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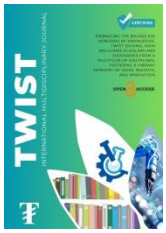

Challenges and Strategies in Drivers' Parking Preference

A Systematic Review

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Abstract
Parking not only occupies a significant amount of space but also has numerous negative environmental impacts. One major consequence is traffic congestion caused by vehicles maneuvering in and out of parking spaces. Additionally, the time and fuel waste while searching for parking contribute to pollution and other environmental issues. The extent of these effects is largely influenced by parking decisions and behaviors, which play a key role in increasing pollution and congestion. The study examines the challenges and strategies in drivers' parking preference. Three internet databases were searched for articles between 2021 and 2025 (i.e., a cumulative index using Scopus, the Web of Science, and Proquest to provide a summary of the challenges and strategies in drivers' parking preference). The findings from this systematic review highlight the diverse and interrelated factors influencing drivers' parking preferences, presenting various challenges for urban planners, policymakers, and transportation authorities.

Keywords
drivers' preferences, parking challenges, parking decisions, determinants of parking choices, systematic review

INTRODUCTION

Traffic congestion and associated problems are growing exponentially as a result of increased motorization. The integration of parking rules with traffic management demonstrates the growing influence of parking on efficient traffic flow (Ajina et al. 2023). However, the model's capacity to model and optimize parking decisions gives drivers useful real-time advice, cutting down on time spent looking for a spot and encouraging the effective use of already-existing parking spaces (Ahad & Kidwai, 2024). With wider advantages for environmental sustainability and urban productivity, this helps to alleviate urban problems like traffic jams and wasteful space use.

Because fewer parking places are available and more private vehicles are being used, parking issues have gotten worse in major cities throughout the world (Jung 2024). Correspondingly, the placement of on-street parking spaces boosts the parking supply at a low cost, but it also has numerous drawbacks (Cao et al., 2024), such as using up some road resources and contributing to traffic congestion during peak travel times. Moreover, the lack of parking facilities in the city's central business district presents a significant challenge to the transportation infrastructure's ability to serve the growing number of motor vehicles (Xiao et al., 2023).

The issue of "difficult parking" in rural areas has gotten worse because of the ongoing modernization of rural areas, and village planning, which includes parking planning, has a significant impact on how rural residents choose to park (Zhu et al., 2024). The information that is available to the motorist when they arrive at their destination to select a parking spot is dynamic, difficult to collect according to Li et al., (2023), and the driver is unable to process the information in order to make a decision. Therefore, in situations where there is uncertainty, the driver's parking choice

behavior should be considered a decision-making activity. The selection of a parking option is impacted by subjective perceptions of parking safety, which are impacted by certain sociodemographic factors, in addition to the intrinsic features of the parking facility (Li et al., 2024). According to Rodriguez et al. (2022), drivers are more inclined to park their car in a facility that offers a higher degree of safety when making parking decisions. Commuters' choice of parking location is greatly influenced by the overall cost of parking for autonomous vehicles as well as the distance between parking facilities and the job (Qih et al., 2022).

Perimeter parking, nearby parking, and returning to the origin all have significant travel costs and parking charges, according to the results. All of the coefficients are negative, meaning that the more expensive these parking options are, the less likely the travelers are to select them (Ye et al., 2022). The choice to cruise is strongly correlated with the cost of cruising, meaning that travelers are less likely to select cruising if the cost is higher. SAVs' parking choice behavior is influenced by both travel and parking time. Travelers are more inclined to opt to serve other passengers when parking for an extended period of time. The findings of Yao (2024) demonstrated that, when all other external parameters were held equal, parking prices had an almost linearly negative association with the likelihood of alternative selections. This implies that differentiating parking fees is a viable way to influence tourists' parking behavior and ease parking challenges. Shared parking has gained a lot of attention as the urban parking issue gets worse, but its growth is hampered by the confusion surrounding the shared parking process (Cai 2023). One of the hardest things for delivery drivers to deal with while delivering to cities is parking. The decision-making process is made more difficult by the scarcity of parking spots close to delivery destinations and the time constraints placed on drivers to finish their designated routes (Amaya et al. 2023).

Travelers prioritize walking distance after parking, driving time, and parking price when choosing a parking spot, according to a poll on sequential parking decision behavior (Qin et al., 2023). In terms of their choice of parking lot, travelers' acceptable psychological thresholds for parking factors were determined to be, generally speaking, less than 800 meters for the walking distance after parking, less than 15 CNY/h for the parking charge, and more than two for available parking spaces.

As a result, this information can help create parking planning plans that are suitable for urban villages, reducing parking issues and promoting the communities' forward growth in line with the larger objectives of urbanisation. These actions can lessen the harm that automobile emissions and traffic congestion cause to the environment. Therefore, it is imperative to stress the importance of carrying out validated research on Challenges and Strategies in Drivers' Parking Preference in urban areas. The specific goal is to learn more about the preferences of people living in urban villages when it comes to parking site selection. This knowledge will help planning agencies create more efficient strategies for distributing parking resources and reducing parking-related issues in urban villages.

