

A Study on the Impact of Parking System on Customer Satisfaction and Patronage

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Abstract - Parking is an important part of the overall shopping experience, yet it is often treated as a secondary facility in mall planning and management. With the increasing use of private vehicles, customers frequently face problems such as limited parking availability, long waiting times, congestion, unclear parking systems, high parking charges, and difficulty in locating vacant spaces, particularly during weekends and peak hours. These issues can create frustration before customers even enter the mall and may influence their overall satisfaction and willingness to return. This study explores the relationship between mall parking facilities, customer satisfaction, and customer patronage, with a focus on understanding how parking experiences influence visitors' perceptions and behaviour.

The study adopts a design-oriented approach to understand parking as part of the overall customer journey rather than only as a functional infrastructure problem. Primary data will be collected through a structured questionnaire from mall visitors who use parking facilities. The study will examine key factors including parking availability, ease of finding a space, waiting time, parking charges, accessibility, safety, cleanliness, signage, and overall convenience. Customer feedback and existing research on parking management and customer satisfaction will be analysed to identify recurring pain points and opportunities for improvement. A user-centred perspective will be used to understand the needs, expectations, and difficulties experienced by customers throughout the parking process.

The study is expected to highlight how the quality of parking facilities can influence customers' overall experience and their intention to revisit a mall. A convenient, safe, and well-managed parking system can reduce stress and contribute positively to customer satisfaction, while inadequate parking and inefficient management may discourage repeat visits and affect patronage. From a practical perspective, the findings can help mall managers and designers identify specific parking-related issues and develop more user-centered solutions. Improvements such as clearer wayfinding and signage, better space allocation, efficient parking management systems, improved accessibility, and greater transparency in parking charges can make the parking experience more convenient. The study therefore aims to demonstrate that parking should be considered an integral part of mall experience design and not merely as a supporting facility.

Keywords : Parking Experience, Parking Search Behaviour, Consumer Convenience, Travel Time Perception

Introduction

The growth of shopping malls has changed the way people shop, spend leisure time, and interact with commercial spaces. In India, malls have increasingly become more than places for purchasing products; they also function as spaces for dining, entertainment, socialising, and recreation. As the number of visitors to these spaces increases, the need for convenient and well-managed parking has become an important part of the overall mall experience. For customers arriving by private vehicles, the experience begins not at the entrance of the mall but from the moment they enter the parking area. Difficulty in finding a vacant space, long queues at entry points, unclear directions, congestion, and concerns about safety can create stress and inconvenience before the actual shopping experience begins. Therefore, parking can play an important role in shaping how customers perceive and evaluate a mall.

Parking problems become particularly noticeable during weekends, holidays, and peak shopping hours when demand is higher than the available capacity. Customers may spend considerable time searching for a space, moving between different levels, or waiting for other vehicles to exit. In some cases, high parking charges can add to the dissatisfaction, especially when customers already expect parking to be a basic facility provided by the mall. Poor signage and inadequate wayfinding can further increase confusion, particularly in large multi-level parking areas. These issues are not limited to physical infrastructure; they also involve the way customers interact with the parking system and the ease with which they can understand and navigate it. As a result, an inefficient parking experience may influence the amount of time customers spend at the mall, their overall satisfaction, and their willingness to return.

This study focuses on understanding the impact of mall parking on customer satisfaction and patronage by looking at parking from a user-centred and design-oriented perspective. Rather than considering parking only as a question of capacity or infrastructure, the study examines it as one part of the complete customer journey. Factors such as parking availability, ease of finding a space, waiting time, charges, accessibility, safety, cleanliness, signage, and overall

convenience are considered to understand the experiences and pain points of mall visitors. Primary research through customer responses will help identify which aspects of parking have the greatest influence on satisfaction and whether negative parking experiences affect customers' intention to revisit or choose the same mall in the future.

A design approach is particularly relevant to this study because parking systems involve continuous interaction between people, physical spaces, information, and technology. Understanding these interactions can help move beyond simply identifying parking problems towards identifying opportunities for improvement. Observing the customer journey can reveal smaller points of friction that may otherwise be overlooked, such as difficulty understanding signs, uncertainty about available spaces, confusing payment processes, or challenges faced by different user groups. By combining customer feedback with a design perspective, the study aims to identify practical areas where the parking experience can be made more intuitive, accessible, and convenient.

