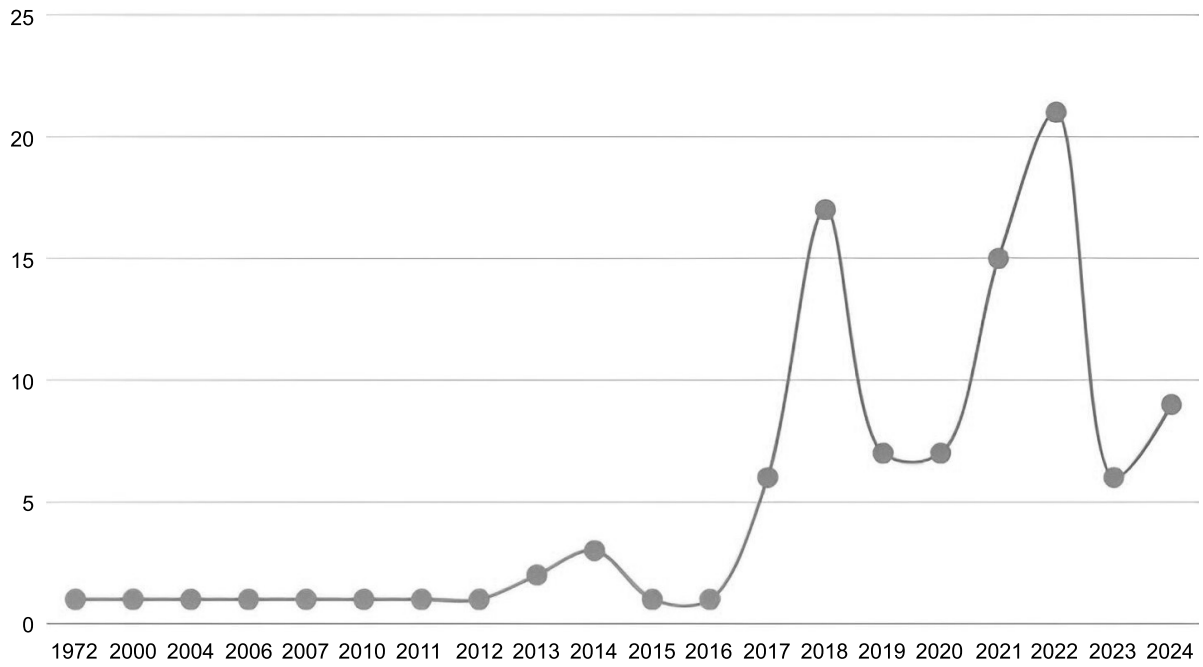

Fig. 2. The number of publications on urban transportation in the East and Southeast Asia (1972–2024)
Source: own elaboration based on analysis of the Scopus Database.

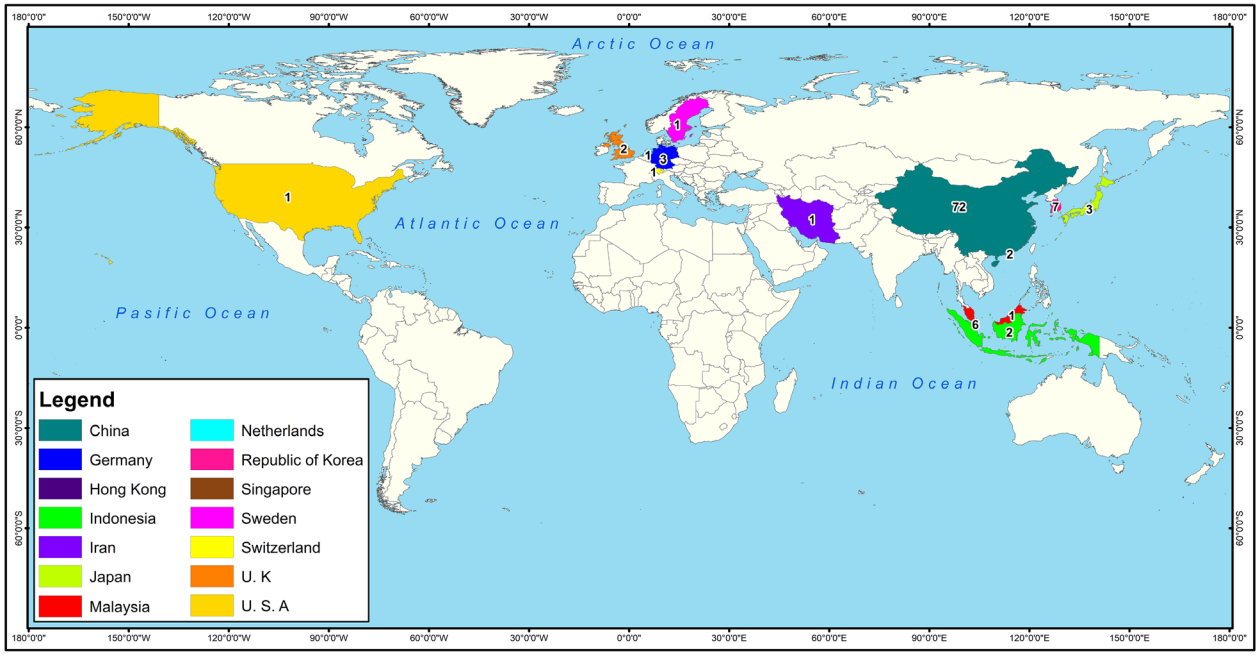

Fig. 3. Country contributors to urban transportation studies in the East and Southeast Asia (1972–2024)
Source: own elaboration based on analysis of the Scopus Database.

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in publications since 2016 (Fig. 4). In general, no country has a relatively stable number of contributions. The contributions of various countries have fluctuated over time.

There is a difference in contribution between East and Southeast Asia, with more studies coming from East Asia. East Asia contributes 84.47% of the studies. East Asia has dominated the study of urban transportation, as shown by studies conducted in China, the Republic of Korea, Japan, and Hong Kong. Southeast Asia contributes 8.74% of the total through studies in Singapore, Malaysia, and Indonesia. There were also 5.82% contributions from non-Asian Region primary authors from Germany, Sweden, Switzerland, the US, and the UK.