MATERIALS AND METHODS

Search Strategy

An experienced librarian assisted in creating the search strategy. An initial search method produced the search phrases, which were then further narrowed until they were verified. The terms "Parking Preferences" OR "Parking Satisfaction" OR "Parking Preferences factors" OR "Parking Choices" OR "Parking Selection" OR "Parking Decisions" OR "Preferred Parking Options" OR "Parking Contentment" OR "Parking Convenience Satisfaction" OR "Parking Approval" OR "Determinants of Parking Choices" OR "Parking Decision Factors" OR "Influencing Factors for Parking Selection" OR "Parking Choice Drivers" was employed for finding abstracts and titles. The same search approach that was created for Scopus was used in the Web of Science and Proquest databases. From 2021 to 2025, reputable and well-known electronic databases (Proquest, Web of Science, and Scopus) were searched for original, peer-reviewed research papers.

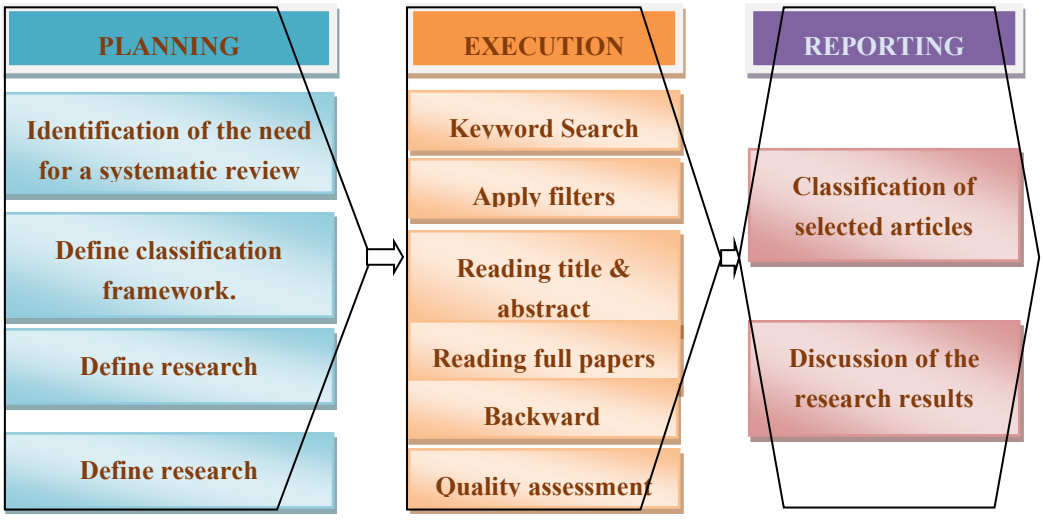

Fig. 1 Systematic review stages

Review planning

A systematic review can help identify, evaluate, and analyse all pertinent literature on a certain topic, intriguing phenomenon, or research question (Ramírez-Montoya & Lugo-Ocando, 2020). Furthermore, it is described as a method that makes it easier to find, arrange, and assess literature related to a certain review topic, as Paul et al. (2021) and Dabic et al. (2020) have examined. Since the goal of this investigation was to highlight significant findings from previous research and provide recommendations for further research, a systematic review was judged appropriate (Hao et al. 2019). The guidelines and protocols of systematic reviews must be followed by researchers who use this method (Ramírez-Montoya & Lugo-Ocando, 2020). The systematic method must be transparent, unbiased, objective, rigorous, and reproducible (Chukwuere, 2023). Paul and Criado separated systematic reviews into several smaller categories, including topic-specific ones. However, Palmatier et al. (2018) divided them into three broad categories: theory-based, domain-based, and method-based reviews. Subtypes of this category include organised theme-based assessments, bibliometric reviews, conceptual appraisals, structure-oriented reviews, and hybrid reviews.

The application of systematic reviews, which are becoming more and more crucial for all firms, is being standardised by the IT and healthcare sectors (Kamboj & Rahman 2015). The present analysis incorporates the methodology and recommendations from Ramírez-Montoya & Lugo-Ocando, (2020) and Ali et al. (2018, 2020, and 2021)." This investigation is conducted in three stages, as suggested by Watson (2015). Additionally, this systematic review was conducted using several collective criteria and principles at different phases, as stated by "(Ramírez-Montoya & Lugo-Ocando, (2020), Ali et al. (2018; 2020; 2021)." During the planning stage, rules and regulations are created. These include determining whether a systematic review is necessary, creating a classification framework, identifying study subjects, and establishing research methodology. Among the strategies employed in the execution process are filter application, keyword search, and backward snowball, reading the article from beginning to the end, evaluating the quality of the content, and examining the abstract and title. The reporting section of this study consisted of classifying the chosen publications and talking about the findings. Figure 1 shows the techniques, standards, and methods used for this thorough evaluation.