The relevance of this study extends beyond the immediate problem of parking at malls. As urban areas continue to experience increased vehicle usage, congestion, and pressure on available space, the way parking is planned and experienced will become increasingly important. Future parking systems are likely to involve technologies such as real-time space availability, digital navigation, automated payments, and smarter parking management. However, technology alone may not solve the problem unless these systems are designed around actual user needs. This study therefore aims to contribute to a better understanding of parking as an important component of customer experience and to provide insights that can support more user-centred parking solutions for malls in the future.

Literature review

Parking has increasingly become an important part of the shopping-mall experience as the use of private vehicles continues to grow. Although parking is often treated as a supporting infrastructure, existing research suggests that it can influence how customers experience and evaluate a shopping destination. Issues such as limited parking availability, long search times, congestion, parking charges, walking distance, poor navigation, and accessibility can affect the convenience of a mall visit. The literature reviewed for this study therefore considers parking from multiple perspectives, including customer behaviour, satisfaction, parking management, accessibility, and emerging smart-parking solutions. These studies provide a foundation for understanding whether parking is simply a functional requirement or an important component of the overall customer experience.

Elattar, Albalawi, and Saleh (2023) examined parking charges and parking-search behaviour among shoppers in Riyadh, Saudi Arabia. The researchers surveyed 394 shoppers across

three shopping malls and investigated factors including parking-search time, congestion, shopping and recreation frequency, socioeconomic characteristics, and willingness to pay to reduce parking-search time. The study found that shoppers spent approximately nine minutes searching for a parking space on average and were willing to pay around 10 Saudi Riyal per visit to reduce this time. This finding is important because it demonstrates that customers place an actual value on the time lost while searching for parking. Rather than viewing parking inconvenience only as a matter of dissatisfaction, the study shows that the time spent searching can become an economic and experiential cost for visitors. This provides a useful basis for examining search time and parking charges as factors affecting customer satisfaction in malls.

Alkheder, Al Rajab, and Alzoubi (2016) investigated parking problems in Abu Dhabi, UAE, with the objective of developing an intelligent parking management system. The researchers conducted a survey of 500 respondents and examined the amount of time people spent searching for parking, particularly in commercial and mall environments. The findings showed that a significant number of respondents spent between five and fifteen minutes searching for a parking space, while some participants reported search times of more than thirty minutes. The problem was also more noticeable during weekends when parking demand increased. The study proposed the use of an intelligent parking system to improve parking management and reduce search time. This research establishes a clear relationship between increased parking demand, time wastage, and the need for better parking management. However, its main focus is on system efficiency rather than the emotional and experiential response of customers.

A more direct relationship between parking and customer behaviour is explored by Abegunde, Oguntokun, and Fayomi (2026) in their study, *Effects of Parking Space on Customer's Satisfaction and Patronage in Shopping Malls at Akobo, Ibadan*. The study examined two shopping malls in Akobo, Ibadan, using questionnaires, interviews, and information from facility-management personnel. A total of 155 consumers participated in the research. The researchers examined several aspects of parking, including parking-space size, layout, aesthetics, ambience, signage, congestion, CCTV, safety, distance between parking and the mall, parking tariffs, trolley availability, and traffic circulation. The findings showed that customers experienced frustration while searching for parking and that parking satisfaction had a statistically significant relationship with customer patronage. The study is particularly relevant to the present research because it moves beyond identifying parking as an inconvenience and investigates whether customers' perceptions of parking can influence their decision to use a shopping mall.

Van der Waerden, Borgers, and Timmermans (1999) examined how parking conditions influence store-choice behaviour in

shopping centres. Their research was conducted at a regional shopping centre in the Netherlands and considered factors such as the number and location of parking spaces, the distance between parking areas and stores, and consumers' parking-lot choices. The study found that characteristics of parking arrangements could influence consumer choice, particularly when customers had to deal with longer walking distances. This finding is significant because having a parking space does not necessarily mean that the parking experience is convenient. The distance between the vehicle and the final destination can also influence how customers evaluate the shopping experience. For the present study, this suggests that parking satisfaction should include not only availability but also walking distance and accessibility from the parking area to the mall entrance.

