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Preface

We have the pleasure to compile these proceedings of the 32nd RARCS conference. The conference gives delegates the option to include either an extended abstract or a full paper in the conference proceedings. In addition, a book of one-page abstracts of all presentations is made available to delegates. Proceedings are only distributed among participants and are not submitted to any repositories. Copyright is not transferred. Thus, delegates can submit their work to journals, without facing any formal self-plagiarism issues.

We trust these proceedings and the book of abstracts are useful material for our delegates.

Soora Rasouli & Harry Timmermans
Co-Chairs

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Service quality, sustainability and reputation in hotels

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Abstract. In the hospitality and tourism industry, service quality and corporate reputation are increasingly linked to the principles of sustainable development. This connection reflects the expectation that businesses will operate responsibly, both environmentally and socially, while maintaining effective and profitable operations. Over recent decades, sustainability has become a central theme in public discourse and policy, driven by growing awareness of human impact on the environment. As a result, consumers are paying closer attention to companies' sustainability practices when making purchasing decisions, which in turn influences their perception of corporate reputation. This study explores how sustainability-related factors, particularly those focused on environmental and social responsibility, affect the reputation of hotels. It also aims to identify which performance attributes should be prioritized to enhance guests' evaluations of hotel reputation. A quantitative research approach was employed, involving a survey of 1487 guests across nine hotels located in downtown Reykjavík, Iceland, during the summer of 2023. The findings reveal that although guests do not perceive sustainability factors as highly important in their pre-booking evaluations, the environmental factor does have a measurable impact on their perceived reputation of the hotel after their stay. In addition, other key factors that significantly influence reputation include perceived value for money, the quality of hotel facilities, and the performance of hotel staff in service delivery. These elements were found to have a positive and statistically significant effect on how guests assess hotel reputation. Based on these results, it is recommended that hotels focus their improvement efforts on the areas that matter most to guests. Enhancing service delivery, maintaining high-quality facilities, and ensuring good value for money should be prioritized. At the same time, continued attention to environmental sustainability can contribute positively to reputation, even if it is not the top concern for all guests. Theoretical implications include understanding of the interplay between service, sustainability factors and reputation of hotels. A limiting factor of this study is that it only includes hotels located downtown Reykjavík, which may result in a relatively homogenous sample.

Keywords: Service; reputation; sustainability; prioritization; performance; importance.

Introduction

Tourism in the Arctic and sub-arctic region has grown considerably in recent decades. The growth has however been uneven, both in time in terms of seasonality and space, in terms of stark differences between destinations (Maher *et al.*, 2022; Rantala & Müller, 2024). The reasons for increased tourism in the Arctic areas are also diverse and have to do with both factors of supply and demand. Tourism has been promoted by national and regional authorities as an engine for socioeconomic development and diversification, which has led to investments in infrastructure facilitating access and improving connectivity. Place promotion commonly reiterates the image of the Arctic as pure, exotic and adventurous wilderness, which attracts a growing number of visitors (Huijbens, 2011, 2022; Müller, 2025; Sæþórsdóttir *et al.*, 2011).

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Iceland is one of the fastest growing destinations in the Arctic area. Tourism in Iceland has grown rapidly in recent years and has for a long time been one of the country's largest export industries. Between 2010 and 2018, the number of foreign visitors to Iceland quadrupled and reached approximately 2,3 million and concomitantly the share of tourism in gross domestic product grew to 8.1% in 2018 (Ferðamálastofa, 2026). After a practical standstill in international travel during the COVID-19 pandemic (2020-2021 that resulted in about 60% decrease in the turnover of the industry, tourism in Iceland bounced back to prior level in 2023 and counted for 8,7% of GDP in 2024 (Ferðamálastofa, 2026; Halldórsdóttir, 2022).

Iceland's main attraction, according to surveys, lies in its natural environment and cultural heritage, which simultaneously form the industry's most valuable resources (Huijbens *et al.*, 2024). Tourism in Iceland shares many of the characteristics of tourism in the circumpolar North, including strong pattern of seasonality, vast distances, sparse population, weak infrastructure and limited labor pools (Rantala *et al.*, 2019). Furthermore, while efforts have been made to attract visitors to different regions across the island, the city of Reykjavík, located close to the Keflavík International airport, is the most common destination of international travelers (Huijbens & Jóhannesson, 2020). It can thus be argued that tourism in Iceland, is to a large extent an urban affair, the city is used as a gateway or a basecamp for visitors who sleep in the city and make use of the services found, but take on shorter excursions to nature sites during their stay (Jóhannesson & Welling, 2020; Þórhallsdóttir *et al.*, 2024); a pattern common in the Arctic area (Müller, 2025; Müller *et al.*, 2020).

The rapid growth of tourism has undeniably created jobs and boosted both regional and national economies, but it has also generated severe challenges in relation to its sustainability. Popular tourist sites have become overcrowded and lacking visitor management and poor infrastructure at key sites has resulted in environmental degradation. Congestion at certain locations has also reduced the quality of visitor experiences, and the booming of short-term rentals has contributed to rising housing prices and shortages (Mermet, 2017; Mixa & Loftsdóttir, 2025; Mixa & Loftsdóttir, 2025; Ólafsdóttir & Runnström, 2013; Ólafsdóttir *et al.*, 2020; Sæþórsdóttir & Hall, 2020; Sæþórsdóttir *et al.*, 2020).

Historically, national authorities have taken a limited action in regulating or supporting the industry, but after the financial crisis in 2008 tourism suddenly received more attention by the state (Jóhannesson & Huijbens, 2010; Jóhannesson *et al.*, 2010). In recent years the national authorities have increased investment in infrastructure and strengthened regulatory frameworks. In June 2024 a tourism policy and action plan to 2030 was issued by the national parliament with the overall aim that by the end of the policy term, Iceland would be a world leading destination in sustainable tourism (Stjórnarráð Íslands, 2024). Traditional pillars of sustainability refer to the environment, society and economy. The current policy framework adds a visitor dimension as a core component of sustainable tourism. This emphasizes that service quality and the visitor experience are essential for building a positive reputation among current guests—reputation that may influence future demand. Sustainability discourse has become central in policymaking in line with growing awareness of human induced climate change. At its core, sustainability presupposes that resource use should not compromise the wellbeing of future generations. Critics argue, however, that sustainability is often invoked superficially, it is susceptible to greenwashing, and that it remains difficult to observe meaningful changes in corporate or consumer behavior even though much effort is put into sustainable development (Saarinen, 2021; Sharpley, 2000, 2020). Nevertheless, research indicates that some visitor groups increasingly seek stronger sustainability practices, particularly in relation to environmental and social issues, and that such preferences may influence their purchasing decisions (Jamrozy & Lawonk, 2017; Yang *et al.*, 2026).

The purpose of this article is to examine hotel guests' assessments of the importance of sustainability with a focus on environmental and social attributes, with the aim of explaining how these influence hotel reputation. We additionally propose a prioritization of performance indicators that shape guests' evaluations of hotel reputation. The analysis provides practical support to operators who would like to take decisive

steps in translating ambitions of sustainable development into action. We pose the following research questions: (i) What gaps are imminent between hotel guests' assessment on the importance and performance of attributes related to sustainability and service? (ii) To what extent do sustainability factors influence the variability of reputation?, and (iii) What performance attributes should be prioritized for enhanced hotel reputation? To respond to these questions, we work with data collected in the period June – September 2023 collected among guests staying at nine hotels in Reykjavík city center, belonging to the same hotel chain. Respondents were asked to assess performance and importance of attributes of service and sustainability as well as the hotel's reputation. The article sets out with providing conceptual framework, discussing the key concepts of sustainability, service and reputation. Then we describe the methodological approach and data before presenting of findings. The final section includes discussion and concluding remarks addressing avenues for further study.

