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Reuse Intentions for Carsharing Services: A Hierarchical Model of Perceived Benefits, Risks, and Individual Differences

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Abstract

This study employs a hierarchical component model to examine reuse intentions among experienced carsharing service users in South Korea, focusing on how various perceptions of benefits and risks impact their decisions. It also explores the influences of self-efficacy, gender, and service usage experience on these perceptions and reuse intentions. Findings highlight that male users are primarily driven by functional benefits such as accessibility and convenience, whereas female users are more responsive to hedonic benefits. Users with high self-efficacy prioritize economic benefits, whereas those with more usage experience prioritize functional benefits. Additionally, social risks significantly deter reuse intentions predominantly among male and less experienced users. By utilizing a hierarchical model, this study offers a deeper understanding of how each dimension of benefits and risks affect overall perceptions, facilitating tailored strategies for carsharing services. The insights contribute valuable theoretical and practical perspectives on the dynamics of carsharing service usage.

Keywords: Carsharing service, Perceived benefit, Perceived risk, Reuse intention, Self-efficacy

1. Introduction

The sharing economy, exemplified by collaborative consumption maximizing resource utility and reduce waste (Botsman and Rogers 2010), has gained considerable academic attention as a new consumption paradigm. Car sharing services, a rapidly expanding segment of the sharing economy (Huang and Nan 2023), have significantly alleviated the need for private vehicle ownership, addressing urban mobility and parking issues and enhancing convenience for those in underserved transportation areas (Czarnecki 2023). Carsharing has evolved globally as a sustainable mobility option (Aguilera-García et al. 2022; Hu et al. 2023). Unlike traditional rental, car-sharing allows users to rent vehicles for very short periods, from multiple urban locations, enhancing economic value and convenience (Huang and Nan

2023; Jain, Rose, and Johnson 2021). Despite its benefits, persistent user complaints suggest potential threats to the industry's sustainability (Hu et al. 2023; Jain, Rose, and Johnson 2021), highlighting the importance of understanding user perceptions and reuse intentions. However, existing research primarily explores initial adoption intentions, with limited understanding of the changing perceptions among current users, as highlighted by several researchers (Hu et al. 2023; Huang and Nan 2023). Moreover, the entire car-sharing process operates online without direct human interaction. This operational difference underscores the need to explore how personal characteristics influence perceived benefits, risks, and reuse intentions. Understanding these factors and the underlying complexities related to consumer characteristics can offer more targeted insights for supporting the sustainable development of the carsharing industry.

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Therefore, this study seeks to address these gaps by using a hierarchical component model to analyze how various benefit and risk perceptions influence reuse intentions. It assesses these perceptions as high-order factors with multiple sub-dimensions, using formative scales for evaluations of relative influence. This approach allows for a deeper examination of the specific factors that motivate or deter service usage. Moreover, this study explores influences of individual characteristics including self-efficacy, gender, and usage experience in the proposed relationships. Understanding these differences can offer deeper insights into user behavior, aiding in the development of targeted strategies to enhance user experience and foster service loyalty. Theoretically, this study integrates the Net Valence Model (NVM) and the Value-based Adoption Model (VAM) to investigate how the trade-offs between perceived benefits and risks impact value perceptions and the reuse intention among existing service users. By integrating these models, the study aims to offer comprehensive insights into how users evaluate the trade-offs between benefits and costs of carsharing, thus providing implications for fostering long-term user engagement and promoting sustainable service practices within the carsharing industry.

2. Literature review

2.1. Sharing economy and car sharing services

The rise of a rational consumption culture, coupled with advancements in digital technology and urbanization, has significantly expanded the sharing economy. This growth is accelerated by consumers' desires for accessible services at reduced costs, facilitated by mobile technology (Oh et al. 2018). The sharing economy, as defined by Botsman and Rogers (2010), creates new value through the sharing, exchanging, and lending of owned assets, emphasizing access over ownership. This model promotes efficiency, waste reduction, and environmental benefits by decreasing overproduction and overconsumption (Heinrichs 2013).

Globally, countries are increasingly embracing the sharing economy as a means to boost local economies and public engagement, with policymakers focusing on its potential to rejuvenate economic landscapes (Oh et al. 2018). Carsharing exemplifies this shift by allowing multiple users to share vehicles for designated time periods. Unlike traditional car rentals that offer day-long leases, carsharing services provide more flexible, minute-by-minute rentals available from strategically located parking spaces within residential areas (Korea Consumer Agency 2017). These

services leverage information and communication technology, mobile payment systems, and online-to-offline services, enhancing convenience through digital platforms that manage car searches, reservations, and payments (Kim and Han 2020).

Carsharing services feature diverse business models which can be broadly categorized into peer-to-peer (P2P) and business-to-consumer (B2C) types. In P2P carsharing models, individual vehicle owners rent their vehicles to other users for a fee via organized sharing platforms (Ramos, Mattos, and Bergstad 2023; Turon 2023). These models are particularly appealing in densely populated, high-income cities (Amirnazmifshar and Diana 2022). On the other hand, B2C carsharing, the more prevalent model (Nicolescu, Dominici, and Vatamanescu 2024), offers access to company-owned vehicles through memberships or on a pay-per-use basis (Shaheen, Cohen, and Farrar 2019). This model can be implemented through two-way, one-way, or free-floating (FF) systems, each integrating with public transportation options to enhance urban mobility. Two-way services require users to return the vehicle to the original pickup location, one-way services allow users to return it to a different designated location, and free-floating services permit parking anywhere within a defined public area, offering the highest flexibility (Mattia, Mugion, and Principato 2019; Shaheen, Cohen, and Farrar 2019; Turon 2023). As sustainable cities aim for lower car ownership, these models have distinct implications for urban planning and environmental sustainability (Nicolescu, Dominici, and Vatamanescu 2024). For instance, B2C carsharing can reduce the total number of cars needed by providing access without the ownership burdens of maintenance and parking. On the other hand, P2P carsharing utilizes existing vehicles more efficiently, potentially decreasing the need for new vehicle production and lowering the overall carbon footprint (Amirnazmifshar and Diana 2022).

Furthermore, a review by Amirnazmifshar and Diana (2022) on socio-demographic factors affecting the demand for different carsharing models found that males, younger individuals, and those with above-average income tend to prefer FF services, while users with more sustainable lifestyles often choose round-trip services. This indicates that different business models can attract diverse user profiles, each seeking unique benefits tailored to their needs. The diffusion of these models also varies across countries, influenced by local social and environmental conditions (Ramos and Bergstad 2021; Ramos, Mattos, and Bergstad 2023). Since its introduction in 2011, the carsharing industry in South Korea has experienced significant growth, led by B2C platforms like Green-car and Socar, despite facing regulatory and market

challenges (Kim, Bin, and Kim 2020). However, there remains a gap in understanding the specific factors and mechanisms that drive the reuse intentions of current carsharing users, despite the evident differences between users and non-users (e.g., Ramos and Bergstad 2021).