Planning stage

Finding out what is needed for the systematic review is the first step in the planning stage. When all available information about a phenomenon needs to be gathered in a thorough and objective manner, a systematic review is necessary. As mentioned earlier, there is a growing body of study on the challenges and strategies in drivers' parking preference. To the best of our knowledge, no thorough investigation using a methodology like ours has been carried out to examine challenges and strategies in drivers' parking preference through a methodical literature review. The development of the research assessment system is the second phase in the planning process. This procedure creates a foundation for understanding the current theoretical and practical viewpoints on the topic. The processes required to conduct a specific systematic review are described in the review criteria for this study. It is crucial to adhere to established protocols to reduce the possibility of bias in research.

Defining the research questions

Developing the study questions is the third and most crucial step in the planning process for any systematic review (Paul et al. 2021). A systematic review has achieved its goal when it is able to answer the research questions (Paul & Benito 2018). An overview of the research issues this systematic review study attempts to answer is provided below:

i. What are the factors influencing the Drivers' Parking Preferences?
ii. What are the challenges with Drivers' Parking Preferences?
iii. What are the strategies for overcoming challenges with the drivers' parking preferences?

Defining the strategies for article selection

Selecting the selection criteria is the fourth step in the article assortment scheduling stage. The goal of the article selection procedures is to identify original papers that offer trustworthy support for the research topic. To prevent bias, the techniques for selecting articles should be decided upon prior to protocol development; however, they can be improved while the search is conducted (Dabic et al. 2020). This process comprised a thorough automated search approach that explored through multiple online databases in addition to a manual evaluation of the chosen papers. A thorough automated search method enables the inclusion of the most relevant online bases (Rosado-Serrano et al. 2018). Online databases like Web of Science, Scopus, and ProQuest were chosen for this in-depth investigation.

Study Selection

The Systematic Review Assistant-Deduplication tool in EndNote was used to eliminate duplicates following the extraction of citations from three databases. After that, Covidence (Covidence Systematic Review Software 2019) was used to screen imported citations. The process of evaluating the relevance of titles and abstracts in respect to the inclusion criteria was then repeated using the complete texts of pertinent articles (Riazi et al., 2023). The backdrop of interest was the challenges and strategies in drivers' parking preference. This made it possible for any article written about the challenges and strategies in drivers' parking preference to be included. Studies that were not conducted in an environment where the challenges and strategies in drivers' parking preference were present were ignored. Observational or

interventional research was defined as studies that used an interventional, qualitative, or mixed approaches approach and were published in a peer-reviewed publication. Acceptable submission formats included theses, abstracts from conferences, study protocols, editorials, comments, opinion pieces, grey literature, and reviews of systematic or narrative literature.

Table 1 The selection criterion for articles searching

Criterion	Inclusion	Exclusion
Language	English	Non-English
Timeline	2021-2025	< 2021
Literature type	Journal (conference proceeding and book chapter)	
Document Type	Conference Paper, Article Review, Book, Book Chapter	
Subject Area	Transportation and Traffic Engineering, Urban and Regional Planning, Civil Engineering, Economics and Business, Environmental Studies, Behavioral and Social Sciences, Smart Cities and Technology	Besides Transportation and Traffic Engineering, Urban and Regional Planning, Civil Engineering, Economics and Business, Environmental Studies, Behavioral and Social Sciences, Smart Cities and Technology

Source: Developed by authors

Data Extraction

Database search produced a total of 681 results since there is a dearth of information regarding challenges and strategies in drivers' parking preference scenarios. Eight duplicate articles were eliminated after 639 articles that were published before 2021 were eliminated. A thorough text review of 34 studies was conducted. By viewing them, the eligibility of 34 articles was determined. 3 articles were removed during the full-text examination because some of them were off-topic and others could not be translated from other languages to English. A total of 31 papers met the standards to be included in this review as shown in figure 1. The data collection for descriptive content analysis uses the PRISMA stage, which consists of four stages: identification, screening, eligibility, and inclusion.