Regarding study locations, most studies were conducted in East Asia. East Asia was the study location of 87.62% of the documents, while Southeast Asia was 12.38%. East Asian studies were conducted in China, the Republic of Korea, Japan, Hong Kong, and Taiwan. Meanwhile, Southeast Asian studies were conducted in Singapore, Indonesia, and Malaysia. The country in East and Southeast Asia with the most research locations is China, which appears in 79 documents. Other countries in the top three research locations are China, with 79 papers; the Republic of Korea, with nine documents; and Singapore, with nine papers (Fig. 5A). Beijing is the city in East and Southeast Asia with the most research locations. The city appears in 15 studies. Other cities

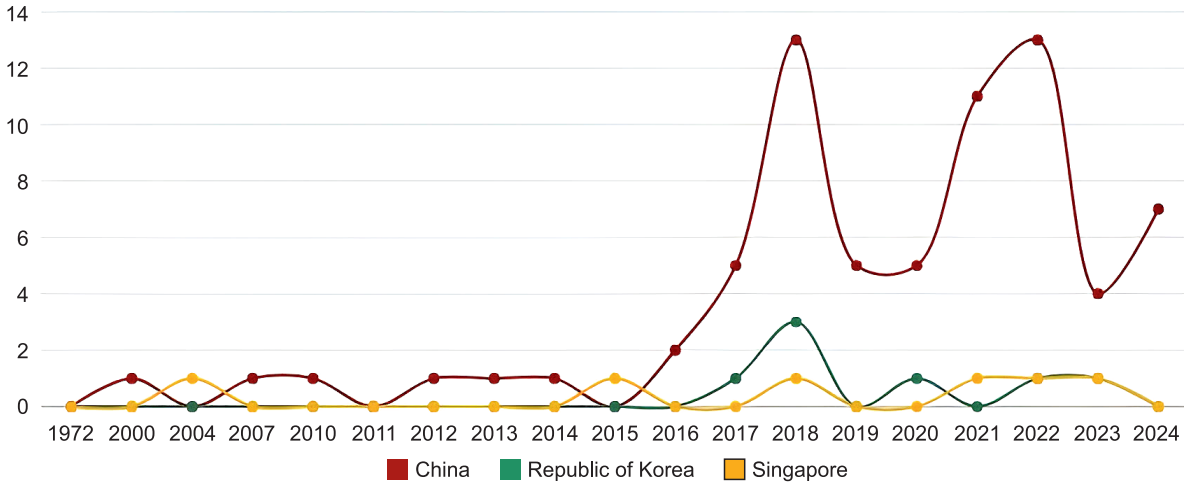

Fig. 4. Number of documents produced by the top three contributing countries
Source: own elaboration based on analysis of the Scopus Database.

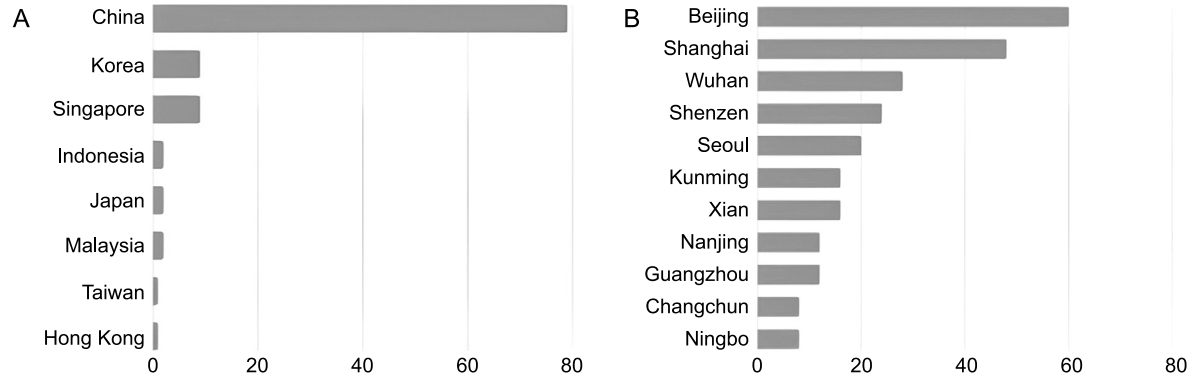

Fig. 5. The number of urban transportation studies in East and Southeast Asia, (A) by country and (B) by city
Source: own elaboration based on analysis of the Scopus Database.

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in the top five study locations are Beijing, China; Shanghai, China; Wuhan, China; Shenzen, China; and Seoul, Republic of Korea (Fig. 5B).

Many authors contributed to studying urban transportation in East and Southeast Asia. The total number of authors who contributed as main and non-main authors is 384. There are two top authors with more than three documents as both main author and non-main author, namely, Chen Hengrui from Chang'An University, China, and Beijing Normal University, China, with three papers contributed (Fig. 6A). Meanwhile, in the main author category, 100 first authors contributed. The top contributors as the first authors are Li Qiumeng from the University of Cambridge, Song Jie from the Institute of High Performance Computing, and Zhou Ruiyu from Chang'an University, with two documents each (Fig. 6B). This author distribution map shows that the