2.2. Net Valence Model (NVM)

Consumers often make decisions based on incomplete information, confronting risks and uncertainties that may discourage purchases (Kim, Ferrin, and Rao 2008). Risk reduction strategies like information gathering are commonly used to mitigate perceived risks, highlighting their significant role in consumer behavior (Lim 2003; Nicolescu, Dominici, and Vatanescu 2024). However, this risk-centric view may overshadow potential positive outcomes, prompting the development of models that also consider perceived benefits (Wilkie and Pessemier 1973). The NVM, proposed by Peter and Tarpey (1975), provides a balanced framework by evaluating both positive and negative outcomes of purchasing decisions. It suggests that consumers assess these attributes to maximize their net benefit, influencing their attitudes and behavioral intentions. This model has been utilized in various domains, including internet banking (e.g., Kaur and Arora 2023), mobile payments (e.g., Oh 2015), Autonomous vehicles (e.g., Alshaafee and Iahad 2019) to explore how perceived benefits and risks impact user intentions and behaviors. Specifically, Alshaafee and Iahad (2019) applied the VNM model to examine the impact of various dimensions of perceived benefits and risks on novice drivers' adoption intentions for autonomous vehicles, along with additional individual and market variables. These studies highlight that perceived benefits typically bolster user intentions, while risks tend to diminish them, although the extent of influence of specific benefits and risks can vary by context (Sohn 2024). For carsharing services, this implies a need to identify and examine specific dimensions of perceived benefits and risks that are most relevant to users, which is crucial for comprehending what motivates or deters continuous use of the services (Huang and Moon 2020). Adapting the NVM to carsharing provides deeper insights into consumer behavior, enabling the development of targeted marketing strategies that effectively address specific user concerns and preferences.

2.3. Value-based Adoption Model (VAM)

The VAM, which extends the Technology Adoption Model introduced by Davis, Bagozzi, and Warshaw

(1989), explains how new technologies are adopted based on perceived usefulness and other factors. In TAM, perceived usefulness indicates the benefits derived from using the technology, reflecting the consumer's evaluation of the product's superiority (Davis, Bagozzi, and Warshaw 1989). Emotional value, as described by Sweeney and Soutar (2001), is the utility derived from the feelings a product evokes, enhancing usage frequency when technology use is enjoyable (Davis, Bagozzi, and Warshaw 1989). The costs associated with technology adoption include both monetary experiences and non-monetary sacrifices such as ease of use, system reliability, and efficiency, which encompass time, effort, and psychological burden (Kim, Chan, and Gupta 2007). VAM posits that consumer behavior is driven by value maximization, where perceived value, a critical determinant of usage intention, is assessed through a trade-off between benefits and costs—both monetary and non-monetary (Kim, Chan, and Gupta 2007). Integrating the principles of VAM, Zhu, So, and Hudson (2017) explored consumer motivations for adopting ridesharing services apps by examining how perceived benefits and risks impact perceived value, which in turn affect attitudes and intentions. They found the critical role of benefit perceptions in shaping overall perceived values and adoption intentions, in addition to personal characteristics such as self-efficacy. Similarly, in the context of carsharing services, Huang and Moon (2020) highlighted that perceived value is more effective in explaining continuous usage of a service compared to perceived usefulness, as initial adoption is typically driven by perceived usefulness. These studies illustrate that the impact of perceived benefits and risks on perceived value varies by service context and user characteristics. Therefore, this study integrates NVM and VAM to investigate how trade-offs between perceived benefits and risks influence perceived value and reuse intentions among carsharing users.

2.4. Multidimensionality of perceived benefits

The literature on consumer behavior highlights that consumers focus more on the benefits received from a product or service than its technical features. These benefits are subjective rewards or outcomes anticipated from product use (Peter and Olson 1994). They vary based on individual needs, desires, and values. Keller (1993) initially categorized perceived benefits into functional, experiential, and symbolic. Lai (1995) expanded these into functional, social, emotional, cognitive, aesthetic, hedonic, conditional, and overall benefits. In the service sector, Gwinner, Gremler, and Bitner (1998) identified benefits as economic, social,

psychological, and customization. Although there exist some variations, studies on carsharing services consistently highlight economic, functional, hedonic, and environmental benefits (e.g., Park and Lee 2022; Wang et al. 2019).

Economic benefits, defined as the perceived monetary cost advantages of using carsharing services, play a vital role in shaping customer-company relationships (Gwinner, Gremler, and Bitner 1998). Böcker and Meelen (2017) highlighted economic motives as key drivers in the sharing economy. Carsharing offers flexibility, allowing users to access vehicles only as needed, thus avoiding the expenses associated with vehicle ownership such as parking and maintenance fees (Jain, Rose, and Johnson 2021; Schaefers, Lawson, and Kukar-Kinney 2016). These economic benefits positively influence the perceived usefulness of carsharing services, thereby increasing user's intention for continued use (Park and Lee 2022).

Similarly, functional benefits, defined as consumers' perceived convenience, encompass the practical aspect of using a service (Lai 1995). These benefits can include the ease of searching, booking, and utilizing vehicles through digital platforms (Bae, Jeon, and Kang 2019). In carsharing, this convenience is underscored by nearby vehicle rentals and self-service technologies that support real-time reservations and transactions via mobile devices (Kim and Han 2020). Studies have found that the convenience of carsharing services significantly influences user attitudes and intentions to use these services (Czarnetzki 2023; Jang and Park 2019; Nicolescu, Dominici, and Vatanescu 2024).

Hedonic benefits, defined as emotional values such as fun and enjoyment from a service or product (Lai 1995), significantly contribute to user engagement and choices (Alshaafee and Iahad 2019). These benefits are vital for shopping motivations and emotional experiences (Babin, Darden, and Griffin 1994). In carsharing services, hedonic benefits enhance user experience by offering a variety of car models and adding convenience, making service use more enjoyable (Jain, Rose, and Johnson 2021). Such experiences significantly enhance the perceived benefits of using carsharing services (Park and Lee 2022; Ramos, Matos, and Bergstad 2023).

Lastly, environmental concerns drive consumers toward eco-friendly options (Bae, Jeon, and Kang 2019; Safdar et al. 2022). Carsharing services offer a sustainable alternative by minimizing the environmental footprint associated with private ownership (Aguilera-García et al. 2022). This aspect not only conserves resources but also reduces pollution and congestion, fostering a sustainable environment (Park and Moon 2013; Safdar et al. 2022). Studies have

shown that perceived environmental benefits from using carsharing strongly increase attitudes towards these services (Hartl et al. 2018; Jin and Park 2018). Mattia, Mugion, and Principato (2019) further demonstrated that environmental concerns significantly increase the intention to continue using carsharing services. Based on these insights, the following hypothesis is proposed:

H1. *Perceptions of (a) economic, (b) functional, (c) hedonic, and (d) environmental benefits positively influence perceived benefits in carsharing services, serving as a higher-order factor.*

2.5. Multidimensionality of perceived risk

Perceived risk, defined as a consumer's perception of the uncertainty and potential negative outcomes of purchasing a product or service, significantly shape consumer behavior (Dowling and Staelin 1994). These perceptions are subjective, influenced by personal values, involvement levels, and specific circumstances (Conchar et al. 2004). Studies have categorized perceived risks into several types, including financial, performance, physical, social, and psychological risks (Jacoby and Kaplan 1972), with additional consideration of time and privacy risks (Featherman and Pavlou 2003). In the domain of carsharing, previous research has explored various dimensions of perceived risk, commonly highlighting five key dimensions: performance, time, financial, social risks, and privacy risks (e.g., Hall and Royles 2016; Liang, Li, and Xu 2018; Sohn 2024).