Van der Waerden and Timmermans (2014) explored another important aspect of the parking experience: drivers' familiarity with the parking facilities around regional shopping centres. The researchers examined how drivers' familiarity was influenced by factors such as age, gender, education, home location, shopping frequency, travel mode, probability of finding a free parking space, parking cost, driving space, and walking distance. The study highlights that the existence of parking spaces does not automatically mean that customers can use them efficiently. Drivers need to know where the available spaces are and understand the options available to them. This is particularly relevant to large shopping malls with multi-level parking facilities, where poor signage or unclear navigation can make an available parking space difficult to locate. From a design perspective, this research supports the importance of wayfinding, information systems, and clear communication within parking environments.

Müller, Ertl, Gutenbrunner, Scheuchenpflug, and Ostermayer (2026) approached mall parking from the perspective of parking efficiency and predictive technology. Their study used real-world parking data from an Austrian shopping mall to examine parking duration and the assignment of spaces according to expected parking duration. The researchers found that unguided drivers required more time to find parking and that search time increased as parking occupancy increased. The study explored parking-space assignment strategies that could reduce search time and improve the use of available spaces. This research demonstrates how technology and data can be used to address parking problems without relying only on increasing the physical capacity of a parking facility. However, the study mainly focuses on operational efficiency and does not deeply investigate customers' emotional responses or satisfaction. This creates an opportunity for a design-oriented study to consider how such systems can be made understandable, accessible, and convenient for users.

The issue of insufficient parking capacity is also addressed through the concept of spillover parking. The study *Spillover Parking* (2019) examines parking generated by retailers such as shopping malls when the available on-site parking is not sufficient to accommodate demand. In such situations,

customers may park on surrounding streets or other nearby locations and walk to the mall. This can create additional traffic and parking pressure outside the mall itself and may affect local residents and other road users. The study therefore demonstrates that mall parking problems can extend beyond the boundaries of the parking facility. From the perspective of customer experience, this can increase the amount of time required to reach the mall and create additional inconvenience. For the present study, spillover parking is relevant because it shows that parking availability can have wider effects on accessibility, traffic movement, and the overall journey to the shopping destination.

Anselmsson (2006) examined the broader factors that contribute to customer satisfaction with shopping malls. Although parking was not the central focus of the study, the research identified several dimensions associated with the mall experience, including selection, atmosphere, convenience, salespeople, refreshments, location, promotional activities, and merchandising policy. The inclusion of convenience and location is relevant to parking because the parking facility forms part of the physical convenience offered by a mall. Customers do not experience parking separately from their shopping journey; instead, parking is connected to entering the mall, moving between the vehicle and destination, and beginning or ending the visit. This research therefore supports the need to consider parking as one component of a larger customer-experience system. However, it also indicates a gap, as parking-specific factors such as search time, signage, congestion, and parking charges require more focused investigation.

Ersoy, Hasker, and İnci (2016) examined the economic role of parking in shopping malls through the concept of parking as a "loss leader." The study considered the decision between travelling by car and using public transportation and explored why shopping malls may provide parking free of charge or at relatively low prices even though parking infrastructure can be expensive. This perspective is useful because parking charges can influence how customers perceive the value and convenience of a mall visit. However, the study primarily approaches parking from an economic and transportation perspective rather than examining customers' emotional reactions to parking charges. This creates scope for further research into whether customers consider parking fees reasonable, whether charges influence their satisfaction, and whether parking costs affect their willingness to revisit a mall.

Caicedo (2009) investigated the use of parking-space availability information to reduce search time in parking facilities. The study examined Parking Access and Revenue Control systems and considered how information about available spaces could be communicated to drivers. The research showed that dividing parking facilities into internal zones and providing availability information could reduce parking-search time. This is particularly relevant to mall parking because large facilities can be difficult to navigate even when spaces are available. Information systems, signage,

and real-time availability indicators can help customers make quicker decisions and reduce unnecessary movement within the parking area. The study therefore provides a strong basis for considering wayfinding and information design as possible areas of intervention. However, the research primarily evaluates the reduction of search time, leaving room to explore whether reduced search time also improves customers' perceived convenience and overall satisfaction.