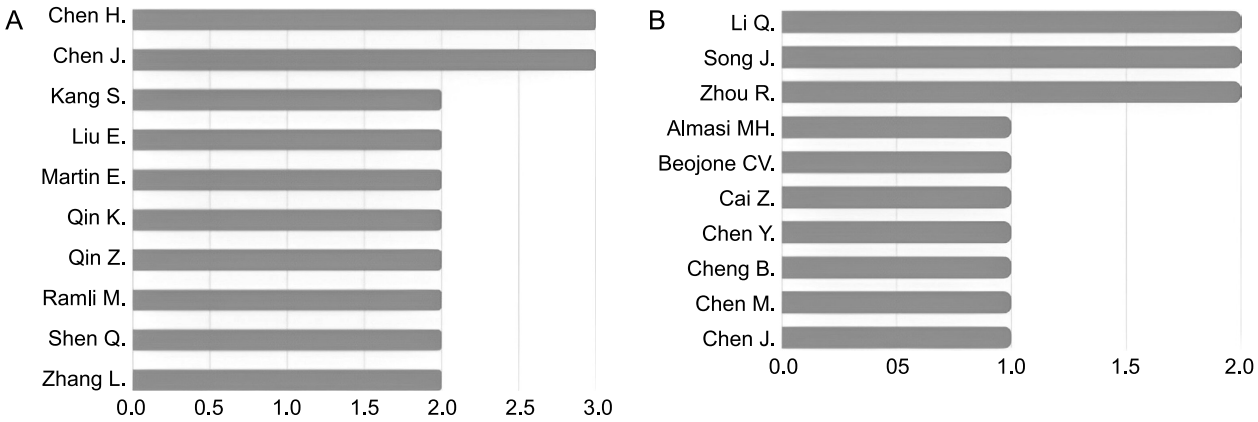

Fig. 6. List of top authors who contributed to studying urban transportation in East and Southeast Asia, (A) as first author or non-first author and (B) as the first author
Source: own elaboration based on analysis of the Scopus Database.

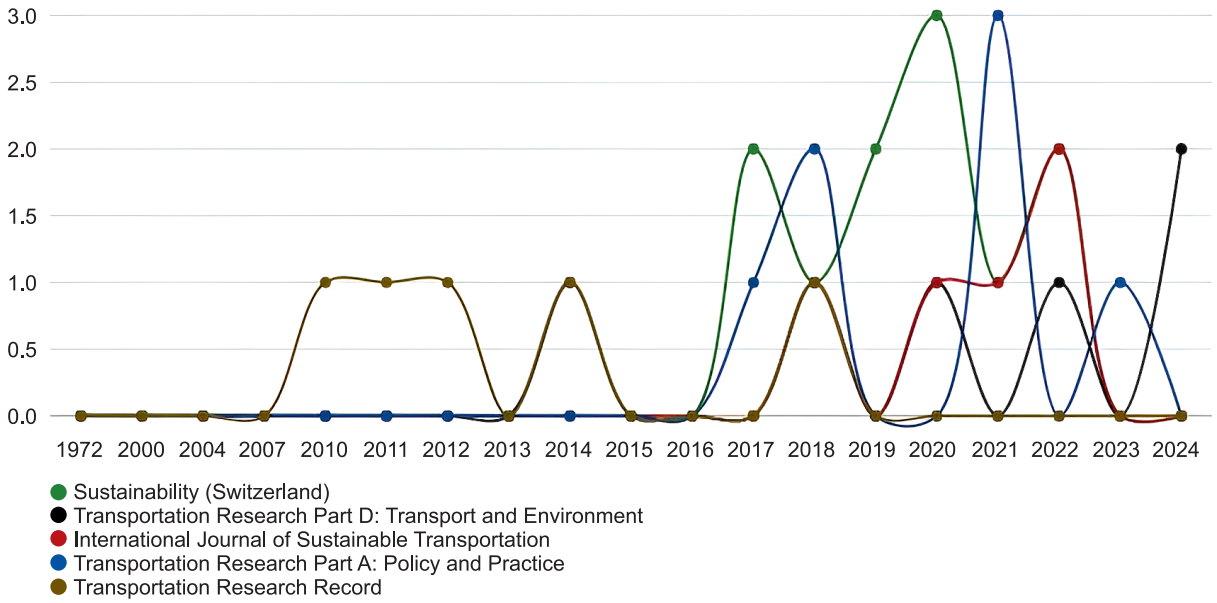

Fig. 7. Top five journals with the highest number of articles published
Source: own elaboration based on analysis of the Scopus Database.

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contributors to the Urban Transportation in East and Southeast Asia study are numerous and not dominated by specific authors.

Just as first authors are numerous, diverse, and not dominated by any particular author, first author affiliations are also very diverse. The documents used in this study are contributions from 74 institutions affiliated with the first author. Three institutions contribute the most, with four papers. The top five first author affiliations and contributions are Beijing Jiaotong University with five documents, Southeast University with four papers, Tongji University with four documents, Chang'an University with four documents, and the Chinese Academy of Science with three papers.

Articles on Urban Transportation in the East and Southeast Region used in this study were published in 58 journals. The top five journals with the highest number of articles include Sustainability (Switzerland), Transportation Research Part D: Transport and Environment, International Journal of Sustainable Transportation, Transportation Research Part A: Policy and Practice, and Transportation Research Record (Fig. 7). The contribution of each journal fluctuates over time. Two journals, Sustainability (Switzerland) and Transportation Research Part A: Policy and Practice, reached the highest contribution with three documents in 2020 and 2021, respectively.

Progress and Recent Research of Urban Transportation in East and Southeast Asia

This section presents findings on the progress and achievements of research on Urban Transportation in East and Southeast Asia. Over the past five decades, the topics studied in this field have been very complex. An analysis of the keywords used in various articles shows that urban transportation and urban transport are the two most mentioned terms used as keywords. Interestingly, China is also widely used as a keyword, indicating the large number of studies conducted in this country. Beijing is the city with the most mentions in the research. Shanghai, Seoul, and Singapore were also mentioned (Fig. 8).