Performance risk arises when a product or service fails to meet expected standards (Grewal, Gotlieb, and Marmorstein 1994). Such concerns are particularly pertinent when adopting new technologies (Alshaafee and Iahad 2019; Sohn 2024). In carsharing, performance issues might occur with vehicles or apps, complicating user experiences. These performance risks can substantially diminish trust in carsharing platforms (Liang, Li, and Xu 2018), indicating that users may have concerns about the reliability of both the app and the vehicles when using carsharing services. Studies on carsharing consistently found that perceived performance risk significantly reduces consumers' adoption behavior or usage intentions (Wang et al. 2019).

Time risk is concerned with the potential loss related to the time spent researching, purchasing, setting up, and learning to use a product or service (Featherman and Hajli 2016). Issues such as difficulty in locating the carsharing parking lot or vehicle, lengthy vehicle inspection and return processes, and time-consuming learning of service terms and

methods can be burdensome for users (Jain, Rose, and Johnson 2021; Nicolescu, Dominici, and Vatamanescu 2024). Perceived time risk is a crucial factor in consumer decisions, reflecting the need for more efficient and reliable products or services that save time (Alshaafee and Iahad 2019).

Financial risk involves concerns about the costs associated with using, maintaining, or purchasing a product or service (Jacoby and Kaplan 1972; Sohn 2024). In carsharing, unexpected costs such as mileage surcharges or non-covered insurance incidents can amplify this risk. According to a 2017 report by the Korea Consumer Agency, there were numerous complaints about excessive billing for repairs, penalties, and overcharges. Such concerns can deter user decisions about service usage (Alshaafee and Iahad 2019; Park and Kim 2017).

Social risk captures the fear that an individual's actions or decisions might negatively impact their social standing (Mitchell 1992; Sohn 2024). This risk involves concerns about negative reactions from others, especially in public contexts, where consumers may fear losing status within their social circles or not keeping up with trends (Featherman and Pavlou 2003). Such perceptions significantly influence consumer behaviors, particularly in decisions related to the adoption of new technologies (Sohn 2024; Park and Kim 2017). In carsharing, users operate vehicles that are not their own, potentially leading to negative social judgments. Zhu, So, and Hudson (2017) found that social perceptions about car ownership significantly influence purchasing decisions. Similarly, Hawapi et al. (2017) discovered that the decision to use carsharing services is heavily influenced by the social risks perceived by one's social network.

Finally, privacy risk involves the potential for misuse of personal information (Featherman and Pavlou 2003). This risk includes unauthorized exposure or malicious use, potentially resulting in identity theft, defamation, and other serious issues. Such incidents not only violate privacy but can also result in financial losses and crimes, highlighting the importance of robust information security and personal data protection (Kim and Lee 2006; Sohn 2024). In carsharing, privacy risk is particularly relevant as personal data, including driver's licenses and credit card details, are necessary for service use and are stored in the system (Lee 2021). A breach in personal data security can severely undermine trust in carsharing platforms and decrease usage intentions (Sohn 2024; Shah et al. 2021; Wang et al. 2019). Based on these insights, the following hypothesis is proposed:

H2. *Perceptions of (a) performance, (b) time, (c) financial, (d) social, and (e) privacy risks positively influence*

perceived risks in carsharing services, serving as a higher-order factor.

2.6. Perceived value

Perceived value is a comprehensive assessment of a product's utility relative to its cost (Zeithaml 1988). This assessment extends beyond mere quality evaluation. It involves assessing what is received against what must be sacrificed, encompassing not only the price but also time, effort, and other non-financial costs (Nicolescu, Dominici, and Vatamanescu 2024; Payne and Holt 2001). Consumers weigh these benefits against sacrifices to determine the overall value, which significantly affects their intention to use a product or service (Kim, Chan, and Gupta 2007) and continuous usage behavior (Huang and Moon 2020). Higher perceived benefits enhance perceived value, while greater perceived risks diminish it (Gao et al. 2023; Nicolescu, Dominici, and Vatamanescu 2024). Therefore, the following hypothesis is proposed:

H3. *(a) Perceived benefits of carsharing services positively influence perceived value, whereas (b) perceived risks of carsharing services negatively influence perceived value.*

2.7. Intention to reuse

Reuse intention refers to an individual's decision about repurchasing a product or service, considering their past experiences and current and potential situations (Hellier et al., 2003). This intention significantly influences consumer behavior, potentially boosting company revenue (Dorsch, Grove, and Darden 2000). Zeithaml, Berry, and Parasuraman (1996) emphasized that positive intentions are strong predictors of consumer loyalty and purchasing behaviors. Studies across various domains, including e-commerce, mobile payments, online banking, as well as carsharing services, consistently show that while perceived risks deter usage intentions, perceived benefits and values encourage them (Kaur and Arora 2023; Kim, Ferrin, and Rao 2008; Nicolescu, Dominici, and Vatamanescu 2024; Park et al. 2019; Wang et al. 2019). These studies highlight the importance of both perceived benefits and risks in shaping consumer decisions, supporting a balanced view to understand and predict consumer decisions effectively. Specifically, in the context of carsharing, Wang et al. (2019) found that perceived value significantly enhances consumer willingness to participate in carsharing and Huang and Moon (2020) found that it plays as a key determinant of continuous usage intention among users. Based on these findings, the following hypothesis is proposed:

H4. While the perceptions of (a) benefits and (b) values of carsharing services positively influence reuse intention, (c) the perceptions of risks negatively influence reuse intention.

2.8. Influences of self-efficacy, gender, and service usage experience

Research indicates that individual differences significantly influence perceptions and behavioral intentions toward carsharing services (Li and Zhang 2023). Factors such as self-efficacy can play a crucial role in perceived benefits and risks on the intention to reuse these services. Self-efficacy, defined as an individual's belief in their capability to execute tasks and manage life's challenges (Bandura 1994; Song et al. 2014), affects how challenges are approached and overcome. Individuals with high self-efficacy view challenges as opportunities and are more likely to engage persistently, whereas those with lower self-efficacy may avoid challenging situations and quickly abandon efforts (Bandura 2012). For instance, Oh (2015) found that self-efficacy moderates the impact of perceived benefits on intentions to use electronic payment services, while Wang, Deng, and Diao (2018) demonstrated that high self-efficacy lessens the negative impact of perceived risks and amplifies the positive impact of perceived benefits on the intention to use veterinary drugs. Meanwhile, since the concept of self-efficacy should be used in a limited way to explain performance in specific areas of interest (Bandura 2012), this study explores how self-efficacy within carsharing services influences perceived benefits and risks and reuse intentions.