Theoretical overview

Sustainability and responsibility

Service quality and corporate reputation are social constructs closely tied to foundational ideas of sustainable development. Over the past two decades, sustainable development has become a central concept in tourism policy formulation globally (Saarinen, 2013; Sharpley, 2000) in the wake of increased understanding of global environmental changes. The publication of the United Nations Sustainable Development Goals (SDGs in 2015 placed sustainability even more firmly at the forefront of discussions surrounding economic growth, resource use, and welfare development and has increasingly been framed as a decisive factor for destination and company competitiveness (Rodríguez-Díaz & Pulido-Fernández, 2020; Streimikiene *et al.*, 2021). This emphasis has been embraced by the United Nations World Tourism Organization (UNWTO), which has mapped the relationship between tourism and all 17 SDGs, identifying key indicators and targets associated with each goal (UNWTO, 2026 aiming for instance to enhance sustainable consumption. Nevertheless, tourism “does not have the most flattering reputation” and can be described as “a symbol of conspicuous consumption” (Hansen-Magnusson & Gehrke, 2023, p. 218 A recent study shows that tourism greenhouse gas emissions have grown at double the rate of the worldwide economy between 2009-2019 and contribute to about 8,8% of global emissions (Sun *et al.*, 2024). The accommodation sector is estimated to account for 12% of total tourism related emissions (Gössling *et al.*, 2024 highlighting a considerable room for boosting sustainable practices to reduce emissions from hotels (von Briel *et al.*, 2026; Yang *et al.*, 2026).

In principle, sustainable tourism aims to ensure that the industry operates in balance with economic viability, social equity, and environmental protection, safeguarding natural and cultural resources for future generations. However, the absence of a single, precise definition of sustainable tourism has created challenges in applying the concept in practice. Critics argue that policy and planning for sustainable development are often poorly conceptualized and insufficient for driving meaningful change and note a disconnect between global and local agendas (Broegaard *et al.*, 2022; Jóhannesson *et al.*, 2024; Pasgaard *et al.*, 2021). They also point out that sustainability rhetoric is frequently adopted without making substantive adjustments to industry practices and stress the importance of local and situated approach to the concepts (Cooper, 2023; Sharpley, 2009; Sveinsdóttir *et al.*, 2025).

Some scholars suggest that the notion of responsible tourism may serve as a practical mechanism for implementing sustainability (see discussion in Saarinen, 2021). This perspective argues that sustainable tourism must be grounded in regulatory frameworks and guidelines that affect the behavior of hosts and guests. Saarinen (2021) traces ideas of responsible tourism to the writings of Jost Krippendorf who studies tourism consumption in the 1980s. According to Krippendorf, consumers were becoming more aware of the environment and therefore companies that adopted responsible and sustainable practices were better off in competition. According to this view, responsibility for fostering sustainability is partially shifted to individual consumers, whose purchasing choices can pressure companies to adopt environmentally sound

practices (Saarinen, 2021). The same is likely to apply to other dimensions of sustainability. Increasing interest in corporate social responsibility further reflects this trend, as firms demonstrate environmental and social responsibility to appeal to potential customers (Coles *et al.*, 2013). Research indicates that many consumers are indeed showing positive attitudes towards sustainable attributes of hotel operations and willingness to pay for green products and services, including paying more for staying at “certified green” accommodation” (Yang *et al.*, 2026).

Reputation and service quality

Corporate reputation has been defined in various ways, often as a collective assessment held by different stakeholders (Inversini, 2020). These perceptions may be positive or negative, short-term or long-term, and grounded in experiences or expectations (Walker, 2020). Stakeholders, including owners, investors, and customers, form their views of a company based on interactions with its brand, operations, or services (Komsic & Dorcic, 2016). Although reputation and corporate image are sometimes used interchangeably, scholars disagree on whether they constitute the same construct. Some argue that image and reputation are essentially identical, whereas others maintain that they represent distinct concepts (Gotsi & Wilson, 2001). One influential framework proposes that reputation consists of three components: 1. organizational identity (what a company is), 2. corporate image (what stakeholders believe the company stands for), and 3. intended identity (what the company claims to represent (Chun, 2005).

Tourism researchers frequently assess online reviews, or electronic word-of-mouth (eWOM), as indicators of reputation (Boley & Woosnam, 2021). These reviews, typically provided by past customers, are often treated as proxies for overall sentiment toward a company or service quality (Liu *et al.*, 2022). Service quality has however multiple definitions, but there is general agreement that it reflects an interaction or co-creation process between providers and customers (Wilson *et al.*, 2021). Evaluations of service quality depend on how well performance aligns with customers’ expectations or perceptions of importance (Üngüren *et al.*, 2021). One of the most widely used tools for evaluating service quality is SERVQUAL, which measures gaps between expected and perceived service (Parasuraman *et al.*, 1985; Zeithaml *et al.*, 2024). Expectations may be shaped by prior experiences, marketing communications, or online reviews, while the perceived importance of service attributes influences how performance is judged (Preziosi *et al.*, 2022; Wilkins, 2007).

In tourism contexts, evaluating service quality can be especially complex, as visitors often encounter unfamiliar environments and conditions. With limited ability to rely on experience, they depend more heavily on external cues such as online reviews (Puri & Singh, 2018). For this reason, reputation, particularly eWOM, plays a critical role in shaping customer expectations and service evaluations. Some researchers argue that online reviews constitute the most influential factor that tourism managers must monitor (Anagnostopoulou *et al.*, 2019) whilst others warn managers to depend solely on average scores, from perhaps anonymous guests, without a statistical confirmation (Asgeirsson *et al.*, 2024; Hannington, 2016; Gonzales-Rodriguez *et al.*, 2016). Regardless of conceptual distinctions, empirical studies consistently show that reputation contributes to competitive differentiation and business performance. Within tourism, research has repeatedly demonstrated that higher service quality leads to stronger, more positive reputation (Hadi & Indradewa, 2019; Mmutle & Shonhe, 2017).

Methodology

Measurement instrument and data collection

The measurement instrument used in this study consisted of 52 items assessing individual service and sustainability factors, reputation, overall satisfaction, and customer loyalty following the hotel stay. For the purposes of the present analysis, following the guidance of Asgeirsson & Jóhannesson (2024), we focus specifically on guests’ assessments of (a) the perceived importance of service and sustainability factors, and (b) their evaluation of hotel performance in these same attributes. These variables reflect the service

elements typically evaluated on major review platforms such as TripAdvisor and Booking.com, as well as feedback routinely collected by the hotel chain itself.

Participants were instructed to assign a score to each factor based on their personal experience, analogous to rating systems commonly used on digital review platforms. They were also asked to indicate how important each factor is when booking hotel accommodation and to evaluate the overall reputation of the hotel chain. Reputation was assessed following the model proposed by Hannington (2016), in which respondents express their confidence in the future performance of a company. All items were measured using a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Data collection took place through the months of June through September 2023. The survey was administered to guests who had stayed at any of the nine hotels participating during the previous month. The sample comprised nine hotels located in downtown Reykjavík, all belonging to the same hotel chain, selected due to their similar operational structures and comparable service offerings. An email invitation was sent to all customers who had booked accommodation at one of the nine hotels, followed by one reminder email sent one week later. A total of 6505 emails were sent out. Of those, 2529 recipients opened the survey link, and 2114 began answering but dropped out, leaving 1497 responses.

During data analysis, 10 respondents were deemed outliers; thus, 1487 valid responses remained and formed the basis for the findings in this research. Most of the respondents (70%) were visiting Iceland for the first time, but about 13% had visited Iceland once or twice before. Most travelled for leisure (86%), and they stayed at several different hotels within the chain for an average of three to four nights. Most participants came from the US (49.9%), followed by Canada (11.2%), Great Britain (10.2%), and other Nordic countries (7.4%). Other participants were primarily from Europe, followed by Australia, Japan, Brazil, and other countries. Of the participants who chose to answer the gender question, 35% were male, 51% were female, and 0.27% defined gender in a different way. The age of the respondents was quite high, with about 33% being older than 66 years and about 70% being 46 years old or older. According to the data available from the hotel chain in question, the demographics described here are good representatives of their guest portfolio.

Data processing and analytical approach

Survey data were exported from QuestionPro and processed in IBM SPSS. After data cleaning and variable definition, missing values for individual items were coded as zero and excluded from item-level analyses. Reliability analyses were conducted to ensure that the items within each measurement group were internally consistent. Two variable sets were evaluated, each consisting of ten items: (1) importance ratings for service and sustainability factors, and (2) performance evaluations for the same factors. Descriptive statistics and standard deviations were calculated for all items. Cronbach's alpha values, item means, and standard deviations are presented in Table 1. The dataset was then imported into Excel and PowerPoint to prepare the tables and figures used for presenting statistical results. Analytical procedures included descriptive comparisons, radar-chart visualizations, correlation analyses, and linear regression models designed to examine the relationship between sustainability and service-related variables and overall positive reputation.