Further analysis of the keywords used shows four clusters of keywords related to urban transportation studies in East and Southeast Asia (Fig. 9). The first cluster relates to the infrastructure of public

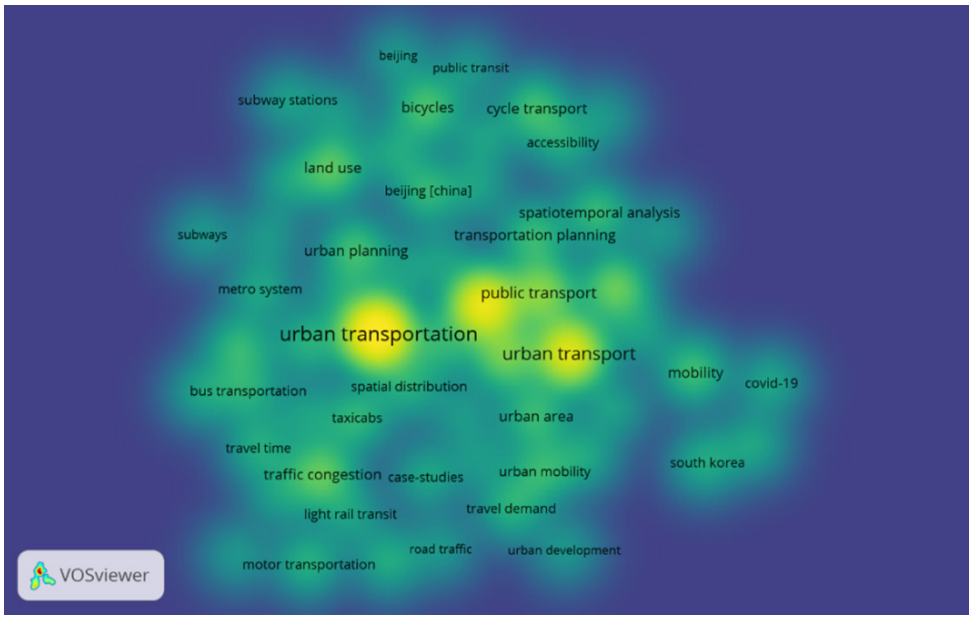

Fig. 8. Keyword Density in Urban Transportation Studies in East and Southeast Asia
Source: own elaboration prepared in VOSviewer.

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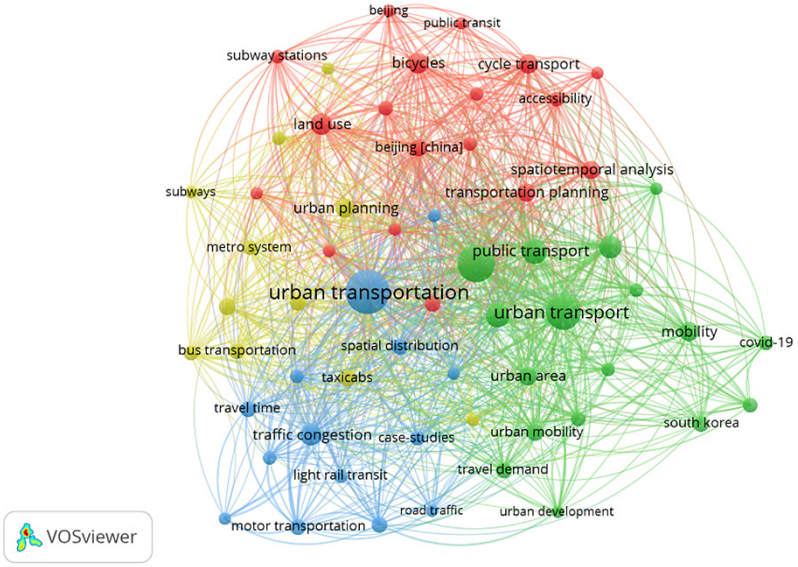

Fig. 9. The cluster of keywords in the studies of Urban Transportation in East and Southeast Asia
Source: own elaboration prepared in VOSviewer.

transportation. Some keywords include public transportation, public transit, land use, transportation development, and transportation planning. The second cluster deals with transportation policy and planning with keywords such as travel demand, urban development, transport policy, and decision-making. The third cluster studies road transportation using keywords such as traffic, roads and streets, traffic congestion, and travel time. The fourth cluster discusses public transportation modes with keywords such as taxi cabs, subway, metro system, bus transportation, and mass transportation. From this, it appears that the discussion of urban transportation in East and Southeast Asia for five decades falls within the scope of these clusters.

Since the number of publications has increased sharply in the last decade, the development of urban transportation studies can be seen in the various keywords used. In the first third of this decade, the keywords used included land use, subway, mass transportation, public transportation, transportation system, accessibility, and urban traffic congestion. Thus, it can be seen that during this period, the development of urban transportation studies was mainly related to analyzing the development and use of public transportation. In the second third, the keywords used include transportation planning, urban transport, transportation system, travel time, light rail transit, roads and streets. At this time, the trend of urban transportation studies in East and Southeast Asia is to analyze the planning and effectiveness of urban transportation. Finally, the keywords used in the last third are mobility, transportation policy, commuting, transport behavior, transportation development, travel pattern, and metro system. It seems that during this period, there was a lot of analysis of the effectiveness of urban transportation concerning decision-making and sustainability. See Fig. 10.

Over the past five decades, studies on urban transportation in East and Southeast Asia have shown topic trends and developments. This study identifies the development of the study of urban transportation in East and Southeast Asia by topic, referring to Rodrigue (2024), namely transportation and mobility, transportation and land use, and

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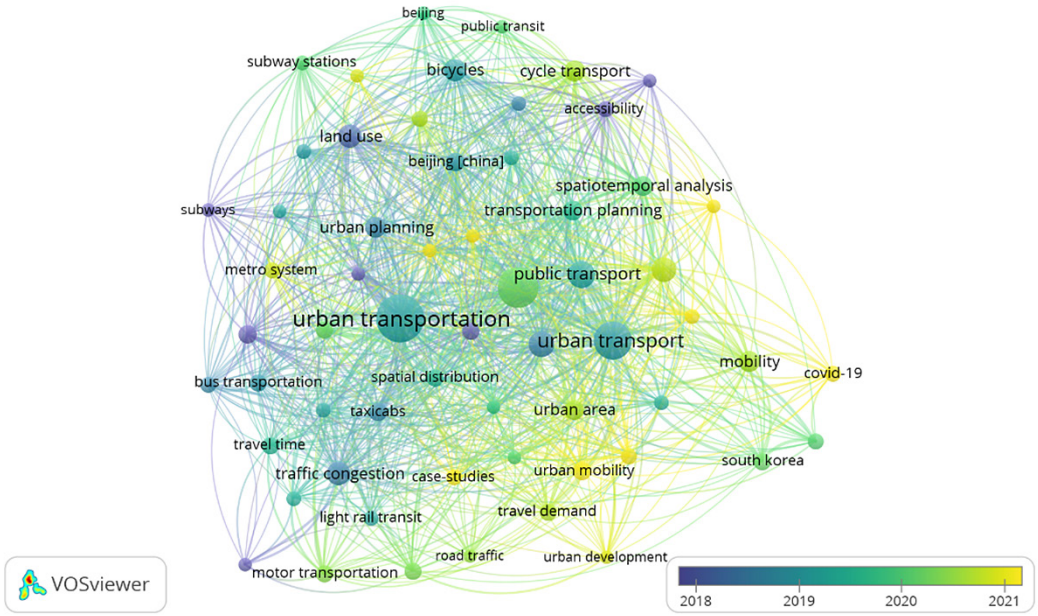