This study further examines how gender and service usage experience influence the relationships between perceived benefits, risks, and reuse intention. Gender is recognized as a critical demographic variable in consumer behavior, impacting consumption motivations and decision-making processes (Shin and Lee 2020). Research indicates that women are more responsive to subtle cues and tend to evaluate them thoroughly, whereas men typically focus on more prominent cues (Maheswaran and Meyers-Levy 1990). Additionally, decision-making styles vary: women often remember emotional experiences associated with products, which influence their subsequent evaluations, while men are more influenced by immediate emotions and events during their decision-making (Dubé and Morgan 1996). Moreover, men and women process information differently; men concentrate on information relevant at the moment, whereas women consider both current and future utility information (Seo and Kim 2004). In terms of mobile phone usage, Lee, Jeon, and Choi

(2007) noted that functional outcomes significantly influence men's satisfaction, while psychological outcomes have a greater impact on women. Darley and Smith (1995) also found that women are more sensitive to various risks when selecting products. These differences suggest that men and women not only diverge in their motives and decision-making processes but also in their perceptions of benefits and risks. Li and Zhang (2023) suggest that men are more likely to overcome usage barriers, focusing less on risks, while women's decisions are more affected by perceived risks.

Lastly, past experiences significantly shape individual beliefs and behaviors, influencing the perceived value of similar services and future behaviors (Han 2018). In carsharing contexts, users with frequent experiences likely differ from those with fewer experiences in their perceptions and behaviors (Hu et al. 2023). Huang and Nan (2023) also observed that service usage frequency impacts users' continuation intentions with carsharing services, suggesting the need for further exploration of this variable. It is assumed that users with limited experience may have heightened concerns and may not fully understand the benefits of the service. Conversely, more experienced users are expected to prioritize perceived benefits over perceived risks, leading to differences in reuse intentions. This study seeks to explore the underlying complexities and dynamics influenced by individual characteristics. Thus, it proposes the following research question:

RQ1: How does self-efficacy, gender, and service usage experience influence perceptions of benefits and risks of carsharing services? Are there any differences in the impact of these perceptions on reuse intentions between different groups?

3. Method

3.1. Sample characteristics

This study targeted adults in South Korea aged 20–59 who have experience using carsharing services. Data was collected in January 2023 through an online survey distributed among a panel of a marketing research company. To ensure gender balance, a quota sampling method was applied, resulting in 320 valid responses split evenly between males and females. The age group of 30–39 years was the most represented, accounting for 47.80% (n = 153) of the sample, followed by 21.30% (n = 68) aged 20–29. The educational level of participants was high, with 75% (n = 240) holding at least a college degree. Regarding

Table 1. Sample profiles.

Categories	F	%
Gender		
Male	160	50.00%
Female	160	50.00%
Age		
20–29 years	68	21.30%
30–39 years	153	47.80%
40–49 years	59	18.40%
50–59 years	40	12.50%
Education		
High school or below	25	7.80%
College (current/graduate)	240	75.00%
Graduate school (current/graduated)	55	17.20%
Usage experience		
Once	69	21.60%
2~4 times	111	34.7%
5~9 times	67	20.90%
10 times or more	73	22.80%
Primary use		
Long-distance personal use such as travel	218	68.13%
Short-distance personal use such as appointments or shopping	123	38.44%
Work-related trips	72	22.50%

service usage frequency, 34.7% (n = 111) had used car-sharing services 2–4 times, and 22.80% (n = 79) ten times or more. The primary use was for long-distance travel (68.13%, n = 218), with short-distance trips for errands like meetings and shopping at 38.44% (n = 123). The details of the sample profiles are presented in Table 1.

3.2. Measurements

Perceived economic benefits are measured with three items based on Sweeney and Soutar (2001) (e.g., “Using carsharing services is good value for money”). Perceived functional benefits are measured by four items adopted from Park and Lee (2022) (e.g., “Using carsharing services is convenient”). Perceived hedonic benefits are measured with three items from Sweeney and Soutar (2001) and Park and Lee (2022) (e.g., “Using carsharing services is enjoyable”). Perceived environmental benefits are measured with three items from Jang and Park (2019) and Möhlmann (2015) (e.g., “Using carsharing services is an environmentally friendly action”).

Perceived performance risk is measured with three items based on Wang et al. (2019) and Yuan et al. (2021) (e.g., “When using carsharing services, there may be issues with the performance of the rented vehicle”). Perceived time risk is measured with three items from Yuan et al. (2021) and Ariffin, Mohan, and Goh (2018) (e.g., “A lot of time may be required to inspect the vehicle before/after return and learn its operation”). Perceived financial risk is measured with three items from Ariffin,

Mohan, and Goh (2018), Yi, Yuan, and Yoo (2020), and Wang et al. (2019) (e.g., “When using carsharing services, more fees may be billed than expected”). Perceived social risk is measured with three items adapted from Featherman and Pavlou (2003), Ariffin, Mohan, and Goh (2018), and Yuan et al. (2021) (e.g., “When using carsharing services, being exposed to others is unwelcome”). Perceived privacy risk is measured with three items from Wang et al. (2019) and Yi, Yuan, and Yoo (2020) (e.g., “When using carsharing services, my registered personal information may be leaked”).

Perceived value is measured with three items from Kim, Chan, and Gupta (2007) (e.g., “Overall, carsharing services are benefits outweigh the disadvantages”). Reuse intention is measured with three items adapted from Ryu (2018) and Park and Lee (2022) (e.g., “In the future, I intent to use carsharing services again”). Lastly, self-efficacy is measured with three items from Dash and Saji (2008) (e.g., “I am confident that I can use carsharing services well without anyone having to specifically teach me”). All these items were measured in Korean using a 7-point Likert scale.

4. Analysis and results

4.1. Measurement properties

Evaluating a reflective measurement model involves assessing internal consistency reliability, convergent validity, and discriminant validity (Hair et al. 2017). Internal consistency reliability can be assessed using Cronbach’s alpha and composite reliability (Shin 2018). In this study, both Cronbach’s alpha and composite reliability values exceeded the recommended threshold of 0.7, affirming robust internal consistency for the latent variables. Common criteria for assessing convergent validity include factor loadings, item reliability, and Average Variance Extracted (AVE) (Shin 2018). All indicator loadings surpassed 0.7, with item reliability and AVE values also exceeding the 0.5 benchmark, indicating well-established reliability and convergent validity of the measurement variables. Discriminant validity is commonly assessed using the Fornell-Larcker criterion by comparing the square root of the AVE of each latent variable with the correlations between the latent variables. For discriminant validity to be established, the square root of the AVE for each latent variable should be greater than the highest correlation with any other latent variable (Shin 2018). This study confirmed discriminant validity, as the square roots of the AVEs were greater than the inter-variable correlations, affirming distinctiveness among the constructs (see Table 2). Lastly, the multicollinearity among latent variables within the endogenous constructs is

Table 2. Measurement properties.