Karunarathna (2026) examined the conversion of conventional shopping-mall car parks into smart parking facilities. The research used an Analytic Hierarchy Process with 45 experts to identify important factors for implementing smart parking in shopping malls. Operational efficiency and technological feasibility emerged as two of the most important categories. The study indicates that transforming a traditional parking facility into a smart system requires more than simply introducing technology; the technology needs to work with existing infrastructure and operational requirements. This is relevant to a design-oriented study because any proposed parking solution should respond to real user problems while also being practical for mall management. At the same time, the study focuses mainly on expert evaluation and implementation rather than direct customer experiences. A user-centred approach can therefore complement this work by identifying what customers actually need from smart parking systems.

Indian research provides additional context for understanding the relationship between mall services and customer satisfaction. Srinivasan, Vijayalakshmi, and Sahila (2024) examined customer satisfaction with services provided by shopping malls in Madurai City. The study recognised sufficient parking space as an important factor in attracting customers and examined customer preferences and satisfaction with mall services. Although parking was not the main focus of the research, its findings support the idea that parking contributes to the attractiveness of a shopping mall. This is particularly relevant to the present study because it provides an Indian context for examining parking as part of the overall customer experience. However, there remains a need for research that focuses specifically on the difficulties customers experience within mall parking facilities and examines how these difficulties influence satisfaction and patronage.

Kuruvilla and Joshi (2010) examined mall patronage in India through a large-scale study involving 3,026 consumers across eight Indian cities. The study investigated demographic and psychographic characteristics, shopping orientation, mall-shopping attitudes, and purchasing patterns. Although parking was not the central research variable, the study provides useful background on the growing mall environment in India, where crowded parking areas can occur alongside busy stores and food courts. This context is important because increasing mall patronage can place greater pressure on parking facilities, particularly during peak periods. The study therefore supports the need to examine the physical and

service conditions that accompany increasing mall usage. A more focused investigation of parking can build on this research by examining whether parking-related inconvenience affects the decision to visit, revisit, or choose a particular mall.

Chakraborty, Mori, Nomura, and Das Mahapatra (2024) examined universal design features in shopping malls through a case study of malls in Kolkata, India. The study considered accessibility within the built environment and highlighted limitations in the availability of accessible facilities, including parking-related accessibility. This research is significant because it demonstrates that parking quality cannot be evaluated only through the number of available spaces. The usability, location, accessibility, and connection between parking areas and mall entrances are also important. For customers with mobility limitations or other accessibility requirements, these factors can significantly affect the ease of completing a mall visit. From a design perspective, this supports the inclusion of accessibility as an important variable when examining parking experiences.

A study of on-street parking in Sonipat also provides a useful local context for understanding parking demand and spillover. The study included locations such as Tulip Point Mall and examined parking conditions during different periods. It reported that parking demand becomes particularly problematic during peak periods and that when parking areas become full, vehicles may extend outside the intended parking area. The study also examined willingness to pay parking fees for different purposes and found differences depending on whether the trip was for recreation, shopping, banking, or shorter activities. Although the study is focused on on-street parking rather than the complete mall parking experience, it is relevant to the present research because it provides a geographical connection to Sonipat and demonstrates that parking demand and willingness to pay can vary according to the purpose of a visit.

Research Gap

The reviewed literature shows that mall parking is a multidimensional issue involving more than the availability of parking spaces. Research has identified measurable problems such as parking-search time, congestion, walking distance, parking charges, navigation difficulties, accessibility, and parking capacity. Some studies demonstrate that parking can influence store or mall choice, while recent research has found a significant relationship between parking satisfaction and customer patronage. At the same time, other research suggests that parking conditions do not automatically determine the economic performance of a shopping centre. This indicates that the relationship between parking and customer behaviour is complex and should be investigated rather than assumed.