Results

This section presents the results addressing the three research questions using appropriate statistical analyses. The structure follows three subsections: (1) descriptive comparisons of important versus performance average score, to identify gaps. (2) preexamination of regression analysis i.e., correlation, outliers and factorability. (3) perform regression to examine the relationship, first between the importance and performance of sustainability and reputation and then between all performance variables and reputation to determine what attributes should be prioritized.

TABLE 1 - Attributes, means, standard deviation and factor Alpha value

Attributes			Text	Mean	Std
20a	Review	Employees		4.74	0.63
20b	Review	Location		4.77	0.58
20c	Review	Cleanliness		4.77	0.54
20d	Review	Value for money		4.28	0.84
20e	Review	Comfort		4.47	0.77
20f	Review	Facilities		4.41	0.80
20g	Review	Environmental focus		4.55	0.74
20h	Review	Social responsibility		4.57	0.70
20i	Review	Room quality		4.35	0.87
20j	Review	Service		4.69	0.66
Importance factor , Cronbach´s Alpha = 0,89					
21a	Importance	Employees		3.94	1.21
21b	Importance	Location		4.87	0.38
21c	Importance	Cleanliness		4.74	0.78
21d	Importance	Value for money		4.64	0.62
21e	Importance	Comfort		4.61	0.70
21f	Importance	Facilities		4.30	0.83
21g	Importance	Environmental focus		3.93	1.01
21h	Importance	Social responsibility		3.92	1.10
21i	Importance	Room quality		4.70	0.65
21j	Importance	Service		4.58	0.84
Reputation					
25	Overall positive reputation			4.67	0.62

In terms of importance ratings, most service attributes also received moderate to high mean scores (4.30–4.87), except for the two sustainability-related variables, environmental focus and social focus, and the employee variable, which received lower importance scores (3.92 to 3.94, respectively). Although these scores remain above the scale midpoint, they indicate that sustainability and employees' considerations were less prominent in guests' booking decisions compared with traditional service attributes. Reputation, measured as guests' overall perception of the company's future performance, also received a high mean score, suggesting that guests evaluated the hotel chain favorably.

A radar chart (see Figure 1) was constructed to visually compare performance and importance values to estimate prioritization of attributes. This method can be traced to SERVQUAL measuring of service quality (Parasuraman *et al.*, 1985). Where focus is on understanding the difference, or gaps, between customer valuation of expectations (here shown as importance) and performance (Zeithaml *et al.*, 2024). Where a gap is shown where performance does not reach importance score, indicates prioritization of that attribute. Vice versa, where importance does not reach performance scores, indicates less important and perhaps redundancy of attribute. The bigger the gap can then indicate prioritization of those attributes (Wilson *et al.*, 2021). The figure displays four lines, where the black dotted line represents the mean score for important factors and the solid black line represents the mean score for performance factors. Two light grey dotted lines indicate the upper and lower thresholds, with the upper threshold at 4.12 and the lower at 3.64. The gap between these threshold values is referred to as the *zone of indifference*, denoting a range within which service may be adequate but generally not of a level where performance becomes a differentiating factor or where the service would be actively recommended (Hayes, 2013).

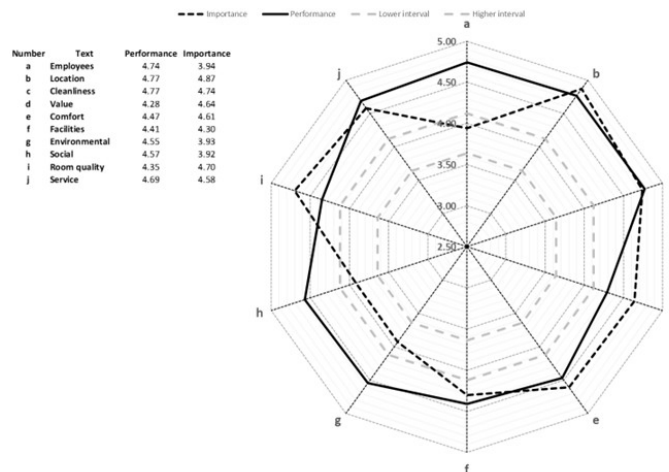


FIGURE 1 - Compared means of importance, performance and zone of indifference

The chart revealed that for several important scores; location, value, comfort, and room quality, exceeded performance ratings of those attributes. These discrepancies indicate potential areas for improvement and prioritization, particularly in service factors directly affecting guest experience. In contrast, performance exceeded importance for attributes such as employees, cleanliness, facilities, environmental focus, social focus, and general service quality. These may be interpreted as overperformance, where the hotel's delivery surpasses guest expectations. Notably, the importance of sustainability and employee variables fell within the “zone of indifference”, a range in which performance is deemed acceptable but not necessarily a differentiating factor. This suggests that although these are not a primary driver of guests’ booking decisions, it nevertheless holds some relevance and should not be disregarded. However, for prioritization purposes this method of using average scores to identify gaps between importance and performance is limited. It helps to understand the existence and nature of those gaps but does not indicate what is most important.

Sustainability factors and reputation

To assess whether sustainability-related variables explain variations in corporate reputation, environmental focus and social focus were combined into two composite variables: sustainability importance and sustainability performance. A correlation analysis showed that the relationship between importance and performance was relatively weak ($r = 0.23$), indicating that they represent distinct constructs. A linear regression model (see Figure 2) was conducted to examine the extent to which these variables explain variations in reputation. The results indicated that the model explained 38% of the variance in reputation ($R^2 = 0.38$). Sustainability performance had a strong, statistically significant effect on reputation ($\beta = 0.60$; $p^2 = 0.36$), whereas sustainability importance showed only a minimal effect ($\beta = 0.06$; $p^2 = 0.001$). This finding suggests that guests respond more strongly to actual sustainability practices experienced during their stay than to the abstract importance they attribute to sustainability when booking.

Prioritization of performance factors

To identify which service and sustainability performance factors significantly predict variations in reputation, a linear regression model was run using all ten performance attributes, and positive overall reputation as dependent variable. Regression analysis is sensitive towards the factorability, and outliers of the independent variables. When conducting correlation on the ten independent variables it showed that the correlation between a few of them exceeded 0.7 recommendations of Pallant (2020). The factorability using direct oblimin rotation revealed that all the ten attributes belonged to the same factor, furthermore, if deleted the alpha value would diminish. Therefore, the highly correlated items were combined. As can be seen on the table, employee service and hotel service, hotel comfort and room comfort, and environmental & social were paired and combined into EMPL-SERV, COMFORT, and SUSTAINABILITY. The correlation for the seven independent variables and correlation can be seen in Table 2.

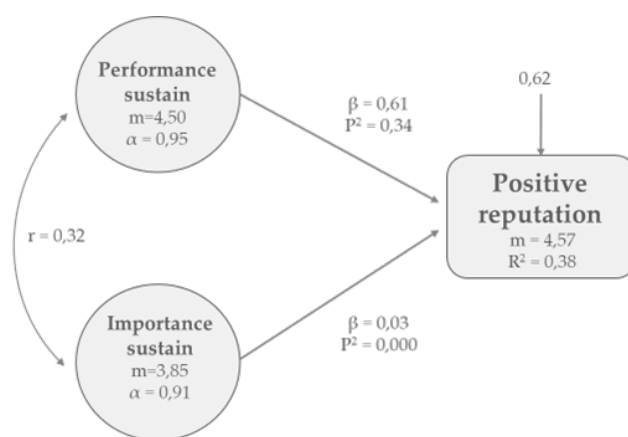


FIGURE 2 - Sustainability factors and reputation

Table 2 - Combined variables and correlations

Number	Attribute	New	Location	Cleanliness	Value	Facilities	Empl-Serv	Comfort	Sustainability
20b	Location	Location	1						
20c	Cleanliness	Cleanliness	0.5**	1					
20d	Value for money	Value	0.4**	0.5**	1				
20f	Facilities	Facilities	0.4**	0.6**	0.6**	1			
20a	Employees	Empl-Serv	0.5**	0.7**	0.7**	0.7**	1		
20j	Service								
20e	Hotel comfort	Comfort	0.4**	0.6**	0.5**	0.6**	0.7**	1	
20i	Room comfort								
20g	Environmental	Sustainability	0.4**	0.6**	0.7**	0.7**	0.7**	0.6**	1
20h	Social								

The table also demonstrates that all correlation values were between 0.3 and 0.7 as per Pallant (2020) and suitable for regression analysis using the seven independent variables against overall reputation as dependent variable. Linear regression was run multiple times and each time those with negative beta coefficients were removed in sequential steps, followed by those without statistically significant effects ($p > 0.05$). The final model included four predictors: value, sustainability, comfort, and empl-serv. All exhibited positive and statistically significant effects on reputation ($p < 0.01$) as shown in Table 3.