	1	2	3	4	5	6	7	8	9	10	11
Mean	4.568	4.875	4.590	4.460	3.635	4.731	4.581	4.847	4.593	4.473	5.023
α	0.892	0.864	0.890	0.900	0.840	0.900	0.766	0.876	0.913	0.892	0.912
CR	0.933	0.908	0.932	0.937	0.904	0.938	0.865	0.923	0.945	0.933	0.945
AVE	0.822	0.711	0.819	0.833	0.852	0.758	0.834	0.683	0.801	0.822	0.851
1	0.907										
2	0.533	0.843									
3	0.416	0.631	0.905								
4	0.507	0.512	0.407	0.913							
5	0.403	0.047	-0.092	-0.006	0.871						
6	0.397	0.015	-0.085	-0.141	0.274	0.913					
7	0.336	-0.007	-0.057	-0.113	0.227	0.578	0.826				
8	0.376	-0.125	-0.007	-0.180	0.231	0.514	0.531	0.895			
9	0.058	-0.027	-0.076	-0.004	0.403	0.397	0.336	0.376	0.923		
10	0.596	0.608	0.496	0.559	0.035	0.024	0.029	-0.002	0.037	0.907	
11	0.467	0.689	0.564	0.430	-0.279	-0.069	-0.008	-0.076	-0.110	0.600	0.922

Note: 1 Economic benefit, 2 Functional benefit, 3 Hedonic benefit, 4 Environmental benefit, 5 Social risk, 6 Performance risk, 7 Time risk, 8 Financial risk, 9 Privacy risk, 10 Perceived value; 11 Reuse intention; CR indicates composite reliability; Bold face in the diagonal line indicates the square root of AVE of each construct.

assessed based on the Variance Inflation Factor (VIF) values. All VIF values remained below 5, confirming that multicollinearity does not complicate the analysis (Hair et al. 2017).

4.2. Path analysis

This study employs Partial Least Squares Structural Equation Modeling (PLS-SEM) to test the hypotheses for several reasons. Perceived benefits and risks are conceptualized as higher-order factors, each represented by multiple sub-dimensions. While each dimension is measured using reflective scales, when measuring the higher dimensions of benefits and risks, each dimension acts as formative scales. This structure captures varying perceptions across dimensions, such as a consumer perceiving high economic and functional benefits but lower hedonic or environmental benefits, without necessitating high correlations among sub-dimensions. PLS-SEM facilitates the analysis of these reflective-formative hierarchical component models (Hair et al. 2019). Additionally, PLS-SEM is optimal for theory development and particularly useful in validating models from a predictive perspective. It is also advantageous for complex structural models (Hair et al. 2019).

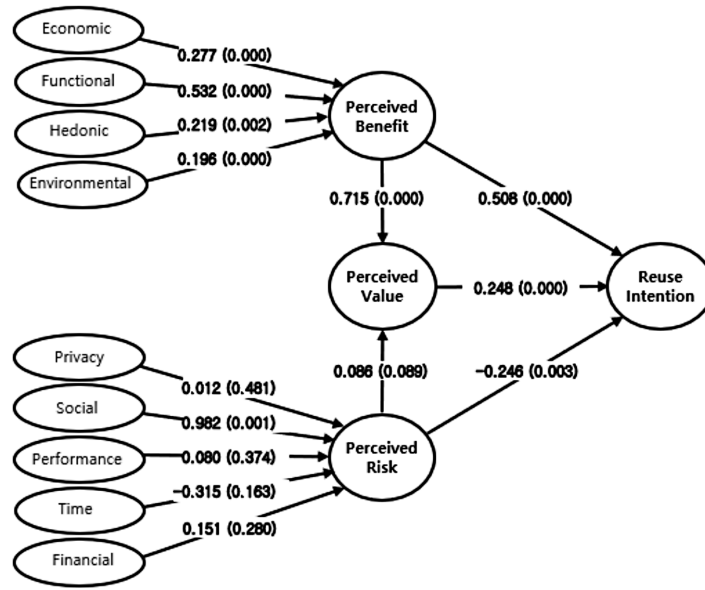
The results of the hypotheses tests are shown in Fig. 1. It revealed that all four benefit dimensions had a significant positive impact on perceived benefits: economic benefits ($\beta = 0.277, p = .000$), functional benefits ($\beta = 0.532, p = .000$), hedonic benefits ($\beta = 0.219, p = .002$), and environmental benefits ($\beta = 0.196, p = .000$). These results supported H1a ~ H1d. Perceived functional benefits played the most crucial role, followed by perceived economic, hedonic, and

environmental benefits. Additionally, the impact of perceived social risk on perceived risk had a significant, positive impact ($\beta = 0.982, p = .001$). However, the other four perceived risk dimensions had no significant impact: performance risk ($\beta = 0.080, p = .374$), time risk ($\beta = -0.315, p = .163$), financial risk ($\beta = 0.151, p = .280$), and privacy risk ($\beta = 0.012, p = .481$). These results supported H2d, while rejecting H2a ~ H2c and H2e.

The impact of perceived benefits on perceived value was significant and positive ($\beta = 0.715, p = .000$), whereas the impact of perceived risks on perceived value was not significant ($\beta = 0.086, p = .089$), thus supporting H3a but rejecting H3b. Additionally, the impact of perceived benefits on reuse intention was significant and positive ($\beta = 0.508, p = .000$), while the impact of perceived risk on reuse intention was significant and negative ($\beta = -0.246, p = .003$). Finally, the impact of perceived value on reuse intention was significant and positive ($\beta = 0.248, p = .000$). These results supported H4a ~ H4c.

4.3. Differences by self-efficacy

To examine how self-efficacy influences the intention to reuse car-sharing services, a multi-group comparison was conducted using the median self-efficacy score (5.5). Individuals scoring above this median ($n = 151$) were categorized as high self-efficacy, while those scoring at or below ($n = 169$) were considered low self-efficacy. The results are shown in Fig. 2. For the low self-efficacy group, perceived functional, hedonic, and environmental benefits had significant positive influences on perceived benefits. In contrast, in the high self-efficacy group, perceived economic, hedonic, and environmental benefits had significant positive influences on perceived benefits.



Note: Perceived Benefit and Perceived Risk are proposed as second-order formative constructs.

Fig. 1. Path analysis: Results.

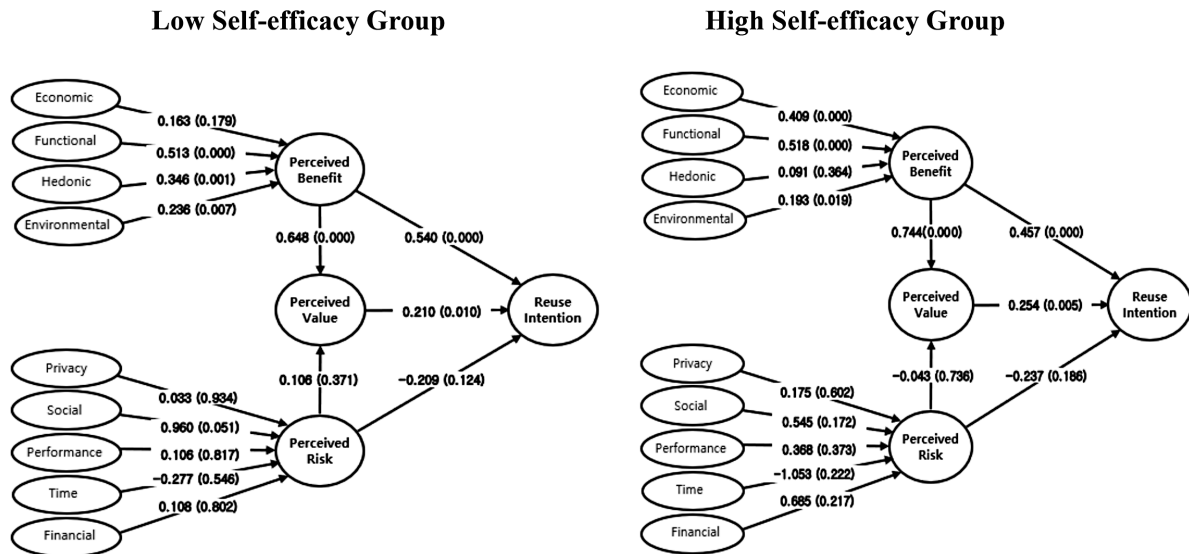


Fig. 2. Model comparisons by self-efficacy.