Fig. 10. Distribution of keywords in the studies of Urban Transportation in East and Southeast Asia over the past decade

Source: own elaboration prepared in VOSviewer.

transportation and urban spatial structure. This study identified four stages of development in urban transportation in East and Southeast Asia. The first stage covers the period 1972–2004, the second in 2005–2016, the third in 2017–2021, and the fourth in 2022–2024 (Fig. 11).

The time in each stage is not the same because the indicator of each stage is a specific topic that is trending and widely discussed at that time. If the trend changes, then categorize it as the next stage. In addition, the number of publications produced also dramatically influences the division of development stages. For example, stage 1 covers a very long period between 1972 and 2004, during which few publications existed. Because of the small number of publications, it certainly does not allow for topic variability. In contrast, the topic's variability and trend are the basis for determining the study's development stage.

Among the three main topics described by Rodrigue (2024), namely transportation and mobility, transportation and land use, and transportation and urban spatial structure, the topic of transportation and mobility is mainly discussed in the first and second stages. Transportation and land use are primarily addressed in the third stage. Meanwhile, the third and fourth stages mainly discuss transportation and urban spatial structure. Thus, the topics of transportation, land use, and urban spatial structure are relatively newer than transportation and mobility. Both topics are developing, and there has been a significant increase in publications since 2016.

An interesting finding is that in the fourth stage (2022–2024), there is much discussion about urban transportation concerning the COVID-19 pandemic. The three main issues mentioned earlier do not seem to cover this topic. Thus, the author proposes a fourth major topic outside the three main topics from Rodrigue (2024), namely urban transportation under the influence of pandemics and disasters. Disasters, both natural and social disasters, need to be added because their occurrence is relevant to the pandemic, so they can be included as a group and form their central topic cluster.

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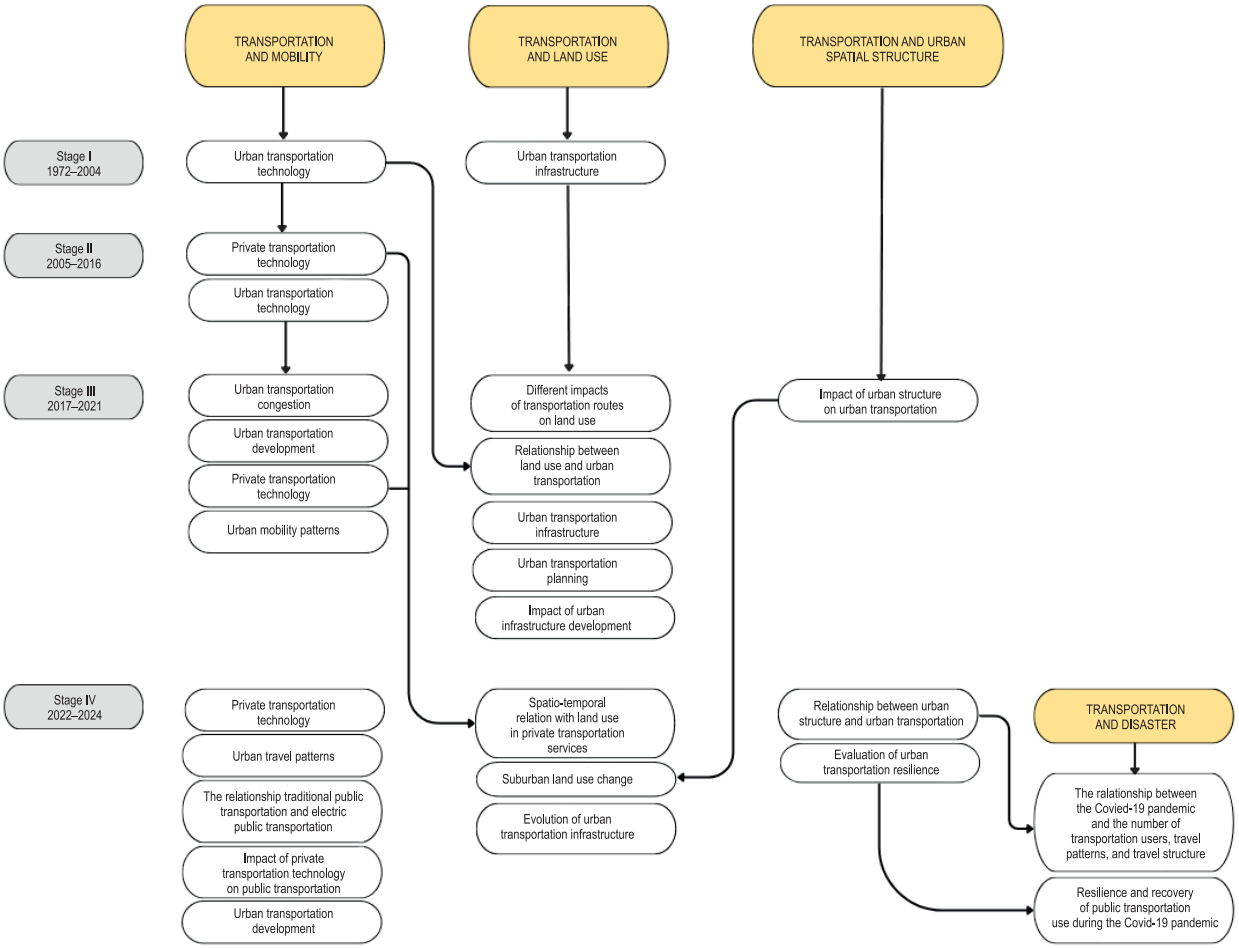

Fig. 11. Roadmap for the development of urban transportation studies in East and Southeast Asia in five decades (1972–2024)
Source: own elaboration based on the data analysis.