TABLE 3 – Multiple regression results

	std (β)	t	Sig	Part	Tolerance	VIF
Value	0.14	3.4	<0.001	0.096	0.45	2.155
Sustainability	0.17	3.7	<0.001	0.105	0.38	2.653
Empl-Serv	0.19	4.9	<0.001	0.141	0.53	1.884
Comfort	0.33	7.5	<0.001	0.215	0.44	2.277

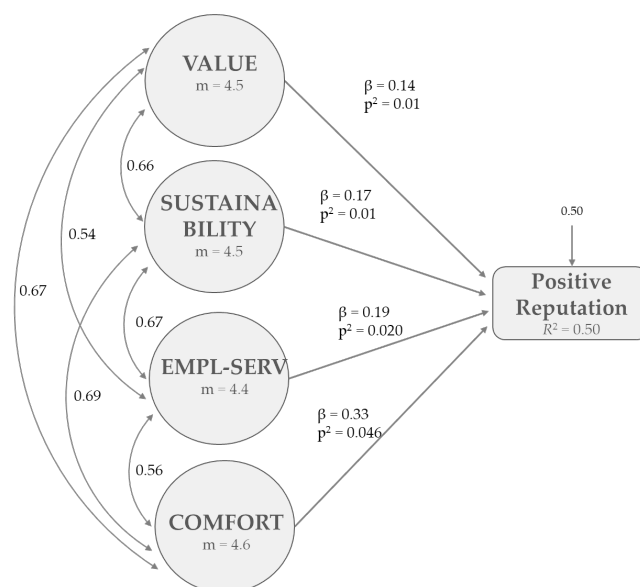


FIGURE 3 - Influential model of independent variables towards the variability of reputation

As seen in the table, the standardized beta (β), ranging from 0.14 to 0.33, suggested that all independent components had a connection to variability in the dependent component. According to Pallant (2020), the greater this number, the more weight the component has in explaining the variability. Tolerance exceeded 0.1, as suggested, and the variance inflation factor (VIF), which is the inverse of the tolerance value (1 divided by tolerance), was lower than 10. All four attributes exhibited a significant relationship with positive reputation ($\text{sig} < 0.001$). The part value squared (P^2) shows how the component individually explained the variance in the dependent component (Pallant. 2020). Figure 3 illustrates the statistical model.

This model explained (R^2) 50% of the variability in positive overall reputation, which means that 50% of the variance in performance remained unexplained by the model and was outside the scope of this research. Pallant (2020) argued that the explanation ratio (R-square) in peer-reviewed academic papers is commonly lower than 45%. Kline (2005), however, argued that in the physical sciences, the value is often higher than 50%. With this considered, the model has certain strengths. Of the four independent attributes, comfort had the strongest connection ($\beta = 0.33$) and the strongest unique contribution of 4.6% to explaining variabilities in performance. This was followed by empl-serv ($\beta = 0.19$), which individually explained approximately 2% of the variance, then sustainability ($\beta = 0.17$) individually contributing 1%), and finally value ($\beta = 0.14$), which explained 1%. individual contributions of the independent components totaled about 9%, which is far less than the explanatory power of the model. This is because, as previously mentioned, all the components were correlated to a degree; therefore, they were stronger together than individually. Moreover, because they were all statistically connected to the variability in reputation, it is safe to assume that all the independent components are important when it comes to explaining variances in overall positive reputation.

Discussion and concluding remarks

The purpose of this article was to examine hotel guests' assessments of the importance of environmental and social sustainability attributes, with the aim of explaining how these influence hotel reputation. Additionally, the goal was to identify and prioritize the performance dimensions that contribute most strongly to guests' evaluations of hotel reputation. The discussion below addresses the three research questions in sequence, drawing on the empirical results presented above.

The first question posed addressed which imminent gaps exist between hotel guests' assessments of the importance and performance of attributes related to sustainability and service. The analysis of the radar

chart (Figure 1) revealed that four attributes, where importance was higher than performance, should be looked at as priority namely, (b) Location, (d) Value, (e) Hotel comfort, and (i) Room quality. Furthermore, three attributes where importance was considerably lower than performance, which suggest that the attributes were less important and perhaps could be made redundant from operational focus. Moreover, (a) Employee performance, Environmental focus (g) and social focus (h) were assigned comparatively low importance relative to traditional service attributes such as cleanliness, comfort, and location.

This finding contrasts with several theoretical perspectives positing that sustainability and more generally “green sentiment” has become increasingly central to consumer decision-making (Saarinen, 2021; Yang *et al.*, 2026). Various studies have suggested that a growing segment of consumers base purchase decisions on values, ideological commitments, and perceived social or environmental responsibility (Jamrozy & Lawonk, 2017; Rutherford, 2011). Nevertheless, as von Briel *et al.* (2026) point out, there remain stark differences between guest segments with regard to what service is deemed important. Therefore, it does not come as a surprise that sustainability factors fall within the zone of indifference, indicating that while guests do not rate them as highly important, they nevertheless consider them relevant to some extent and thus, potentially significant factors for influencing purchase. The analysis also shows that performance ratings in sustainability were substantially higher than important ratings, which indicates that respondents got aware of sustainability practices during the hotel stay and that experience contributed to guests’ perceptions of the hotel’s reputation. This finding leads to the next research question, which concerns the extent sustainability factors influence the variability of reputation.

To answer this question a linear regression was performed. Environmental and social focus were merged into important sustainability and performance sustainability and used as independent variables, and overall positive reputation used as the dependent variable. The model explained 38% ($R^2=0.38$) of the variability in reputation. Furthermore, findings also showed that performance sustainability factor alone explained 34% of the variance in reputation, representing nearly the entirety of the model’s explanatory power (38%). This suggests that guests respond more strongly to the sustainability practices they experience during their stay than to their prior beliefs about the importance of such practices aligning with Asgeirsson and Jóhannesson (2024). This result also supports the broader argument that reputation is formed through concrete experiences rather than abstract expectations. While critics of sustainability discourse argue that sustainability is often superficial or weakly implemented (Sharpley, 2020), these findings show that genuine sustainability practices, when visible to guests, can meaningfully enhance corporate reputation. The implication is that sustainability should not be considered merely as a marketing tool or compliance requirement but as an operational area capable of generating competitive advantage further underlining how important it is for companies to abstain from greenwashing (Alyahia *et al.*, 2024). For managers and owners, reputation is shaped less by what is claimed and more by what is genuinely done. This leads to the third research question which revolves around what exactly should be done.

The third research question focused on identifying which performance factors should be prioritized to strengthen hotel positive reputation. Although prioritization was carried out through gaps analysis, suggesting prioritizing Location, Value, Hotel comfort, and Room quality, it is important not to rely solely on average score in this regard (Asgeirsson *et al.*, 2024; Hannington, 2016; Gonzales-Rodriguez *et al.*, 2016). The regression was carried out, after making sure of data suitability resulting in combination of attributes due to high correlation. The model strength was 50% ($R^2=0.50$) indication a strong model (Pallant, 2020; Klein 2005). Variables had different strength in explaining the variation of reputation and this different strength can be used for prioritizing attributes. the strongest connection was through comfort ($\beta = 0.33$; $p^2 = 0.046$), then empl-serv ($\beta = 0.19$; $p^2 = 0.02$), followed by sustainability ($\beta = 0.17$; $p^2 = 0.01$), and lastly value ($\beta = 0.14$; $p^2 = 0.01$). Due to the correlation of attributes, the overall model strength is considerably higher than the combined individual attributes scores. This underlines the importance of considering all aspects simultaneously, which means that prioritization of one of those attributes is not possible, but great

focus needs to be on all of them with special attention to hotel and room comfort. This is without no doubt four broad areas of operation, but still effectively narrows the managerial focus. This finding is particularly striking given that sustainability attributes of social and environmental focus received low importance scores. It suggests that sustainability functions as a latent driver of reputation, one that guests may not explicitly identify as important but nevertheless reward when they experience it (Coles *et al.*, 2013).