functional, and environmental benefits had significant positive influences. Among the five dimensions of perceived risk, only the social risk dimension showed a marginally significant positive impact on perceived risk in the low self-efficacy group ($\beta = .960$, $p = .051$). For both groups, perceived benefits positively influenced perceived value ($\beta = .648$, $p = .000$ for low; 744 , $p = .000$ for high) and reuse intention ($\beta = .540$, $p = .000$ for low; $.457$, $p = .000$ for high), while perceived risk did not significant impact either perceived value or reuse intention. Perceived value also positively impacted reuse intention.

4.4. Differences by gender

This study further explored differences by gender (n = 160 for each). The relative influence of the sub-dimensions on perceived benefits varied by gender. The female group showed the functional dimension having the strongest influence on perceived benefits, followed by hedonic, economic, and environmental dimensions. In the male group, the functional dimension had the strongest influence on perceived benefits, followed by economic and environmental dimensions; however, the hedonic dimension did not

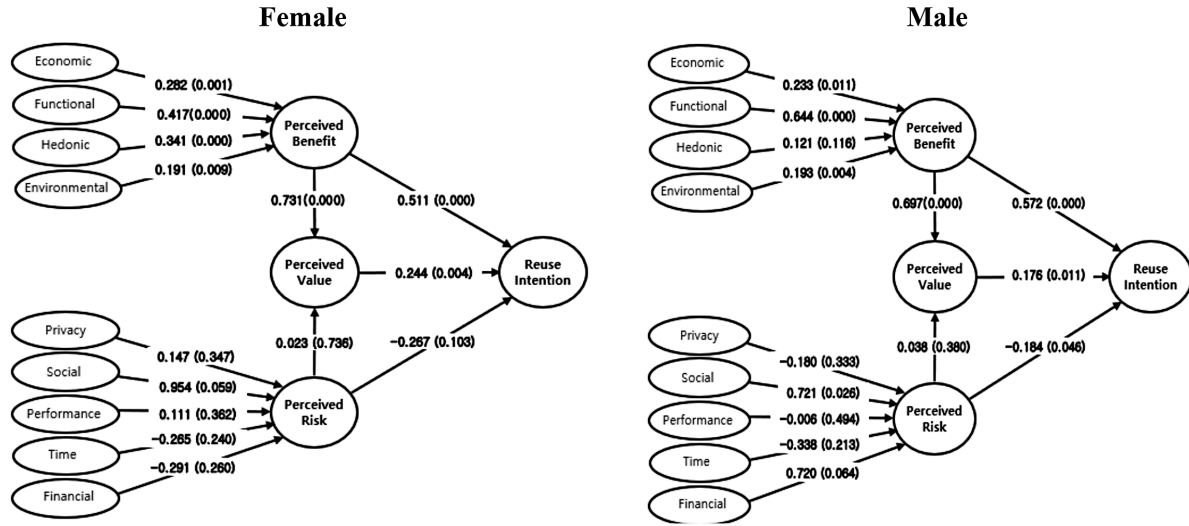


Fig. 3. Model comparisons by gender.

significantly influence perceived benefits. Regarding perceived risks, none of the sub-dimensions were significantly perceived as risks in the female group. In the male group, only the social dimension significantly increased perceived risk ($\beta = .721, p = .026$). Additionally, for both groups, perceived benefits significantly increased perceived value ($\beta = .731, p = .000$ for female; $\beta = .697, p = .000$ for male) and reuse intention ($\beta = .511, p = .000$ for female; $\beta = .572, p = .000$ for male). Perceived risk had no significant impact on perceived value for either gender ($\beta = .023, p = .415$ for female; $\beta = .038, p = .380$ for male). The negative impact of perceived risk on reuse intention was significant for the male group ($\beta = -.184, p = .046$) but not for the female group ($\beta = -.267, p = .103$). Additionally, perceived value significantly increased reuse intention in both groups ($\beta = .244, p = .004$ for female; $\beta = .176, p = .011$ for male).

4.5. Differences by service usage experience

This study investigated whether the proposed relationships vary with service usage experience. As shown in Table 1, the respondents reported varied frequencies of carsharing usage: 21.6% had used the service only once, 34.7% had used it 2–4 times, 20.9% had used it 5–9 times, and 22.8% had used it more than 10 times. The study grouped users into two categories for a balanced comparison: those with fewer experiences (once and 2 ~ 4 times; $n = 180, 56.3%$) and those with more experiences (5 ~ 9 times and more than 10 times; $n = 140, 43.7%$).

The comparison results (see Fig. 4) indicate that among the benefit dimensions, perceived economic benefits were not significant in the high experience

group. For this group, only functional, hedonic, and environmental benefits were significantly perceived. For the low experience group, all four benefit dimensions were significant. The functional dimension was the most important for both groups. In terms of perceived risks, for the high experience group, none of the five risk dimensions significantly influenced reuse intention. Conversely, for the low experience group, the social dimension significantly increased perceived risks. Additionally, for both groups, perceived benefits significantly increased perceived value ($\beta = .765, p = .000$ for low; $\beta = .658, p = .000$ for high) and reuse intention ($\beta = .443, p = .000$ for low; $\beta = .584, p = .000$ for high). Perceived risk had no significant impact on perceived value for either group ($\beta = .110, p = .196$ for low; $\beta = .034, p = .724$ for high). The negative impact of perceived risk on reuse intention was marginally significant for the low experience group ($\beta = -.256, p = .051$) but not for the high experience group ($\beta = -.250, p = .214$). Additionally, perceived value significantly increased reuse intention in both groups ($\beta = .297, p = .000$ for low; $\beta = .211, p = .008$ for high).