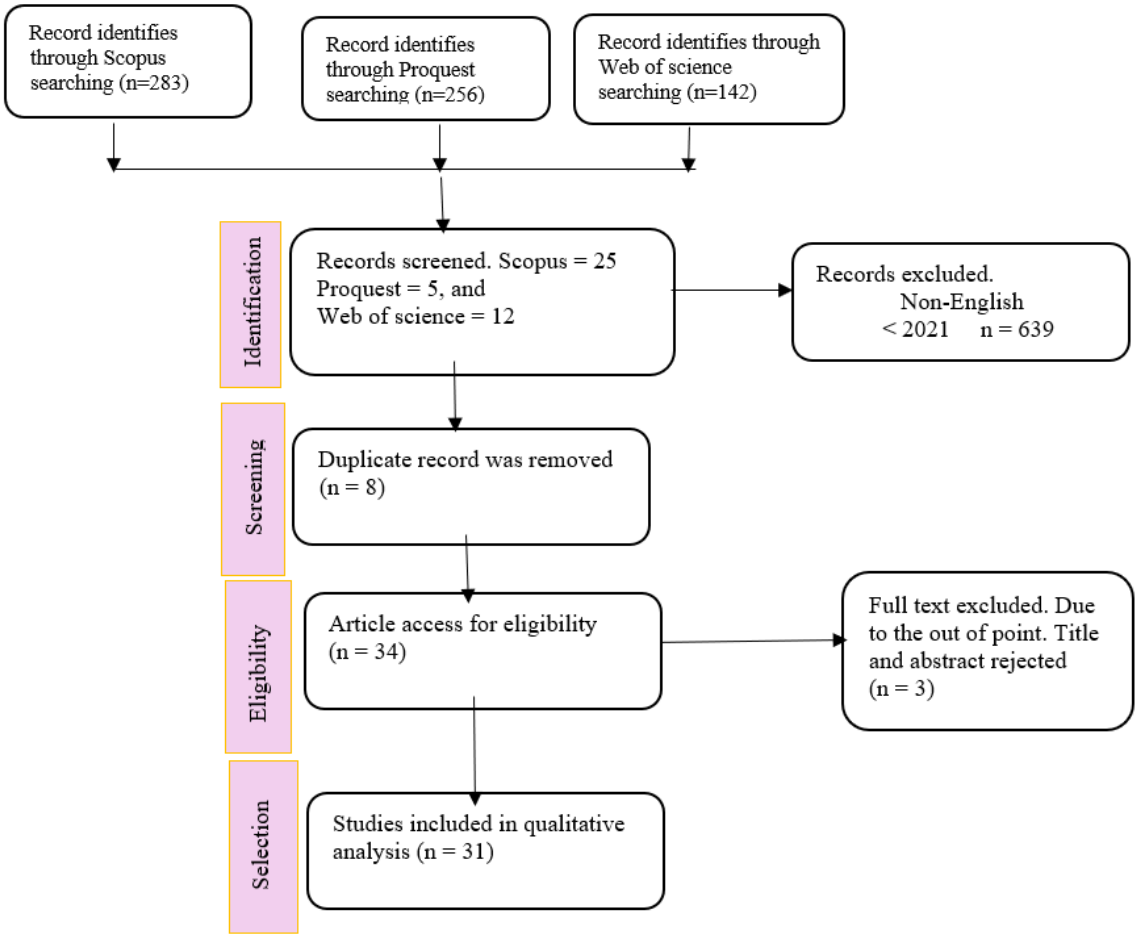

Fig. 2 Flowchart of PRISMA stage
Source: Researcher

Coding Procedures

One of the most important steps in organising and evaluating data from a vast corpus of literature is creating a coding scheme for a systematic literature review (SLR). A coding framework's objective is to accurately, consistently, and

reproducibly classify, retrieve, and analyse pertinent data from research projects. The specific actions done to improve and guarantee precision and uniformity in the coding process are listed below:

i. Establishing the research questions and objectives is the initial stage. This began with a clear understanding of the study's goals or research questions. This guarantees that the coding procedure is concentrated on gathering information that specifically addresses the review's goal. To address these questions, important themes or factors were found. These direct the coding frameworks' initial structure.

ii. The second step is choosing the starting codes and categories. To organise the coding, initial groups or themes were created based on the study questions. A thorough study of a variety of research publications was made possible by the categories' maximum inclusivity and mutual exclusion.

iii. The third step in this process is creating a codebook. An indispensable resource that offers thorough explanations of every code or category in the coding framework is a codebook. Every category had a precise definition and samples of the kinds of data that ought to be associated with each code. There were guidelines on how to deal with unclear or overlapping content.

iv. The fourth step, Pilot the Coding Framework, involves testing the initial coding framework on a small sample of research, such as five to ten publications. In addition to determining whether any significant themes are missing or whether there are overlapping categories that need to be combined, this pilot phase also helps establish whether the coding instructions in the codebook are clear and whether the categories are too broad, too narrow, or require refinement. Following this first experiment, the framework was improved considering the findings and difficulties.

v. The fifth step is to establish inter-coder dependability. We made sure that several coders independently coded the same sample of studies in order to evaluate inter-coder reliability. We then used statistical tests, such as Cohen's kappa, to gauge how well the coders agreed with one another.

vi. The entire dataset was subjected to the final coding scheme at this point. To guarantee accuracy and consistency, we closely followed the codebook and instructions during this phase.

vii. Double coding was carried out on a regular basis, with two coders independently coding the identical articles to verify consistency and ensure quality control.

viii. Following the coding of every study, data was compiled and analysed using the coding framework's categories. To make sure the coding structure for a thorough analysis that addresses the goals of the systematic review, we go over the research questions again.

Every article's content was frequently compared while keeping in mind the ongoing comparison method to reevaluate and update the framework (Creswell 2012). The aim of the coding process, involving the utilization of three coders to ensure the accuracy, consistency, and reliability of the results, was to identify themes and patterns related to the challenges and strategies in drivers' parking preference (Saeloe & Prichanont 2017). All the coders approved the results.