Taken together, these findings provide two key insights. First, importance-performance gaps reveal what guests believe should be improved, while regression analysis identifies the factors that drive reputation. These may not always align. Second, sustainability performance plays a central role in reputation formation, reinforcing the argument that hotels should invest strategically in sustainability initiatives and communicate them clearly to guests. This study suggests that even when sustainability is not a conscious priority during booking, it may still influence post-consumption evaluations and, in turn, a hotel's reputation, which is among the most significant factors affecting companies' competitiveness.

The global discourse on the sustainable development of tourism has been criticized for being lofty and too abstract to yield actual change. When the rapid growth of tourism related greenhouse gas emissions is considered, it becomes clear that the sector has a vast space for improvement, to put it mildly (Gössling *et al.*, 2024; Sharpley, 2020). Nevertheless, efforts to boost sustainable operations, in the sense of reducing emissions, caring for the environment and advocating social responsibility, is probably the best option for doing better' tourism; tourism that safeguards resources for future generations. In the Arctic area, tourism has increased rapidly and is likely to grow further in the near future (Müller, 2025). Research is already indicating that the most popular tourist sites and destinations in the Arctic region are getting overcrowded and suffering from overtourism (Jóhannesson *et al.*, 2022; Sveinsdóttir *et al.*, 2025; Sæþórsdóttir *et al.*, 2020). As the meaning of sustainability is ambiguous for tourism stakeholders in the region (Broegaard *et al.*, 2022; Cooper, 2023; Jóhannesson *et al.*, 2024) it is imperative to identify what sustainable practices may include and how they might matter.

Overall, this study contributes to both academic and managerial understanding of how sustainability influences hotel reputation. From a theoretical perspective, it demonstrates that sustainability performance exerts a stronger effect on reputation than sustainability importance, highlighting the distinction between pre-purchase priorities and post-experience evaluations. From a managerial standpoint, the results underscore the value of data-driven decision-making and the need to prioritize performance improvements that have demonstrable effects on guest perceptions, particularly environmental sustainability, value for money, and room quality.

Finally, it is important to acknowledge the study's limitations. The dataset is limited to a single hotel chain, a single geographic location (downtown Reykjavík), and data collection period during the four summer months representing the high season. Additionally, background variables such as age, nationality, or prior travel experience were not analyzed in relation to sustainability preferences, though these factors may influence guest attitudes. Future research could explore these variables, conduct longitudinal analyses and compare different hotel categories to strengthen external validity (Asgeirsson & Jóhannesson, 2024). Considering increasing awareness of the importance of addressing sustainability from a situated perspective (Cooper, 2023; Sveinsdóttir *et al.*, 2025) we also recommend a comparative study of regional dynamics of sustainability importance and performance attributes and their effects on reputation.

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Emotion trumps quality in Gen Z's TikTok consumer brand engagement: the mediating role of brand evaluation in virtual influencer marketing

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Abstract. This study tests the veracity and reliability of consumer mechanisms related to para-social interaction with virtual influencers on TikTok and subsequent impacts on consumer brand engagement among Gen Z. It aims to extend the Theory of Persuasion in the context of digital retailing by proposing and testing a multi-dimensional brand evaluation construct as the key mediator, moving beyond traditional purchase intention outcomes. To achieve this, a quantitative survey was conducted with 408 active Gen Z TikTok users (aged 18-29) recruited via the Prolific online consumer panel. Participants viewed a real-world fashion brand promotion video from virtual influencer Lil Miquela before completing the questionnaire, and the proposed theoretical model was tested using Partial Least Squares Structural Equation Modelling (PLS-SEM). The findings reveal that para-social interaction positively impacted all consumer brand evaluation dimensions (perceived brand quality, brand affect, brand preference). However, only brand affect and brand preference significantly mediated the consumers' path to consumer brand engagement, while perceived brand quality did not. This key finding suggests that for Gen Z consumers on TikTok, affective and preferential pathways to engagement are more critical than evaluative judgments of product excellence. Ultimately, this research extends the Theory of Persuasion for digital retail research by introducing multi-dimensional brand evaluation as a psychological mediating mechanism and consumer brand engagement as the primary outcome, demonstrating that virtuality alters the consumer persuasion process: in human-virtual interactions, affective and preferential pathways, rather than cognitive evaluations of brand superiority, are the definitive drivers of engagement.

Keywords: Virtual Influencer; consumer brand engagement; para-social interaction; brand evaluation; generation Z

Introduction

The integration of computer-generated personalities, known as virtual influencers, has emerged as a disruptive and highly lucrative phenomenon across digital retail and social commerce platforms (Kim & Park, 2023). With the influencer marketing industry projected to reach \$32.55 billion by 2025, these entities have grown from niche digital experiments into central figures forming commercial partnerships with major brands (Ross, 2025; Gambetti & Kozinets, 2024; Astrid, 2022). On visually driven and highly interactive platforms like TikTok, virtual influencers demonstrate significant effectiveness in shaping the attitudes and purchasing decisions of Generation Z consumers (Theocharis *et al.*, 2025). As digital natives, this cohort

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shows a unique receptiveness to these entities, often perceiving them as genuine and relatable despite their artificial nature (Audrezet & Koles, 2023).

Since the foundational conceptualizations of influencer marketing, scholars have relied heavily on the Theory of Persuasion to explain how consumers choose to interact with and purchase from endorsed brands (Masuda *et al.*, 2022; Farivar *et al.*, 2023; Saad *et al.*, 2025). This classical framework conceptualizes the relational pull of an influencer as a function of their observable attributes, such as physical attractiveness, social attractiveness, and attitude homophily (Masuda *et al.*, 2022). These attributes foster para-social interaction, a one-sided psychological relationship where audiences develop a sense of intimacy and connection with the media personality (Vu *et al.*, 2024; Lacap *et al.*, 2023; Saini & Bansal, 2025). However, despite its enduring influence, applying this traditional persuasion-based model directly to virtual influencers reveals a critical theoretical limitation: the classical framework is inherently rooted in human-to-human authenticity (Alboqami, 2023). It lacks the explanatory depth to account for the highly positive, successful connections Gen Z forms with computer-generated entities, virtual influencers (Hidayat *et al.*, 2024).

Building on this limitation, existing models frequently oversimplify the consumer journey by drawing a direct line from virtual influencer characteristics to purchase intention, treating the intermediary psychological evaluation as a scalar black box (Kim *et al.*, 2024; Becerra & Badrinarayanan, 2013). Brand evaluation, which encompasses subjective beliefs of brand superiority (perceived brand quality), affective responses (brand affect), and behavioral commitments (brand preference), is a crucial mechanism that shapes long-term retail success (Han, 2023). Treating brand outcomes merely as a function of direct purchase intent neglects the multidirectional and nuanced ways in which consumers process virtual endorsements (Sheng, 2024).

In modern social commerce environments like TikTok, retail success is increasingly defined by consumer brand engagement, a multifaceted construct involving a consumer's active cognitive, emotional, and behavioral connectedness with a brand beyond the initial transaction (Hollebeek *et al.*, 2022; Pereira *et al.*, 2024; Masuda *et al.*, 2022; Nicolas *et al.*, 2023). Understanding how para-social interactions cultivate this broader, more interactive engagement is vital for digital retail strategy, yet it remains significantly underexplored concerning virtual influencers (Shen, 2025).

Addressing these theoretical and methodological gaps, this study proposes an extended Theory of Persuasion that integrates multi-dimensional brand evaluation as the central mediating mechanism between virtual influencer para-social interaction and consumer brand engagement. The research advances the following hypotheses:

Hypothesis 1: Para-social interaction positively influences consumers' brand evaluation, specifically:

H1a: Para-social interaction positively influences perceived brand quality.

H1b: Para-social interaction positively influences brand affect.

H1c: Para-social interaction positively influences brand preference.

Hypothesis 2: Consumers' brand evaluation positively influences consumer brand engagement, specifically:

H2a: Perceived brand quality positively influences consumer brand engagement.

H2b: Brand affect positively influences consumer brand engagement.

H2c: Brand preference positively influences consumer brand engagement.

Methodology

RESEARCH DESIGN

Before launching the full-scale survey, a pilot study involving 100 participants was carried out. The purpose of this preliminary step was to test the survey instrument and assess initial response patterns. The pilot test was also instrumental in refining the Brand Affect scale by confirming the correct coding for all its items.