A major gap identified from the literature is the limited integration of parking research with a user-centred design perspective. Many existing studies focus on transportation planning, economic factors, traffic management, parking

capacity, or technological efficiency. Comparatively less attention is given to the complete customer journey through the parking environment and to how different problems combine to influence the user's perception of a mall. The present study addresses this gap by examining parking as an experience involving physical space, information, navigation, technology, accessibility, and human behaviour. It aims to understand not only whether customers can find parking but also how easy, safe, convenient, and satisfying the overall experience is.

Based on the reviewed literature, the present research will examine factors including parking availability, search time, congestion, parking fees, walking distance, ease of navigation, safety, accessibility, and overall parking satisfaction, and explore their relationship with customer patronage and revisit intention. These variables are supported by the problems and measurable factors identified across the reviewed research. The findings can subsequently be used to identify design opportunities such as clearer wayfinding, improved information systems, better parking-space allocation, accessible parking, improved traffic circulation, and smart parking solutions. In this way, the research moves from identifying parking problems towards understanding how the parking experience can be improved through a more user-centred approach.

Design Process

The design process translates the research findings into a user-centred parking experience. The proposed system is designed around a simple idea: users should not have to drive around a large parking facility, decode confusing signs, or remember where they left their vehicle. Instead, the system connects parking-space information, kiosk-based discovery, QR access and mobile navigation into one continuous journey.

1. Problem Identification

The literature review identified parking-search time, congestion, unclear navigation, limited visibility of available spaces, walking distance, accessibility and difficulty remembering a parked vehicle as recurring problems. These issues become more significant in large multi-level malls where the number of parking bays, ramps, zones and entrances makes the physical environment difficult to understand.

The design problem was therefore defined as an information and navigation problem in addition to a physical parking problem. Even when parking spaces exist, users may not know which spaces are free, which level is appropriate, how to reach a selected space, or how to find their vehicle after shopping.

How might we help mall visitors find a suitable parking space quickly, navigate to it confidently, and find their vehicle again without confusion?

2. User Needs

The user needs were derived from the parking problems identified in the literature and from the complete parking journey represented by the proposed concept.

User Need	Design Response
Find available parking quickly	Show available/occupied spaces clearly so users can make a decision before driving through multiple areas.
Choose a suitable space	Provide categories and filters for requirements such as accessible parking, EV charging and other designated spaces.
Understand the parking layout	Present levels, zones, bay identifiers, entrances, exits, elevators and circulation paths in a consistent visual system.
Navigate inside the parking facility	Provide turn-by-turn guidance from the user's current position to the selected parking slot.
Access the service easily	Use a QR code at the parking kiosk to transfer the selected parking information to the user's phone.
Know the exact parked location	Save the selected bay and parking information so the user can return to it later.
Find the car after shopping	Provide a 'Find My Car' route that guides the user back to the saved parking location.
Minimise mental effort	Keep the flow focused on a small number of decisions and avoid forcing users to interpret the whole parking map at once.

3. User Flow

The proposed flow connects the physical parking environment, kiosk and mobile website. The flow begins when the visitor arrives at the parking entrance and ends when the visitor exits after successfully returning to the vehicle.

3.1 Finding and Parking the Vehicle

- Arrival at the parking entrance — the user enters the parking facility and accesses the parking dashboard.
- Checking available slots — the user views occupied and empty spaces and can apply filters such as accessible parking, EV charging or other relevant requirements.
- Selecting a preferred slot — the user chooses a suitable parking location from the available spaces.
- Scanning the QR code — the user scans the QR code displayed on the parking kiosk/dashboard. The mobile parking website opens with the selected slot information.
- Viewing the mobile home screen — the selected parking location, route-related information and key actions are made available on the phone.
- Navigation to the slot — the system provides turn-by-turn guidance so the user can reach the selected bay with fewer unnecessary movements.
- Parking the vehicle — the user reaches the selected bay, parks the vehicle and the parking timer starts. The selected location is saved on the phone.