4.6. Discussion and implications

This study examined the factors influencing the reuse intentions of existing carsharing service users, an important area for fostering loyalty and promoting sustainable mobility that has not been understudied. Specifically, it analyzed specific benefits and risks perceived by users and their impact on value judgments and the intention to reuse the service. It further explored the influences of self-efficacy, gender, and service usage experience on these relationships. The summary of our findings is as follows:

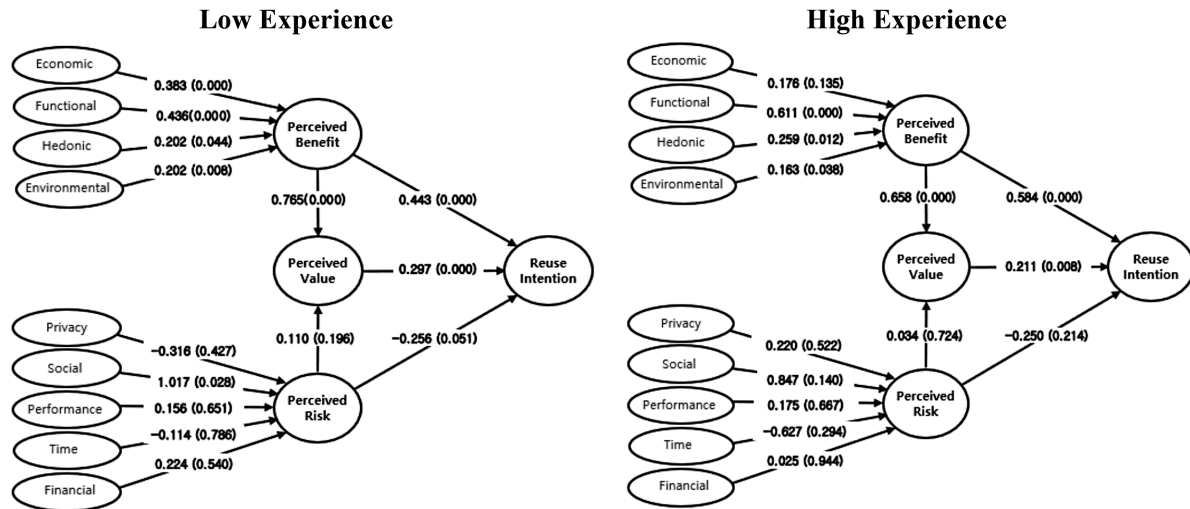


Fig. 4. Model comparisons by service usage experience.

First, the study identified four dimensions of benefits perceived by users: economic, functional, hedonic, and environmental, with functional benefits exerting the strongest impact, followed by economic, hedonic, and environmental benefits. Furthermore, perceived benefits were varied by gender. Hedonic benefits significantly impacted only female users, indicating that gener-specific motivations for using carsharing services. While both genders prioritize functional benefits, which related to the practical performance of the service, female users view hedonic, intrinsic aspects to be important in benefit perceptions. Furthermore, service usage experience influenced benefit perceptions. Consumers with more usage experience tend to prioritize functional benefits such as accessibility and convenience over economic benefits. This finding highlights that frequent users appreciate the practical benefits of carsharing, reducing the relative importance of cost savings. Among the four benefit dimensions, while environmental benefits had the least impact, this dimension played a significant, positive role in the formation of benefit perceptions, regardless of gender or service usage experience. Therefore, although not the major factors driving carsharing usage behavior, as consistently found by previous research (Hartl et al. 2018; Ramos, Mattos, and Bergstad 2023), environmental benefits related to the sustainability of carsharing services continue to be an important factor for users.

Secondly, this study found that among the five risk dimensions—performance, time, financial, social, and privacy risks—only social risk was significantly perceived by carsharing users. Furthermore, notable differences were found by gender. For female users, none of the five risk dimensions significantly affected benefit perceptions, reflecting a growing familiarity

with carsharing services. For example, Huang and Nan (2023) found that platform security is not a major concern among experienced users due to familiarity. This result is similar to Aldhowayan and Baig (2023)'s study which found that perceived risk such as privacy/security concerns are not a significant factor influencing reuse intentions among users of the sharing service platforms in Saudi Arabia. They also found that female users perceived greater benefits, showed stronger confidence and reuse intentions compared to male users. In our study, for male consumers, social risk was the only significant risk factor, highlighting their sensitivity to how they are perceived by others when using carsharing services. This difference may be due to the automotive nature of the product involved in this study. Namely, men are interpreted to be more psychologically involved with and men's greater psychological involvement and desire for car ownership (Jain, Rose, and Johnson 2021). Additionally, perceived social risk varied by service usage experience. Consumers with less experience perceived greater social risk, indicating that usage experience can mitigate concerns about social perceptions, leading to a strong focus on benefits of service use.

Thirdly, the findings highlighted how self-efficacy influences the types of benefits that users prioritize. Individuals with lower self-efficacy were more responsive to functional, hedonic, and environmental benefits, whereas those with higher self-efficacy were influenced more by economic, functional, and environmental benefits. This difference suggests that self-efficacy levels shape consumer preferences, with those lower in self-efficacy valuing immediate and experiential aspects, and those higher valuing economic considerations. Among perceived risks, only

social risk showed a marginal influence in the low self-efficacy group, indicating their sensitivity to social perceptions. However, perceived risks did not significantly affect either perceived value or reuse intentions in both groups, indicating that while risks are recognized, they do not deter users from continuing to use carsharing services. Bandura (1994) noted that successes and failures significantly influence one's self-efficacy, suggesting that positive experiences enhance it. According to Wang, Harris, and Patterson (2013), self-efficacy plays a crucial initial role in adopting self-service technologies but is later eclipsed by satisfaction and habitual use in determining continued engagement. Aligning with this, our findings imply that self-efficacy might be more influential for adoption decisions but diminishes in impact for experienced users.

Lastly, this study established that perceived benefits consistently enhance perceived value, and consequently, the intention to reuse the service across various user characteristics, including self-efficacy, gender, and service usage experience. This underscores that enhancing perceived value through targeted benefits is essential for promoting long-term usage of carsharing services, aligning with the findings by Huang and Moon (2020). In contrast, perceived risks did not affect perceived value but had a direct impact on reuse intention. This may imply that even if consumers do not highly rate the risks of carsharing, the mere potential for such risks can deter their usage intention (Jang and Park 2019). A deeper analysis revealed that the negative impact of perceived risk on reuse intention was significant primarily for male users and marginally significant for the low experience group, both of whom perceived higher social risks than other groups. This differentiation highlights the importance of addressing specific concerns within targeted demographic segments to mitigate the adverse effects of perceived risks on the long-term adoption of carsharing services.

4.7. Theoretical implications

The findings of this study offer important theoretical implications. First, it integrates the NVM and the VAM to analyze how perceptions of benefit and risk impact perceived value and reuse intentions for carsharing services among current users. This integration allowed examination of whether perceived benefits and risks directly influence reuse intentions and/or indirectly through perceived value. While NVM predicts adoption decisions based on the evaluation of net benefits versus risks, VAM considers the impact of perceived value, which depends on a relative evaluation of benefits and risks. This study

reveals that perceived benefits directly and indirectly increase reuse intentions through perceived value, whereas perceived risks directly decrease reuse intentions bypassing the mediation of perceived value. These findings suggest that while benefits are integrated into the value perception process, enhancing reuse likelihood, perceived risks might operate outside the perceived value framework, exerting a straightforward deterrent effect on reuse intentions. This insight contributes to our understanding of user behavior in carsharing services, emphasizing the asymmetric impact of perceived benefits and risks on decision-making processes.