This validation process ensured the clarity and robustness of the questionnaire for the main data collection phase.

The virtual influencer Lil Miquela was selected for this study due to her significant presence and high engagement on TikTok, making her a relevant figure for examining brand endorsements targeted at English-speaking Gen Z globally. The stimulus material consisted of a promotional video posted on her official TikTok account before, showcasing brand collaborations with the vehicle brand, BMW, chosen to ensure high ecological validity through a genuine, high-profile marketing campaign. Selecting a high-involvement luxury automotive brand mitigated potential gender biases inherent to fashion stimuli, and it ensured that the endorsed product required significant consumer evaluation. Crucially, this cross-sector stimulus does not manipulate the findings. Instead, it provides a rigorous test of the virtual influencer's ability to drive engagement independent of the consumer's immediate purchase intent.

The procedure began with participants providing informed consent after being presented with the study's purpose and their privacy rights. After providing consent by proceeding with the survey, they were then shown the selected brand promotion videos by Lil Miquela and BMW. After viewing the content, they proceeded to complete the survey questionnaire. The questionnaire was structured to align with the theoretical model, first measuring the independent variable, para-social interaction, followed by the mediators (perceived brand quality, brand affect, and brand preference), the dependent variable, consumer brand engagement, and finally, demographic questions.

The measurement items for the model's constructs were drawn from previously validated scales in the existing literature, with all items measured on a 7-point Likert scale (1 = "Strongly Disagree" to 7 = "Strongly Agree"). Para-social interaction (PSI) was measured with a 5-item scale (Sokolova & Kefi, 2020; Liu *et al.*, 2019). Perceived brand quality (PBQ) and brand preference (BP) were measured with 3-item scales from Vera (2015) and Tingchi Liu *et al.* (2014). Brand affect (BA) was measured with a 3-item scale from Sung and Kim (2010). Finally, consumer brand engagement (CBE) was measured with a 3-item scale from Coffie *et al.* (2025).

The hypothesized relationships within the theoretical framework, which proposes that brand evaluation mediates the effect of para-social interaction on consumer brand engagement, were then evaluated using Partial Least Squares Structural Equation Modelling (PLS-SEM) in SmartPLS 4. PLS-SEM is highly suitable for this study as it accommodates non-normal data, focuses on prediction, and effectively handles complex models that include mediating effects (Guenther *et al.*, 2025; Hair *et al.*, 2024). To verify the significance of all path coefficients and mediating effects, a bootstrapping procedure was applied using 5,000 subsamples, a number considered robust for achieving stable results (Hair *et al.*, 2023).

SAMPLE

Participants were recruited through the professional Prolific online consumer panel. Prolific distributed the survey link to its pre-screened panel members who matched the study's demographic criteria. The inclusion criteria required participants to be active TikTok users between the ages of 18 and 29. Data collection took place over a three-week period in Summer 2025 via the Prolific survey platform. An initial sample of 428 responses was collected. However, 20 responses were removed for falling below a 90-second completion threshold, indicating they did not actively watch the 51-second stimulus video. This process yielded a final valid sample of 408 respondents for the analysis.

The sample was predominantly female ($N = 236$, 57.8%), with a smaller proportion of males ($N = 170$, 41.7%) and two participants identifying as non-binary/third gender (0.5%). In terms of age, the largest cohort was 21-25 years old ($N = 228$, 55.9%), followed by those aged 26-29 ($N = 149$, 36.5%) and 18-20 ($N = 31$, 7.6%). Geographically, the majority of respondents were from South Africa ($N = 284$, 69.6%) and the United Kingdom ($N = 45$, 11.0%). Crucially for this research, a significant majority of participants (N

= 243, 59.6%) confirmed that they already follow at least one virtual influencer, affirming the relevance of this population for the study.

Results

During the initial item evaluation, one reverse-coded item for Brand Affect (BA3, capturing an “unpleasant experience”) was flagged for a low outer loading of 0.315. This item was deliberately included in the survey design as a hidden attention check to identify straight-lining behavior and ensure participant attentiveness during the preliminary data screening phase. Having successfully served its methodological purpose for data quality assurance, BA3 was removed from the final structural model to priorities the psychometric rigor, reliability, and validity of the core construct.

Following the removal of BA3, the refined model demonstrated exceptionally strong reliability and convergent validity. Specifically, all Cronbach’s Alpha values ranged from 0.915 to 0.954, demonstrating excellent internal consistency. Composite reliability (CR) values ranged from 0.952 to 0.970, well above the recommended 0.70 threshold. Furthermore, the average variance extracted (AVE) values for all constructs ranged from 0.837 to 0.922, significantly exceeding the standard 0.50 level. To measure discriminant validity, the heterotrait–monotrait (HTMT) ratio of correlations was applied. All HTMT point estimates in the refined model now fall strictly below the 0.90 threshold recommended by Henseler *et al.* (2015). The highest recorded ratio in the revised matrix is 0.878, observed between Para-social Interaction and Consumer Brand Engagement.

The first set of hypotheses (H1a-H1c) posited a positive link between para-social interaction and the components of brand evaluation. A significant positive relationship was found between Para-social Interaction and Perceived Brand Quality (H1a: $\beta = 0.653$, $t = 19.701$, $p < .001$), Brand Affect (H1b: $\beta = 0.777$, $t = 30.059$, $p < .001$), and Brand Preference (H1c: $\beta = 0.716$, $t = 24.102$, $p < .001$).

The results substantiated a significant positive link between Brand Affect and Consumer Brand Engagement (H2b: $\beta = 0.434$, $t = 7.153$, $p < .001$), as well as between Brand Preference and Consumer Brand Engagement (H2c: $\beta = 0.451$, $t = 8.206$, $p < .001$). However, the data did not support a significant relationship between Perceived Brand Quality and Consumer Brand Engagement (H2a: $\beta = 0.058$, $t = 1.051$, $p = .293$).

Furthermore, an examination of the specific indirect effects was conducted to test the mediating role of brand evaluation. The results confirm that Brand Affect ($\beta = 0.323$, $t = 7.148$, $p < .001$) and Brand Preference ($\beta = 0.337$, $t = 6.437$, $p < .001$) are significant mediators of the relationship between para-social interaction and consumer brand engagement. In contrast, the indirect effect through Perceived Brand Quality was not significant ($\beta = 0.038$, $t = 1.032$, $p = .302$), which is consistent with the non-significant direct path of H2a.

The coefficient of determination (R^2) was used to assess the amount of variance in the endogenous constructs explained by the model. The R^2 for Consumer Brand Engagement is 0.754, and for Brand Affect is 0.604, suggesting the coefficient of determination is substantial for both constructs, as per the guidelines provided by Henseler *et al.* (2009).

Conclusions and discussion

This study investigated the mechanisms through which Gen Z consumers’ para-social interactions with virtual influencers on TikTok shape their consumer brand engagement. The statistical analysis yielded several key findings that provide a nuanced understanding of virtual influencer effectiveness within digital retail environments. Three findings, in particular, stand out regarding the consumer journey: (1) the powerful role of para-social interaction as a driver of brand evaluation (Dabiran *et al.*, 2024); (2) the dominance of emotional and preferential pathways over evaluative ones in fostering consumer brand engagement

(Ballester *et al.*, 2025; Trisetti & Ali, 2025); and (3) the confirmation that consumers' brand evaluation operates as a critical mediator in this process (Yan *et al.*, 2024).

The results demonstrated that para-social interaction had a strong, significant, and positive effect on all three dimensions of consumers' brand evaluation: perceived brand quality (H1a), brand affect (H1b), and brand preference (H1c). This is the most robust set of relationships found in the model, indicating that the perceived personal connection and one-sided intimacy that Gen Z consumers develop with a virtual influencer like Lil Miquela directly translate into more positive consumer perceptions of the brands she endorses within the digital retail space. While some research questions the authenticity of computer-generated personas (Hidayat *et al.*, 2024), this study shows that for Gen Z consumers on TikTok, the artificial nature of the influencer does not preclude the formation of powerful para-social interactions that have tangible effects on consumer brand attitudes and shopping evaluations.