3.2 Returning to the Vehicle and Exiting

- Leaving the vehicle — the user leaves the car and continues the mall visit while the parking information remains saved.
- Returning to the car — the user opens the mobile parking website again and selects 'Find My Car'.
- Walking navigation — the system provides directions from the user's current location back to the saved parking slot.
- Exiting the parking facility — after reaching the vehicle, the user follows the parking circulation route towards the exit. The journey ends without requiring the user to remember the exact route independently.

This flow is important because the parking problem is not limited to finding a vacant bay. The experience has two distinct navigation moments: getting to the vehicle and getting back to it. The proposed system addresses both.

4. Wireframes

The wireframing stage focused on establishing the information hierarchy and interaction logic before applying the final visual treatment. The main design decision was to separate discovery from navigation. The kiosk provides a broad view of parking availability and categories, while the mobile experience focuses on the selected slot and the user's immediate journey.

- Parking discovery is placed at the beginning of the flow so users can understand availability before committing to a route.

- Vehicle type and parking-level controls allow the system to adapt to different parts of the parking facility.
- Parking categories make specialised spaces discoverable without requiring users to inspect every bay.
- The map is the primary visual element because the task is spatial rather than text-heavy.
- Bay identifiers provide a bridge between the digital map and the physical parking environment.
- QR access creates a transition from the shared kiosk to the user's personal mobile interface.
- The mobile interface prioritises the selected slot, route guidance, timer and saved parking information.
- The return journey includes a dedicated 'Find My Car' function rather than expecting users to reverse-engineer the original route.

The wireframes therefore establish a progressive disclosure model: users first see the information required to choose a parking space, then receive more detailed information once a destination is selected. This reduces the need to process the entire parking structure at once.

5. Mockups / Final Design

The final mockups present the parking system as a high-contrast digital interface using a dark base with orange highlights. The visual treatment is intended to support the technical and infrastructural nature of the parking environment while keeping active states, selected bays and controls visually distinguishable.

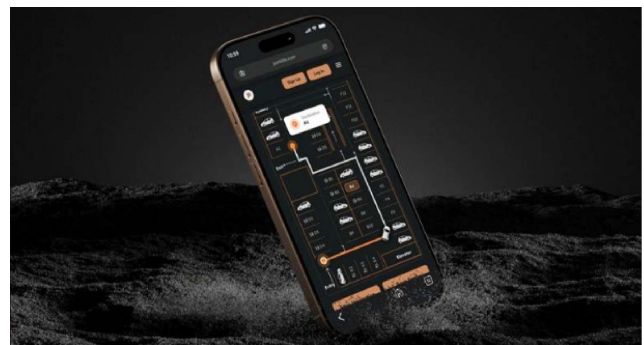


Figure 1. Mobile parking interface showing the selected parking location and route through the parking structure.

The mobile mockup represents the personal navigation layer of the system. A selected parking location is visually highlighted on the map, with the route connecting the entrance/current position to the destination. Bay labels and circulation information allow the digital route to correspond with the physical environment.



Figure 2. Parking kiosk interface showing Level 1, vehicle selection, parking categories, bay identifiers and circulation paths.

The kiosk acts as the shared discovery and orientation point. Users can switch between Car and Bike, select a parking level, and identify categories such as Accessible Parking, Electric Vehicle Charging Slot, VIP/Reserved, Valet Parking Zone, Loading-Unloading and general Parking Zone. The detailed map shows bay codes, vehicle positions, entrances, exits, elevator access and directional movement.



Figure 3. Parking kiosk interface showing Level 2 and demonstrating consistency across multiple parking floors.

The Level 2 mockup demonstrates that the interaction model can remain consistent across different floors. Users can switch levels without learning a new interface, while bay identifiers and circulation paths retain the same visual language.

5.1 Design Decisions

Map-first interface: The parking map receives the greatest visual emphasis because spatial orientation is the primary task.

Level navigation: Level controls make the multi-storey structure explicit and allow users to inspect a specific floor.

Clear parking categories: Specialised parking areas are presented as explicit categories instead of being hidden within the map.

Physical bay references: Identifiers such as A1, B4 and F13 provide recognisable references that can be matched with physical signage.

Route visibility: Directional paths make the intended movement understandable without relying on lengthy written instructions.