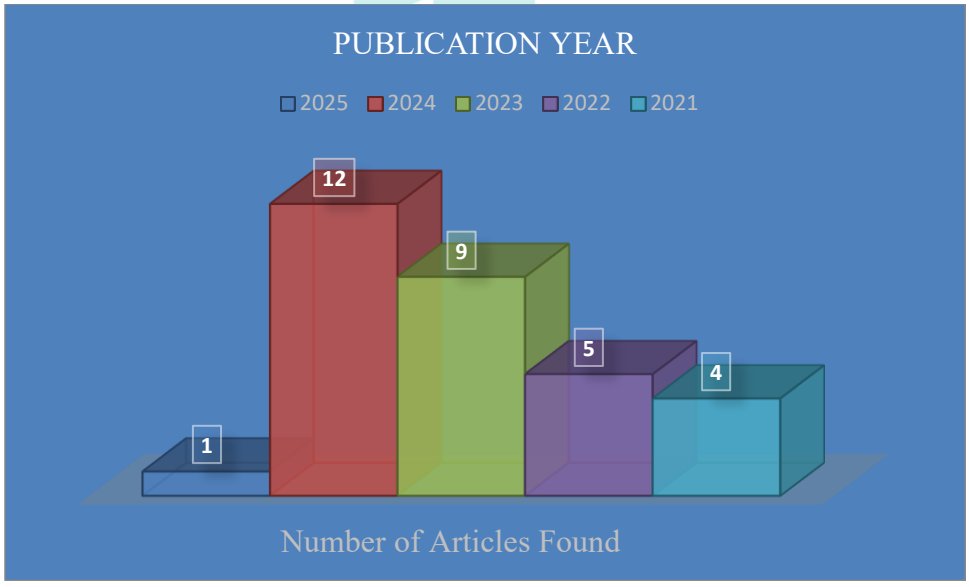

Fig. 3 Distribution of articles by publication year

As shown in Figure 3, the first reports on the barriers to drivers' parking preferences and strategies for overcoming them were published in 2021. In 2024, the greatest number of 12 articles were published. Nine papers were published in 2023, five publications were discovered in 2022, four in 2021, and one in 2025.

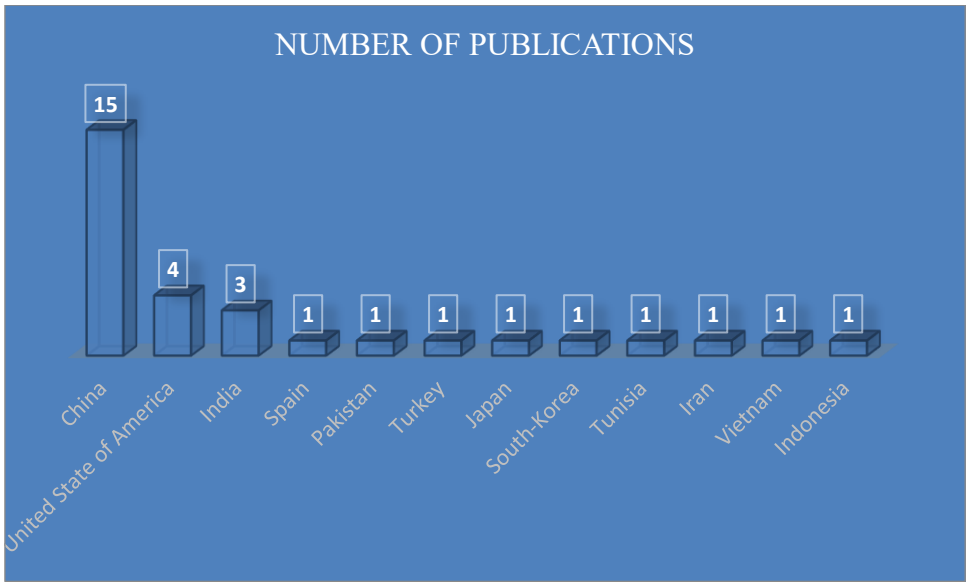

Fig. 4 Distribution of articles by Countries

The selected articles are arranged in Figure 4 by the country in which they were published. There were three articles published in India, four in the United States of America, and fifteen in China. Spain, Pakistan, Turkey, Japan, South Korea, Tunisia, Iran, Vietnam, and Indonesia all published one article each.