A central and counterintuitive finding of this study is the clear divergence in how different facets of a consumer's brand evaluation impact their consumer brand engagement within digital retail environments. Both Brand Affect (H2b) and Brand Preference (H2c) were found to be strong, significant predictors of consumer brand engagement. In stark contrast, and contrary to traditional consumer behavior assumptions, Perceived Brand Quality (H2a) had no significant effect. This finding challenges the conventional marketing retail logic that a consumer's positive evaluative judgment of product excellence ("This brand is of high quality") is a direct and necessary precursor to active consumer brand engagement. This suggests that for Gen Z consumers in a fast-paced, visually-driven social commerce environment like TikTok, the decision to engage with a brand (e.g., follow, like, share content) is driven more by emotional connection ("This brand makes me happy") and loyalty ("This is my preferred brand") than by an evaluative judgment of the brand's superiority.

Furthermore, this study explicitly articulates how virtual influencers change the traditional Theory of Persuasion in digital marketing. Unlike human influencers, who often build trust by demonstrating tangible product efficacy, virtual influencers operate within a strictly emotional framework to drive consumer interactions. Furthermore, to translate follower loyalty into active consumer brand engagement, marketing campaigns featuring virtual influencers should be designed to evoke emotion and build a sense of brand identity. Content that makes followers feel happy, excited, or part of an exclusive group is more likely to result in likes, shares, and user-generated content than content that simply lists product features (Shen, 2025).

This study should be considered in light of certain limitations which provide avenues for future research. First, the cross-sectional survey design presents a potential for common method variance, suggesting future research could use longitudinal or experimental designs to further validate causal relationships (Malhotra *et al.*, 2017). Second, the sample was geographically concentrated in South Africa, indicating a need to replicate the proposed model across more diverse global markets to verify cross-cultural robustness. Finally, the research focused on a single virtual influencer and platform, so future studies should replicate these findings with other virtual entities to enhance generalizability (Shen *et al.*, 2021), and explore the conditions that cause consumer disengagement, as virtual influencers can sometimes be perceived as uncanny and deceiving (Franke *et al.*, 2023).

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Leading through retail turbulence: transformational leadership as the foundational catalyst for service outcomes

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Abstract. The contemporary retail environment is marked by declining physical retail space (Kupfer *et al.*, 2024), shifting consumer decision making processes, and divergent demands of omnichannel shoppers (McKinsey & Company, 2021). These conditions create unprecedented challenges for organizations seeking to maintain service quality and customer loyalty. Leadership has become a critical factor in guiding employees through uncertainty, balancing efficiency with empathy, and aligning employee behavior with evolving customer expectations. This study proposes a Transformational Leadership-Activated Outcomes Framework (TLAOF) that reframes the Transformational Leadership (TFL) and Path Goal Theory (PGT) relationship as hierarchical rather than parallel. Drawing on survey data from 274 retail employees, this study found Transformational Leadership creates the foundational conditions through which Path-Goal behaviors become viable and sustainable. The TFL dimensions differentially activate specific service outcomes and demonstrates that these activation patterns are empirically distinct, theoretically coherent, and practically consequential.

Keywords: Leadership; transformational; customer orientation; path goal; service outcomes

Introduction

Retail has entered a period of structural reconfiguration that shows no sign of stabilization. The contraction of physical store networks (Kupfer *et al.*, 2024), the fragmentation of customer journeys across digital and physical channels (McKinsey & Company, 2021), and uneven organizational readiness for omnichannel integration (Manhattan Association, 2025) have collectively altered what service delivery demands from frontline employees. These employees are expected to absorb channel complexity and customer friction simultaneously while maintaining consistent service quality regardless of the conditions under which service is delivered.

The leadership problem this creates is not simply a matter of the right style. Path-Goal Theory (House, 1971, 1996) emphasizes matching directive, supportive, participative, or achievement-oriented behaviors to situational requirements, but this logic assumes a degree of situational clarity that turbulent retail environments rarely provide. In many retail settings, employees need goal clarity, emotional support, decision-making autonomy, and performance challenges at the same time, not in a neat sequence.

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Transformational leadership (TFL) theory offers a more suitable conceptual entry point in such conditions because it emphasizes identification, inspiration, and intellectual development rather than contingent exchange (Bass & Riggio, 2006). Yet TFL has been examined primarily as a predictor of single outcomes, limiting its potential to explain leadership effectiveness when multiple outcomes must be achieved concurrently.

Theoretical framework

The TLAOF rests on three propositions. First, TFL operates upstream of Path-Goal behaviors. Burns (1978) and Bass (1985) established that transformational leadership works at a deeper motivational level than transactional behavioral approaches, shaping what followers value rather than merely directing what they do. Building on Yukl's (2010) argument that TFL functions as a higher-order enabling orientation, the TLAOF positions transformational practices as creating the psychological and relational conditions (trust, shared purpose, cognitive readiness) that make directive, supportive, participative, and achievement-oriented behaviors effective rather than merely performed. Second, TFL dimensions activate outcomes through distinct mechanisms. Bass & Riggio (2006) and Podsakoff *et al.* (1990) provide both conceptual and empirical grounds for treating the four dimensions as functionally distinct. Idealized influence works through value internalization; inspirational motivation through shared aspiration; individualized consideration (operationalized here as team-based collaboration) through cooperative infrastructure; and intellectual stimulation through cognitive development. These mechanisms should produce differentiated empirical patterns across outcomes while remaining correlated as components of an integrated leadership orientation. Third, turbulent retail contexts demand simultaneous behavioral activation.

Path-Goal Theory assumes sequential situational diagnosis: leaders assess needs, then select responses (House, 1971). This logic breaks down when employees face concurrent demands such as directional uncertainty, emotional strain, cognitive overload, and performance pressure. Antonakis *et al.* (2003) demonstrate that environmental turbulence favors transformational over transactional leadership because TFL creates enabling conditions rather than situational prescriptions. TLAOF extends this logic; in volatile retail settings, TFL provides the foundation from which leaders can activate the full Path-Goal repertoire simultaneously rather than sequentially.

Methodology

RESEARCH DESIGN

This study proposes a Transformational Leadership-Activated Outcomes Framework (TLAOF) that reframes the TFL-PGT relationship as hierarchical rather than parallel. In this framework, TFL does not operate alongside Path-Goal Theory as a competing explanatory logic. It is the foundational condition from which Path-Goal behavioral repertoires and customer orientation emerge. Four TFL dimensions were measured: collaboration (team-based individualized consideration), idealized influence, inspirational motivation, and intellectual stimulation. Five outcome variables were assessed: customer orientation and four Path-Goal leadership behaviors such as directive, supportive, participative, and achievement orientation. All scales used 5-point Likert response formats, and internal consistency reliabilities exceeded conventional thresholds (Cronbach's $\alpha > .70$).

SAMPLE

Data were collected from 274 employees working in retail and closely related consumer-facing sectors. The largest segment came from food, beverage, and hospitality (40%), followed by consumer-packaged goods (15%), consumer electronics (5%), and other retail or service categories. Supervisory and management personnel comprised 44% of respondents, entry-level employees 27%, and sales and marketing roles 15%, with the remainder in executive or other positions. Tenure was distributed across early, mid, and senior career stages.

Analysis

The analytical strategy combined three steps. First, bivariate correlations were examined to establish the overall pattern of associations among TFL dimensions, Path-Goal behaviors, and customer orientation. Second, multiple regressions with all four TFL dimensions entered simultaneously were estimated for each outcome to identify unique activation effects. Third, ANOVAs tested whether employees' perceptions of key constructs varied systematically by career stage, organizational level, educational attainment, and gender.

Results

The correlation patterns support for the framework. The four TFL dimensions were strongly interrelated ($r = .68-.83, p < .001$), consistent with an integrated leadership orientation rather than a set of isolated behaviors (Bass & Riggio, 2006). Path-Goal behaviors also correlated substantially with one another ($r = .38-.75, p < .001$). By contrast, customer orientation showed weak associations with Path-Goal behaviors ($r = .06-.25$), suggesting that customer-focused attitudes are shaped more directly by transformational processes than by these behavioral styles. This pattern supports a dual-path model where TFL influences customer orientation directly through value identification while separately shaping behavioral effectiveness.

Regression analyses reveal differentiated activation patterns. Customer orientation showed meaningful explained variance ($R^2 = .256, F(4, 269) = 23.15, p < .001$), with idealized influence as the primary predictor ($\beta = .228, p = .024$) and inspirational motivation marginally significant ($\beta = .203, p = .063$). Collaboration and intellectual stimulation contributed negligibly once influence and motivation were controlled. Customer orientation thus appears fundamentally identification-based: employees develop customer focus when leaders visibly model customer-centric values and articulate why service excellence matters, not simply through collaborative structures or cognitive challenge.