In all stages (1972–2024), many studies on urban transportation in East and Southeast Asia, including transportation and mobility and transportation development in urban areas, were conducted. The results of the studies during this period include traffic congestion in urban areas, traffic density, and urban mobility patterns – for example, a study conducted by Liu et al. (2017) in Beijing, China. The study found that traffic congestion patterns were identified in three types: point type, caused by lack of capacity at road network nodes; lane type, caused by high traffic demand or congestion problems on road sections; and area type, resulting from the merging and connection of several high-demand highways. Another study by Zhou et al. (2021) on urban traffic congestion in Xian City, China, found that "the congestion of the entire network in the study area over time has spatiotemporal characteristics." Recurrent congestion mainly occurs at intersections and urban arterial roads.

Transportation and mobility also deal with the spatiotemporal pattern of urban mobility and its relationship with congestion. Tan et al. (2022), based on their study of congestion in Beijing, China, found five traffic patterns. On weekdays, especially during the morning and evening rush hours, there is a lot of mobility aimed at companies, residences, apartments, and public services, which results in significant mobility that can increase traffic

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congestion in the city. On weekends, the peak hour takes place from 19:00 to midnight, and people usually have a lot of mobility in recreational areas. Liu et al. (2017), in their research in Changsha, China, found that in the temporal dimension study area, vehicle trips can be grouped into three modes, namely, the morning peak pattern concentrated at 7:00–9:00; the afternoon peak pattern concentrated at 17:00–19:00; and the evening peak pattern concentrated around 21:00. These times can be called peak times.

Zhu et al. (2021), in a study in the city of Jinan, China, successfully found that traffic flows in the study area during the morning and evening rush hours increased primarily on weekdays because most residents pass through the main road. In addition, the influence of services on public transportation also significantly influences people's interest in using public transportation to carry out mobility such as school, work, and other activities, especially in urban areas. The same conditions were found by research by Yao et al. (2021) in Cangzhou, China, namely that high-quality bus services lead to decreased car use, so many people use public transportation to carry out daily activities.

From 2005 to 2024, some studies discuss the topic of urban transportation and land use. Many studies explain that land use significantly affects urban transportation. There are also many studies related to urban infrastructure. Ma et al. (2018) found that at the city scale, there are significant differences in the dependence of three types of land use on specific transportation routes. However, this study only explains at the micro-scale that the relationship between intra-city transportation and land use shows a corridor effect through newly built transportation routes that triggers quantitative and distributed urban land adjustments along these routes. Adjustments closer to transportation lines tend to be more intensive than adjustments further away. In addition, there are statistically significant differences in the corridor effects of different transportation routes on specific land uses. Research results from the study of Zhao et al. (2017) in Beijing, China, and Yang and Yao (2019) in Japan related to this topic discuss the development of urban transportation infrastructure. Zhao et al. (2017) found that expanding urban transit systems statistically significantly impacts population growth across the Beijing metropolitan area. The expansion of the urban subway system has a more significant impact on the floating population than on residents across the Beijing metro area due to the low fares of the urban subway system. Meanwhile, Yang & Yao (2019) found that the construction of rail transit hubs in Japan can improve the optimization of people's mobility and increase traffic efficiency so that many people use public transport.

Lin et al. (2020), in a study conducted in Beijing, China, showed that urban mobility, especially around Metro Stations, is related to land use. The more land use there is, the higher urban mobility will be. Based on time (temporal), metro stations have high mobility accuracy during peak hours. Hu et al. (2018), in Changting found that the declining interest in e-bikes and motorcycles contradicts the interest in walking and bicycles. Land use diversity in workplaces is related to travel mode choice on weekdays. In contrast, land use diversity in residential and workplaces does not significantly affect mode choice on weekends.

In Indonesia, Surya et al. (2022) researched the relationship between urban transportation and land use in Makassar City. The study found that the intensity of land use change coupled with population mobility, in addition to affecting the urban transportation system based on travel origin and destination patterns, also impacts the decline in the environmental quality of suburban areas. Land use change, socio-economic activities, population mobility, and transportation systems affect the decrease in environmental quality in suburban areas, with a coefficient of determination of 95.65%.

In 2017–2021 and 2022–2024, there were many studies on transportation and urban spatial structure. In this topic, many studies discuss urban transportation planning, the impact of urban structure, the location of urban road networks, and urban structure and transportation networks. The results of research by Ye et al. (2019) in Shanghai

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and Lyu et al. (2020) in Beijing discussed urban structure and urban transportation networks. Ye et al. (2019) found that the structure of public facilities in Shanghai, such as hospitals, restaurants, and education, triggered taxi use significantly. Lyu et al. (2020) found that the location of stations in Beijing is relative to the city center and land use patterns, such as public facilities. The urban structure that tends towards the presence of stations suggests that it is better to improve accessibility to destinations than to improve public transit performance in the area.

The topic of transportation and urban spatial structure related to urban transportation networks is discussed by Yang et al. (2018), Wei et al. (2020), and Kim et al. (2020). Yang et al. (2018) found that the distribution of taxi pick-up and drop-off areas is unbalanced in urban Xi'an, China. Taxi transit points are primarily in the eastern districts, including Weiyang, Lianhu, Xincheng, Beilin, and Yanta, as well as the western part of Baqiao district. These locations tend to be economically developed, with few in peripheral regions. Wei et al. (2020) found that in China, there is a shortage of urban bus services in different administrative areas. Most urban bus services are in Yushan City because it is the city center and an economic development zone compared to other cities. The proportion of bus stations of each community in different administrative units shows that Zhouzhang Town, Jinxi Town, and Dianshanhu Town south of Kunshan are all composed of one community.