RESULTS AND DISCUSSION

Results

Table 2 Popular Dimensions used in the Obstacles in Drivers' Parking Preferences and Methods for Resolving Them

Themes	Features
	Factors influencing the Drivers' Parking Preferences
Theme 1	Research suggests that personal characteristics, including gender, age, and driving experience, significantly affect parking preferences (Li et al., 2022; Widodo et al., 2021).
Theme 2	The availability of well-managed, secure parking areas is a key determinant of drivers' preferences, particularly in rural regions (Zhu et al., 2024).
Theme 3	Research further shows that drivers prioritize ease of access to destinations, with walking distance and travel purpose influencing their parking choices (Xue et al., 2021).
Theme 4	Parking costs and time constraints are major determinants in parking preferences, as uncertainty in parking process significantly impacts drivers' decision-making (Jung et al., 2024).
Theme 5	Yao et al. (2024) emphasize that parking rates and in-car time significantly influence parking behavior, highlighting the potential for guiding travelers' decisions through strategic pricing mechanisms.
Theme 6	Amaya et al. (2023) identify three major determinants—search time, walking time to the destination, and hourly parking cost—along with a moderating variable, "Safe Behavior," which affects parking choices differently for various drivers.
Theme 7	Zhu et al. (2023) confirm that walking distance from a parking location to the destination is a substantial factor in the decision-making process.
Theme 8	Xue et al. (2022) report that rental prices, personal traits, and habits influence parking choices, while Hassine et al. (2022) highlight that on-street parking is often preferred due to cost, fuel savings, and security considerations
Theme 9	The findings also indicate that travelers' social networks, trip duration, and origin points play a role in determining parking location preferences, as shown in the study by Ghaffari et al. (2024).
Theme 10	Shoup (2021) observes that short-term parkers, carpoolers, and individuals who prioritize time savings tend to park closer to their destinations, whereas solo drivers, long-term parkers, and those who do not value time savings as highly are more likely to park further away.
Theme 11	Zhou et al. (2023) demonstrate that parking cost, cash rewards, and surrounding road conditions significantly impact curbside parking preferences
Theme 12	The results of the models show that the number of factors influencing parking type preference is higher for free parking than for paid parking. including driver, vehicle, travel, and parking characteristics (Sarısoy & Tezcan 2024),
Theme 13	Jha et al. (2023) indicate that parking duration and a driver's valuation of time play crucial roles in determining parking preferences.
Theme 14	Gu et al. (2024) describes a hierarchical model where destination choice impacts parking preference.

Continuation of **Table 2** Popular Dimensions used in the Obstacles in Drivers' Parking Preferences and Methods for Resolving Them

	Challenges with the Drivers' Parking Preferences
Theme 15	Studies reveal that parking fees, search times, and walking distances negatively affect drivers' choices (Li et al., 2024; Zhang et al., 2024).
Theme 16	The model demonstrated good fitness, indicating that parking charges, search time, and walking distance to home have negative impacts on parking choices (Li et al., 2024; Qih et al., 2022).
Theme 17	Long et al. (2023) find that drivers often fail to account for trade-offs between parking fees and walking distances due to a lack of awareness regarding available parking locations and services.
Theme 18	It is found that the model considering the risk attitude of drivers in the decision-making process is more in line with reality (Cao et al., 2024).
	Strategies for overcoming challenges with the drivers' parking preferences
Theme 19	Technology on parking efficiency, with studies indicating that integrating Automated Number Plate Recognition (ANPR) and Internet of Things (IoT) technologies can improve parking experience by reducing congestion and optimizing resource utilization (Ditta et al., 2025; Pawar et al., 2024).
Theme 20	Findings also suggest that pricing policies, such as reducing parking fees or increasing travel costs, could encourage more efficient parking behaviors (Rodríguez et al., 2023; Ye et al., 2022).
Theme 21	The implementation of intelligent parking services and shared parking systems has been proposed as an effective solution to optimize space utilization and enhance user experience (Qin et al., 2023; Cai, 2023).
Theme 22	Ajina et al. (2023) suggests that implementing a well-structured travel demand policy, including parking pricing and management, can significantly enhance urban mobility and alleviate parking-related issues.
Theme 23	Ahad & Kidwai (2024) propose an innovative Two-Phase Parking Choice Model (PCM) that facilitates better pre-trip decision-making, improving efficiency and convenience in the parking process
Theme 24	Higuchi & Oguchi (2021) emphasize that since drivers have diverse preferences for parking spot selection, personalized navigation systems could significantly improve satisfaction.

DISCUSSION

Drivers choose parking locations based on their personal traits along with external factors and tactical thinking. Li et al. (2022) and Widodo et al. (2021) demonstrate that personal characteristics including gender, age, and driving experience play a significant role in determining parking preferences. The presence of well-managed and secure parking facilities in rural regions influences drivers' preferences because these elements are essential for their decision making (Zhu et al., 2024). Parking management policy design needs to factor in both demographic and geographical variations according to these research findings.

Accessibility stands out as a primary element that shapes parking choices. Research by Xue et al. (2021) and Zhu et al. (2023) found that a driver's choice of parking spots depends heavily on the walking distance and travel purpose. Similarly, Amaya et al. Amaya et al. (2023) determined that major factors influencing parking decisions include search time and walking time to the destination as well as hourly parking cost while noting that "Safe Behavior" serves as a moderating factor which affects parking choices differently for each driver. The results emphasize how urban planners should position parking spaces closer to busy zones and maintain safe pedestrian routes to promote the use of official parking spaces.