Moreover, the study employed a hierarchical component model to examine perceived benefits and risks as high-order factors, composed of various dimensions treated as formative indicators. This approach allows for a deeper understanding of how each sub-dimension uniquely contributes to overall perceptions of benefits and risks (Hair et al. 2019). Previous studies often measure multidimensional concepts using reflective indicators despite low correlations among sub-dimensions, or incorrectly present sub-dimensions as separate exogenous independent variables for analytical convenience. This study contributes theoretically by demonstrating the utility of a hierarchical component model with formative indicators.

Additionally, this study explored the influence of self-efficacy, gender, and service usage experience on the proposed relationships. There has been few research that extensively examined how these individual differences influence perceptions of risks and benefits and reuse intentions in the context of carsharing service. This study highlights the importance of incorporating user-specific characteristics to comprehensively understand the mechanisms that drive changes in user perceptions and behaviors regarding carsharing services. Lastly, by focusing on the decision-making processes of existing carsharing service users—a group often overlooked despite the increasing adoption of such services (Hu et al. 2023; Huang and Nan 2023; Ramos and Bergstad 2021)—the study contributes empirical evidence to support theories of sustainable service use and highlights the dynamic nature of user engagement in the sharing economy. This research not only enriches the extant literature but also offers insights for enhancing the long-term viability and customer loyalty in the carsharing industry.

4.8. Managerial implications

Despite the global growth and substantial market potential of carsharing services (Hue et al. 2023),

research focusing on the reuse intentions of existing users remains scarce (Hu et al. 2023; Huang and Nan 2023). Addressing this gap, this study's findings have significant practical implications for carsharing businesses, particularly in markets experiencing transitional phases.

First, to ensure sustained growth of carsharing services, marketing practitioners should prioritize the diversity of service benefits and develop focused communication strategies that highlight functional and economic benefits, which have proven to significantly impact existing users in this study. While environmental benefits are positively viewed, they should not be the primary focus in promotional activities, as suggested by Hartl et al. (2018). Instead, these benefits should serve to complement the more influential functional and economic benefits, thus enhancing the overall appeal of the service without overshadowing the core advantages that primarily attract and retain users. Furthermore, marketing strategies for carsharing services must account for individual differences in understanding differences in benefit perceptions. For male users, strategies should highlight the functional benefits of carsharing, such as the ease of access and cost efficiency, enhancing the service's appeal as a smart, practical choice. For female users, service providers should emphasize various benefits, particularly differentiating it through hedonic appeals. For instance, a campaign could feature testimonials from female users who describe how carsharing enhances their daily lives—be it through ease of access for shopping trips, leisure activities, or social outings, portraying carsharing not just as a practical transportation solution but also as a fun, trendy choice that fits their lifestyle needs (Hu et al. 2023).

Additionally, further research should refine market segmentation strategies based on detailed user profiles, including self-efficacy and service usage experience levels, to tailor communications and enhance user engagements. For users with high self-efficacy, who recognize greater economic, functional, and environmental benefits, marketing strategies should emphasize cost-effectiveness, convenience, and sustainability. Communications could highlight the practical benefits and environmental impact of carsharing, aligning with their confidence in managing these services effectively. For example, offering features that cater to their efficiency needs, such as streamlined booking processes or rewards for frequent use, could enhance their perceived value. Conversely, for users with lower self-efficacy, who are significantly influenced by functional, hedonic, and environmental benefits, carsharing companies should focus on the ease of use and immediate enjoyment of the service. Specifically, it could be effective to implement

educational programs that simplify the service usage process. Furthermore, for users with more experience, who prioritize functional benefits over economic benefits, companies should focus more on enhancing service reliability, ease of use, and technological advancements to meet their expectations for efficiency and convenience.

Third, social risks are the only concern significantly affecting current users' reuse intentions, particularly for men and less experienced users. Carsharing companies need to address these risks to encourage broader service usage. Consumer perceptions are evolving; carsharing, previously viewed negatively as a sign of financial constraint, is increasingly regarded as a status symbol (Jain, Rose, and Johnson 2021). This shift indicates that using carsharing services is becoming a socially desirable choice. To capitalize on this change, featuring scenes in popular TV dramas where high-profile individuals or celebrities use carsharing can effectively showcase its benefits, help counter negative stereotypes, and enhance the social image of using carsharing services.

Lastly, the environmental advantages of carsharing could play a crucial role in its long-term viability and expansion (Li and Zhang 2023). While environmental benefits show a relatively weaker impact compared to other benefits, they still positively influenced benefit perceptions across all user segments. This is especially pertinent for segments sensitive to social perceptions, such as men and those with less experience. Service providers should enhance and promote environmental benefits of their services and develop initiatives that encourage responsible and environmentally friendly usage. For instance, increasing the availability of electric or zero-emission vehicles could attract users with high environmental consciousness, reinforcing carsharing as a sustainable mobility option (Aguilera-García et al. 2022). Additionally, collaborating with various influencers who are vocal about environmental issues can help reframe carsharing as a symbol of eco-conscious behavior, effectively reducing social risk perceptions and encouraging wider adoption of the service. By aligning their offerings with consumers' diverse psychological needs, carsharing services can enhance user satisfaction and reuse intentions, thus securing long-term customer engagement and loyalty.

4.9. Study limitations and future research

The study has several limitations that suggest directions for future research. First, this study identified perceived benefits and risks of carsharing services based on previous studies and market reports. More robust findings could be achieved through

exploratory methods, such as intensive interviews with consumers or experts, uncovering additional factors influencing carsharing usage. Second, the study focused on adults aged 20–59 who had experience with car-sharing services. Due to the survey qualifications, the demographic constraints limited the scope of analyses. Although the survey achieved gender balance, allowing for gender-based comparisons, age and other demographic factors like education and car ownership were not extensively analyzed due to insufficient subgroup sizes. Future studies could benefit from more diverse samples to enable more detailed analyses (Hair et al. 2017). Moreover, the study focused on perceived benefits and risks. Including additional variables, such as service quality and personal lifestyle or psychological factors like variety-seeking or environmentalism, could provide a more comprehensive understanding of the drivers behind reuse intentions (Aguilera-García et al. 2022; Huang and Nan 2023; Lee 2021).

Another limitation of this study was the presence of negative coefficients for perceived time risk, within the formative model assessing perceived risks. Although these coefficients were not statistically significant, their negative directions could suggest that these dimensions—such as privacy, performance, and financial costs—may not be as salient or critical to current users as they might be to non-users. This differentiation highlights the importance of tailoring risk dimensions more closely to the specific concerns and expectations of active service users, rather than broadly incorporating factors that might be more pertinent to potential non-users.

Lastly, while this study was confined to South Korea, testing the model in other countries where carsharing is emerging could enhance the external validity of the findings and reveal whether the factors influencing reuse intentions vary across countries (Hu et al. 2023; Ramos and Bergstad 2021). This could offer both theoretical insights and practical implications, especially in regions experiencing rapid urbanization and economic changes that could increase the demand for carsharing services (Aguilera-García et al. 2022).

Conflict of interest

The authors declare that they do not have any conflicts of interest.

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