In contrast, Yushan Town is composed of several communities to meet the needs of urban bus travel. Kim et al. (2020) found that bus transit passengers using bus stops in Seoul, Republic Korea, tend to increase in proportion to the number of origins or destinations provided by the stops. The more destinations provided by bus stops, the higher the number of people who use bus stops.

The proportion of bus stations of each community in different administrative units shows that Zhouzhang Town, Jinxi Town, and Dianshanhu Town south of Kunshan are all composed of one community. In contrast, Yushan Town is composed of several communities to meet the needs of urban bus travel. Kim et al. (2020) found that bus transit passengers using bus stops in Seoul, Republic Korea, tend to increase in proportion to the number of origins or destinations provided by the stops. The more destinations provided by bus stops, the higher the number of people who use bus stops. In post-pandemic Wuhan City, more cycling communities have emerged in suburban areas, and the percentage of bike-sharing users in congested areas has decreased, especially in workplaces. This suggests a trend towards decentralization of bike sharing. Meanwhile, research conducted by He et al. (2024) in Shanghai, China, found that the volume of regular trips is much larger than that of visitors, vacations, and flow trips. In addition, the COVID-19 pandemic has a more significant impact on regular, visitor, and commuter travel flows but has the most negligible impact on vacation travel flows.

DISCUSSION

Contributions offered based on comparative findings with study achievements in other regions

Studies on urban transportation in East and Southeast Asia have been conducted for five decades, although a significant increase has occurred in the last decade. This study found that the development of urban transportation studies in East and Southeast Asia covers four stages. The first stage (1972–2004) mainly discusses urban transportation technology and infrastructure. The second stage, 2005–2016, mainly discusses private and urban transportation technology. The third stage in 2017–2021 studies related to transportation and mobility continue to develop with a broader scope. This stage is accompanied by the development of studies related to transportation and land use and transportation and urban spatial structure. The fourth stage of 2022–2024 is the most complex topic of study. Also, in the fourth stage, a new topic is introduced. The topic of transportation and disaster began to develop during the COVID-19 pandemic, which influenced urban transportation.

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The achievements of urban transportation studies in East and Southeast Asia have similarities and differences with those in other regions worldwide. In the Region of Australia and the Pacific, urban transportation studies began in 1988. Studies at that time discussed urban public transit services, such as the one conducted by Pretty and Russell (1988) in Brisbane. This study shows that in that era, the discussion of urban transportation in Australia was similar to that of East and Southeast Asia, namely transportation technology.

Another study in Australia conducted by Murray et al. (1998) in Queensland studied the development of public transportation for sustainable development in the region. The study showed that the proximity of public transport will significantly influence the performance of the public transport system stops to residents, so many people are interested in using them. The findings of this study clarify that the topic of transportation and spatial structure has been studied earlier in Australia than in East and Southeast Asia. In 1998, there was already a study on transportation services concerning the distribution of population activities that represent the spatial structure. In contrast, this topic was only widely discussed in East and Southeast Asia in stage 3 (2017–2021).

Compared to East and Southeast Asia, Australia has been discussing transportation and spatial structure for a long time. Australia has been concerned with using transportation to support spatial and sustainable development. This topic has only become a trend in the last decade in East and Southeast Asia. This shows that the trend of discussing a particular subject is highly dependent on the achievement of transportation development and policies implemented in a region.

In the South American Region in 2021, studies were conducted on evaluating urban freight transportation issues, such as the study by de Oliveira et al. (2021). At the same time, East and Southeast Asia studies focus more on urban transportation development, private transportation technology, and urban mobility patterns. Studies on urban freight transportation have not even been conducted in East and Southeast Asia at all stages. In Europe, in 2023–2024, the topic of private transportation technology is growing, as in the study conducted by Vinagre Diaz et al. (2023) in Rome, Italy, and Li et al. (2024) in 124 European cities that discuss the relationship between e-scooters and public transportation.

Based on this study, it can be seen that the progress of studies in East and Southeast Asia and Europe is the same because both regions discussed private transportation technology during this period. The absence of discussion on freight transportation in urban East and Southeast Asia is an interesting finding. Today, as East Asian cities progress, on par with those in Europe, the focus is on personal transportation technologies. However, the issue of freight transportation should be of interest as many of the region's cities serve as trading hubs. Future studies should consider the typology of cities in terms of their transportation characteristics. The development of transportation geography studies in East and Southeast Asia and a simultaneous comparison with other regions is shown in Fig. 12.

Overall, by reviewing the development of transportation geography studies in East and Southeast Asia, the findings of this study show that the focus of studies has grown in this region in recent times. The number of achievements has increased quickly, and the topics have become more varied. The development of the study focus over time follows the existing transportation policies and trends in the region. It is evident that at the same time, other regions discuss different topics, or the same subject has been studied first in other regions, and there are even topics in other regions that have never been studied in East and Southeast Asia. This study contributes to developing micro theories of transportation studies that follow transportation policies and trends under the various established macro theories of transportation.