Parking costs combined with time limitations function as important economic factors that determine how drivers choose to operate. Studies by Jung et al. (2024) and Yao et al. (2024) demonstrate how parking process uncertainties influence driver choices and identifies parking rates along with in-car time as key factors determining parking behavior. Zhou et al. (2023) show that parking costs combined with cash rewards and nearby road conditions largely determine curbside parking choices. The research indicates that dynamic pricing models, off-peak parking incentives and real-time parking information systems can lead to better parking efficiency and less congestion.

Additionally, rental prices, personal habits, and social networks also contribute to parking preferences (Xue et al., 2022; Ghaffari et al., 2024). Travelers' origin points, trip duration, and whether they are traveling alone or in groups influence where they choose to park. Shoup (2021) notes that short-term parkers, carpoolers, and individuals who prioritize time savings tend to park closer to their destinations, while long-term parkers and those who do not value time savings as highly are more likely to park farther away. These findings highlight the importance of targeted interventions such as priority parking for high-turnover vehicles and designated areas for long-term parking to balance demand.

Another important consideration is the preference for on-street parking. Hassine et al. (2022) emphasize that many drivers choose on-street parking due to cost savings, reduced fuel consumption, and security considerations. However, this preference can lead to increased congestion and reduced availability for short-term parkers. Strategies such as on-street parking regulations, higher pricing for curbside parking, and incentives for off-street parking use could help address these challenges.

From a broader perspective, destination choice also influences parking preferences, as demonstrated by Gu et al. (2024). Their hierarchical model suggests that parking decisions are interconnected with overall travel behavior,

reinforcing the need for integrated urban mobility solutions. Sarısoy & Tezcan (2024) further reveal that a higher number of factors influence free parking choices compared to paid parking, including driver characteristics, vehicle type, and travel purpose. This suggests that efforts to manage parking demand should consider the underlying motivations behind free parking preference and explore alternative strategies such as subsidized off-peak parking or improved public transportation options.

The study by Jha et al. (2023) highlights the critical role of parking duration and a driver's valuation of time in decision-making. This underscores the need for time-sensitive parking fees, digital parking reservation systems, and efficient enforcement mechanisms to ensure fair parking allocation and minimize unnecessary congestion.

The findings also suggest that parking fees, search times, and walking distances are major challenges affecting drivers' parking preferences. Studies by Li et al. (2024) and Zhang et al. (2024) reveal that these factors negatively influence drivers' choices, making it difficult for them to find optimal parking spaces. High parking fees deter many drivers from choosing paid parking options, forcing them to search for free or lower-cost alternatives. However, this extended search time leads to increased traffic congestion and driver frustration, further exacerbating parking-related challenges.

The impact of walking distance on parking decisions is another key concern. Research by Qih et al. (2022) and Li et al. (2024) indicates that longer walking distances from parking spots to drivers' destinations discourage certain parking choices. Drivers tend to favor parking locations that minimize walking time, particularly in urban areas where accessibility is a priority. However, this demand for proximity often results in higher competition for central parking spaces, leading to inefficiencies and increased parking difficulties. Addressing this issue may require strategic solutions such as designated short-term parking zones, improved pedestrian infrastructure, and shuttle services to connect remote parking areas with key destinations.

A critical insight from Long et al. (2023) is that drivers frequently fail to consider the trade-offs between parking fees and walking distances due to a lack of awareness about available parking options. This highlights the need for better information dissemination, real-time parking availability updates, and digital navigation systems that guide drivers toward the most suitable parking choices. Without sufficient information, drivers often make suboptimal decisions, either paying higher fees than necessary or spending excessive time searching for free spots. Therefore, the implementation of smart parking technologies, mobile apps, and digital signage can help mitigate these issues and improve overall parking efficiency.

Additionally, drivers' risk attitudes play a crucial role in their parking decisions, as noted by Cao et al. (2024). Some drivers are more risk-averse, preferring to park in designated and secure locations despite higher fees, while others are willing to take risks by parking in unauthorized or less secure areas to avoid costs. The integration of behavioral factors into parking models ensures a more accurate representation of real-world parking choices. To address these varying risk preferences, policymakers can implement tiered pricing structures, dynamic pricing based on demand, and enhanced security features in parking facilities to cater to different driver segments.

The integration of technology in parking management has been recognized as a key strategy in enhancing parking efficiency. Research by Ditta et al. (2025) and Pawar et al. (2024) highlights that technologies such as Automated Number Plate Recognition (ANPR) and the Internet of Things (IoT) can significantly reduce congestion by optimizing resource utilization. These technologies facilitate real-time monitoring and automated fee collection, minimizing delays associated with manual parking operations. By streamlining the process, such advancements not only enhance convenience for drivers but also improve overall urban mobility.