QR-to-mobile transition: The kiosk provides the starting point, while QR scanning transfers the relevant parking information to the user's own device.

Saved location and timer: The mobile experience retains the parking location and timing information for use during the mall visit.

Find My Car: The return journey is treated as a separate task and supported through walking navigation back to the saved bay.

Consistent system language: The same levels, bay codes and categories can be used across kiosk, mobile interface and physical signage.

6. How the Design Addresses the Parking Problem

The proposed design does not solve the physical shortage of parking capacity. Its purpose is to reduce the information and navigation problems that cause users to spend additional time and effort inside a parking facility.

Parking-search time: Showing available/occupied spaces and allowing users to select a suitable bay reduces unnecessary searching.

Unclear parking layouts: The level-based map communicates the structure of multi-storey parking in a single visual system.

Poor wayfinding: Directional routes, bay identifiers, entrances, exits and vertical circulation create a continuous navigation language.

Difficulty identifying special spaces: Accessible, EV, VIP/reserved, valet and loading/unloading areas are explicitly represented.

Information transfer: QR scanning connects the kiosk experience to the user's mobile device so the selected parking information can travel with the user.

Navigation to the selected slot: Turn-by-turn guidance reduces the need to interpret the parking map while driving.

Forgetting the parked location: The system saves the selected parking location and timer for later reference.

Difficulty finding the vehicle: A dedicated 'Find My Car' function provides walking navigation back to the saved location.

Inconsistent physical and digital references: Using the same level and bay identifiers across the system can make physical signage easier to relate to the digital interface.

The key contribution of the design is therefore the continuity of the parking journey. Instead of treating parking discovery, navigation and vehicle retrieval as separate problems, the system connects them through one information structure: discover a suitable space, transfer the destination to the phone, navigate to the bay, save the location, and navigate back later.

Conclusion

Mall parking is often treated as a supporting facility, but the literature reviewed in this study shows that it can influence the quality of the overall customer journey. Long search times, congestion, unclear navigation, walking distance, accessibility limitations and uncertainty about parking availability can create frustration before customers even enter the mall. Research from different contexts also suggests that parking satisfaction can be related to customer patronage, while other studies caution that parking alone does not determine shopping-centre performance. This makes parking an important but multidimensional customer-experience factor rather than a problem that can be explained only through the number of available spaces.

The design process translated these findings into a user-centred parking solution focused on reducing uncertainty and unnecessary effort. The identified user needs included finding suitable parking quickly, understanding multi-level layouts, identifying specialised parking spaces, navigating to the selected bay, transferring parking information to a personal device, remembering the parked location and finding the vehicle again after shopping. The proposed experience connects an interactive parking kiosk with a mobile interface. The kiosk supports parking discovery and spatial orientation, while QR access transfers the selected parking information to the user's phone. The mobile experience then supports navigation to the chosen slot, saving the parking location and returning to the vehicle through a dedicated 'Find My Car' function.

The final mockups demonstrate a consistent visual and information system across parking levels. Clear bay identifiers, level controls, parking categories, directional routes, entrances, exits and vertical circulation are used to connect the digital interface with the physical parking environment. This approach addresses the information and navigation aspects of parking inconvenience without claiming to increase physical parking capacity.

The current design should be considered a research-backed design proposal rather than evidence of proven behavioural impact. Future validation should test whether the system actually reduces parking-search time, navigation errors and perceived effort, and whether these improvements translate into higher parking satisfaction or stronger revisit intention. Overall, the study demonstrates that mall parking can be approached as a UX problem as well as an infrastructure problem. A connected, user-centred parking experience can make existing facilities easier to understand, navigate and use, providing a stronger foundation for smarter and more customer-focused mall environments.

Future Scope

The system can be further developed into a connected smart-parking service with real-time and predictive availability, indoor navigation, Find My Car, accessibility-aware routing, EV charging integration, dynamic signage, voice and multilingual guidance, and integration with other mall services. Management analytics could help track occupancy, peak demand and congestion. The next key step would be real-world testing with mall visitors to evaluate search time, navigation accuracy, task completion, errors, workload and overall parking satisfaction.

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