Reflecting on a review of previous studies in East and Southeast Asia, it is clear that the topics in transportation geography in this region have evolved considerably. This development follows

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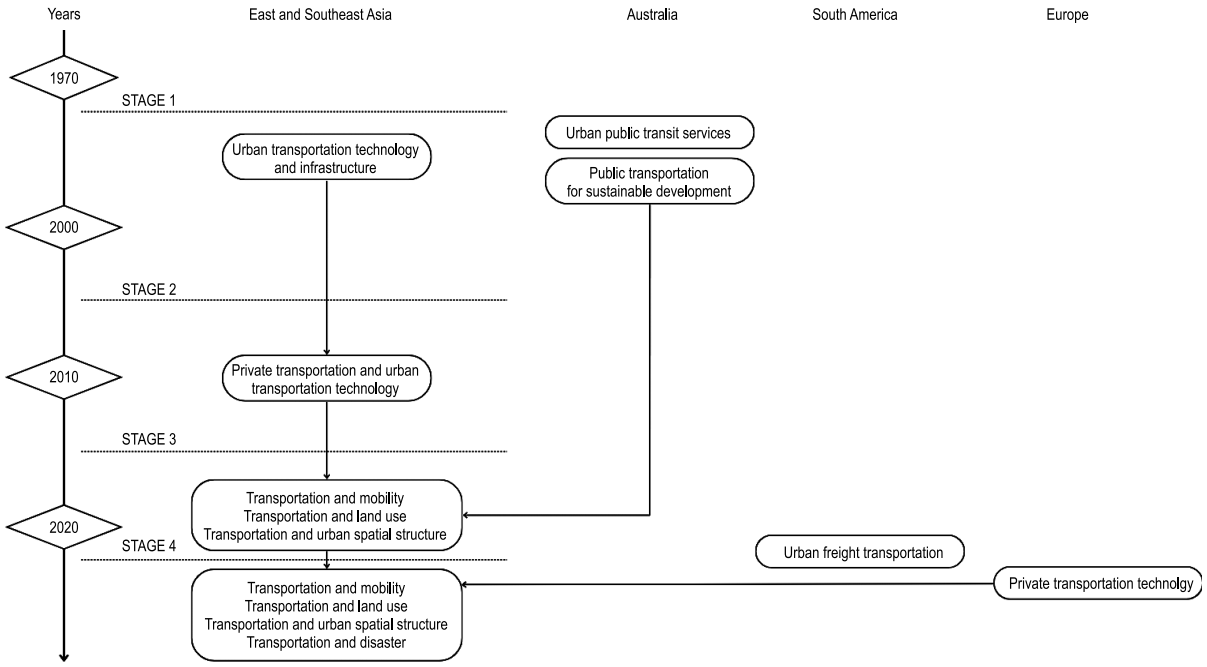

Fig. 12. The development of transportation geography studies in East and Southeast Asia and a comparison with other regions
Source: own elaboration based on the data analysis.

transportation policies and trends over time. As a result of this reflection, we propose some practical recommendations for future studies in the region, at least in the next five years. In 2030, with the end of the sustainable development goals, a study evaluating sustainable transportation in East and Southeast Asia should be conducted.

Moreover, at the last stage, there was a new topic in transportation studies in East and Southeast Asia, namely transportation and disaster. In the next five years, studies on how transportation in the region deals with disasters must be increased, especially concerning global climate change. Recently, East and Southeast Asia has experienced many disasters related to global climate change, such as rising cyclone events, bad weather, and various meteorological disasters. In this regard, studying how transportation management, transportation policy, and transportation mode technology are prepared in this region concerning global climate change is necessary.

Contributions offered based on comparative scope and findings with other studies

Our study is about urban transportation in general and provides an opportunity to identify various topics of urban transportation studies in East and Southeast Asia. Our study explores the achievements and developments of urban transportation studies over time. This is different from other studies that focus on specific topics in transportation. Kervall and Palsson (2022) conducted a study on urban freight systems. This study was also conducted with a systematic literature review of 93 peer-reviewed journal articles on a specific topic. Similarly, Bhavana and Reddy (2021) conducted a systematic literature review study focusing only on urban transport planning. Meanwhile, Aloui et al. (2021) conducted a systematic literature review on sustainable transportation.

By conducting a systematic literature review on the broader topic of East and Southeast Asia, we hope this study can provide new insights into the

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achievements of studies conducted in the region. The various achievements of this study are milestones of scientific development, can inspire further studies, and become a source of reference for policy making. Studies on particular topics are also critical so that these various studies can complement and contribute to the body of knowledge.

Tao et al. (2023) conducted a systematic literature review on urban transportation resilience research. This topic is relatively more specific than our study but uses a relatively similar perspective, namely, studying the progress and achievements of previous studies. However, this study provides reflections to predict future developments. Miskolczi et al. (2021) also gave predictions for the future and conducted a systematic literature review of 62 scientific papers. This study succeeded in building several scenarios related to urban mobility until 2030.

Compared to previous studies that focus on one specific topic, the scope of the study is broad and covers the entire world. Our study focuses on finding various issues related to studies conducted in a particular region. Thus, our study also contributes new knowledge related to urban transportation studies from a more geographical perspective. This study also offers new insights, referencing similarities and differences within a particular geographical area.

CONCLUSIONS

The discussion on urban transportation is critical as the number of people living in urban areas continues to increase, and urbanization has become a global issue in recent decades. Here, this study found the development of metropolitan transportation studies in East and Southeast Asia. The study of urban transportation in East and Southeast Asia has been conducted for five decades and has four stages. Four categories develop in these four stages, namely: (1) transportation and mobility, (2) transportation and land use, (3) transportation and urban spatial structure, and (4) transportation and disaster. The first topic continues to evolve through the four stages and influences the development of other issues. Meanwhile, the third topic only appeared in the third stage. The fourth topic only appeared in the fourth stage. The most rapid development has occurred in the last decade, with three stages of development occurring during this period. This is due to the many publications produced during the previous decade. This study also found that the COVID-19 pandemic, some time ago, also influenced the latest trend in the development of urban transportation studies in East and Southeast Asia.

For evaluation, this study still has limitations. This study focused on using the Scopus database as a source of documents for review. Also, this study was conducted in half of Asia, focusing on East and Southeast Asia. Future studies are highly recommended to highlight urban transportation studies in two regions, South Asia and Central Asia, specifically. The databases used can be more diverse, such as Google Scholar, Web of Science, and others. Document searches can also be done through several publishers such as ScienceDirect, Springer, Taylor and Francis, Wiley, Sage, and others. Moreover, concerning the end of the SDGs in 2030, further studies in East and Southeast Asia are highly recommended to study sustainable transportation. Also, the discussion of transportation in relation to various disasters due to climate change impacts in East and Southeast Asia is highly recommended.

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