Pricing policies also play a crucial role in influencing parking behavior. Studies by Rodríguez et al. (2023) and Ye et al. (2022) suggest that reducing parking fees or increasing travel costs can encourage drivers to adopt more efficient parking habits. Lowering parking fees in designated areas can divert vehicles from congested zones, while higher travel costs (e.g., fuel surcharges or congestion pricing) can discourage unnecessary car trips, leading to a more balanced demand for parking spaces. Implementing dynamic pricing models based on demand and time of day may further optimize space allocation and reduce overcrowding.

To address space constraints, intelligent parking services and shared parking systems have been proposed as viable solutions. Qin et al. (2023) and Cai (2023) advocate for shared parking models, where underutilized spaces in residential or commercial areas can be made available for public use. These systems, supported by digital platforms, allow for efficient space allocation and improved user experience. Such innovations are particularly beneficial in densely populated urban centers, where parking demand often exceeds supply.

Moreover, urban mobility policies can have a profound impact on parking efficiency. Ajina et al. (2023) emphasize that a well-structured travel demand policy, incorporating pricing regulations and parking management strategies, can significantly alleviate congestion and improve accessibility. Cities that implement comprehensive parking frameworks which include time-based restrictions, designated parking zones, and incentive programs for sustainable transport are more likely to see improved traffic flow and reduced parking-related stress.

A novel approach to parking decision-making is the Two-Phase Parking Choice Model (PCM) proposed by Ahad & Kidwai (2024). This model enhances pre-trip planning, allowing drivers to select optimal parking spaces before reaching their destinations. By providing real-time availability updates and personalized recommendations, such models improve efficiency and convenience, reducing unnecessary circling and search times. Finally, personalized parking navigation systems are gaining traction as a means to cater to drivers' diverse preferences. Higuchi & Oguchi (2021) highlight that

customized guidance systems, which factor in individual habits, priorities, and location preferences, can enhance user satisfaction by directing drivers to the most suitable parking options. Such technologies, integrated with smartphone applications and in-vehicle systems, represent a promising direction for improving the overall parking experience.

PRACTICAL IMPLICATIONS OF STUDY

The findings from this study have significant implications for urban planning, transportation policy, and smart mobility solutions. Understanding the various factors that influence drivers' parking preferences can help policymakers and urban planners develop targeted strategies to improve parking efficiency, reduce congestion, and enhance overall mobility.

i. Differences in age, gender, and driving experience impact on parking preferences, meaning that policymakers must design parking policies that cater to different user groups
ii. This suggests that urban planners should prioritize parking locations near high-demand areas while ensuring safe and pedestrian-friendly environments to encourage parking in designated areas.
iii. To address these challenges, cities should consider implementing:
    - Dynamic pricing models that adjust fees based on demand and congestion levels
    - Incentives for off-peak parking to balance parking demand throughout the day
    - Real-time parking information systems to reduce unnecessary search time and congestion
iv. Overreliance on on-street parking contributes to congestion and parking shortages for short-term users. Policymakers can address these issues by:
    - Implementing stricter on-street parking regulations
    - Introducing higher pricing for curbside parking to encourage off-street parking use
    - Providing incentives for off-street and shared parking solutions
v. Policymakers should gradually phase out free parking in high-demand areas while offering affordable alternatives, such as park-and-ride facilities or low-cost long-term parking zones.
vi. The implementation of real-time parking updates, digital payment systems, and AI-driven parking guidance can significantly streamline the parking process.
vii. The study suggests that urban mobility policies, economic incentives, and technological advancements should be integrated into parking management strategies to create more sustainable, efficient, and driver-friendly parking systems.

CONCLUSION

The findings from this systematic review highlight the diverse and interrelated factors influencing drivers' parking preferences, presenting various challenges for urban planners, policymakers, and transportation authorities. While cost, accessibility, behavioral tendencies, and external conditions play crucial roles, strategic interventions such as demand-based pricing, intelligent parking systems, and regulatory adjustments can help optimize parking efficiency. Future policies should focus on integrating technological solutions, personalized navigation tools, and incentive-based parking models to enhance parking experiences and alleviate congestion in urban environments.

The results also highlight significant challenges in drivers' parking preferences, primarily influenced by cost, search time, walking distance, and risk attitudes. Addressing these issues requires a combination of technological solutions, policy interventions, and improved information accessibility. By incorporating smart parking systems, pricing strategies, and behavioral insights, urban planners and policymakers can develop more effective parking management strategies to enhance convenience and reduce congestion in high-demand areas.

The findings emphasize that technological advancements, pricing strategies, shared parking models, and intelligent navigation systems are key components in optimizing parking efficiency. By leveraging smart parking solutions, dynamic pricing, and well-structured urban mobility policies, cities can alleviate parking-related challenges and enhance the overall driving experience. Future developments in AI-driven parking management, demand-based pricing, and integrated transportation systems will further contribute to reducing congestion and improving accessibility in urban environments.

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CONFLICT OF INTEREST

Authors declared that there is no conflict of interest.

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