Participative leadership yielded the study's strongest single pathway ($R^2 = .238, F(4, 269) = 21.01, p < .001$). Intellectual stimulation was the only significant predictor ($\beta = .381, p < .001$), while other dimensions proved nonsignificant. This repositions participative leadership as primarily cognitive outcome. Employees participate meaningfully when encouraged to question assumptions and analyze problems, not merely because they feel generally supported or inspired. Organizations that promote participation without intellectual stimulation risk encouraging input that is procedural rather than genuinely problem-solving.

Supportive leadership showed another distinct pattern ($R^2 = .214, F(4, 269) = 18.31, p < .001$). Idealized influence emerged strongest ($\beta = .263, p = .011$), with intellectual stimulation marginally significant ($\beta = .182, p = .067$). Employees apparently interpret support in terms of leader credibility: when leaders appear principled and trustworthy, expressions of concern are seen as genuine rather than performative.

Directive leadership provided a useful boundary test for the framework. The model showed modest fit ($R^2 = .065, F(4, 269) = 4.67, p = .001$), indicating that directive guidance operates largely outside TFL's direct influence and is shaped primarily by structural factors such as standardized procedures and role requirements. Team-based collaboration was the only significant predictor ($\beta = .184, p = .039$), suggesting that leaders who coordinate collaborative work also tend to provide clearer task structures and expectations.

Achievement orientation showed the strongest model fit among all outcomes ($R^2 = .286, F(4, 269) = 27.00, p < .001$). No single TFL dimension emerged as a unique predictor, despite moderate correlations between achievement and each transformational dimension ($r = .44-.50, p < .001$). All four TFL components produced positive but marginal individual coefficients in the regression. This pattern points to genuinely synergistic effects. Achievement orientation requires the combined influence of role modeling, motivational communication, cognitive challenge, and collaborative structures rather than dominance from any one practice.

The ANOVA results revealed uneven TFL activation across demographics. Work experience affected both customer orientation ($F(3, 270) = 3.00, p = .031$) and intellectual stimulation ($F(3, 270) = 2.83, p = .039$) in inverted-U patterns. Mid-career employees (10-15 years) reported the highest levels, while early- and late-career employees reported lower means and greater dispersion. This suggests that transformational practices are experienced most consistently among mid-career employees, while newcomers and veterans receive more uneven exposure despite their respective value for organizational learning and accumulated expertise.

Position level significantly differentiated participation ($F(4, 269) = 4.02, p = .003$). Entry-level employees reported substantially lower participation ($M = 3.31$) than supervisory ($M = 3.88$) and executive levels ($M = 3.90$). Given that intellectual stimulation is the key driver of participation, this pattern reveals critical oversight: organizations fail to engage frontline employees cognitively despite their direct exposure to service failures and changing customer expectations.

Educational attainment associated with collaboration perceptions ($F(6, 267) = 3.22, p = .005$), with professional degree holders reporting markedly higher collaboration ($M = 4.64$) than bachelor's holders ($M = 3.89$). A marginal gender effect on motivation ($t(272) = -1.87, p = .062$) showed women reporting slightly higher levels ($M = 4.11$) than men ($M = 3.91$), though modest, this underscores that transformational practices are not perceived uniformly across groups.

Conclusions and discussion

The findings support that Transformational Leadership and Path-Goal Theory operate at distinct analytical levels rather than as competing alternatives. Transformational leadership creates the foundational conditions through which Path-Goal behaviors become viable and sustainable. The results demonstrate that idealized influence shapes customer orientation and supportive climates primarily through employees' identification with leader-modeled values. Intellectual stimulation enables participative leadership by developing employees' capacity for analytical engagement with organizational challenges. Achievement-oriented cultures emerge when multiple transformational dimensions work together, indicating no single practice suffices. Notably, directive behaviors show minimal connection to transformational practices, indicating that task structures and organizational mandates remain important independent determinants.

These patterns translate into specific leadership development priorities. Organizations seeking to strengthen customer orientation should shift emphasis from procedural training toward developing leaders who demonstrate customer-centric principles in their daily conduct. Building genuine participation requires embedding intellectual challenge into frontline work itself, not merely installing formal suggestion mechanisms. The career-stage patterns we observe suggest that transformational activation should be strategically adjusted across employees' organizational tenure rather than treated as universally applicable. Mid-career employees demonstrate peak activation levels, while both early-career and veteran employees exhibit notable deficits, indicating the need for differentiated approaches. The entry-level participation gap proves particularly consequential given frontline employees' proximity to customer intelligence. In turbulent retail contexts where multiple demands surface concurrently, leadership effectiveness depends less on diagnosing situations to select optimal styles and more on cultivating transformational capabilities that simultaneously activate complementary behavioral responses.

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Exploring customers' perceptions of neobanks and the influence of corporate digital responsibility

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Abstract. Digital banking, referred to as Financial Technology (Fintech) services, is widely acclaimed for delivering financial services entirely online. These services have ushered in a wave of innovative experiences worldwide. Since the emergence of neobank services in the 2000s, significant changes in their structure have led to varying levels of acceptance worldwide. Understanding the factors influencing individuals' adoption of these services has always been crucial for fintech companies to align with client expectations and encourage more users to join. This study delves into customers' perceptions of neobanks, barriers to their adoption, and the potential of Corporate Digital Responsibility (CDR) to overcome those hurdles. We employed a qualitative approach, analyzing several semi-structured interviews conducted in two formats: individual interviews and focus group discussions. Using structured interview guides, we recruited 40 respondents with diverse demographic profiles who were interested in participating in our sessions. Among them, 21 were non-users and 19 were users of neobank services, all residing in different provinces across Canada during the interviews. The interviews were analyzed using NVivo 12. Our investigation revealed several dimensions, including a strong need for transparency, enhanced security, new protection protocols, supervised legislation, and a lack of access to sufficient educational materials and social inclusion. These findings underscore the importance of CDR as a primary concern for Neobanks. Additionally, ease of access, convenience in managing daily financial affairs, and 24/7 customer support emerged as motivating factors for adoption. By highlighting these insightful results, this qualitative study aims to inform the financial sector and policymakers about the current client landscape, attitudes, and mindsets, enabling them to enhance services to meet client expectations. Furthermore, it provides the academic community with the latest analysis of consumers' perceptions of neobanks for future research.

Keywords: Neobank, FinTech, perceived adoption and constraints, Canada

Introduction

Over the past two decades, the financial services industry has undergone a significant transformation, primarily driven by technological advancements and evolving consumer expectations. According to (FSB, 2019), Financial Technology (FinTech) “technology-enabled innovation in financial services that could result in new business models, applications, processes or products with an associated material effect on the provision of financial services.” Traditionally, financial services have focused on saving money, providing loans, facilitating payments, and managing risks, primarily through banks and insurance companies (Gomber *et al.*, 2018). FinTech has introduced new technologies that make services more accessible, cost-effective,

and user-friendly, thereby challenging traditional methods. A notable development in FinTech is the emergence of neobanks that operate exclusively online without physical branches (Temelkov, 2020). The global neobank market was valued at approximately \$143.29 billion in 2024 and is projected to expand to \$3.4 trillion by 2032, with an annual growth rate of 48.6% (Jain, 2025).

Neobanks began to flourish following the 2008 financial crisis, which prompted new regulations and a demand for alternative banking options in the US. Europe was at the forefront of neobank development, with the UK and Germany facilitating the establishment of digital banks (Al-Harbi, 2025). In Canada, the growth of neobanks has taken a different path owing to specific regulations and market conditions. The country hosts over 1,000 financial technology companies, primarily in Toronto, with others in Vancouver, Montreal, and Calgary (Morales-Guzman, 2025). Canadian neobanks collaborate with regulated banks since they cannot obtain full banking licenses and are unable to label themselves as “banks”. Examples include Neo Financial, which partners with major retailers such as Tim Hortons (McKinsey & Company, 2024). By 2028, Canada anticipates having 5 million neobank users, representing approximately 12.22% of the market. This is lower than the US figure, where 24% of the population uses neobanks (Radage, 2024). Trust remains a significant issue, as people tend to trust traditional banks more due to their established reputations, regulatory oversight, and physical presence. Barriers include concerns about security and data privacy, limited services, cash-handling issues, and reduced human interaction in customer service (Garteiz-Goxeascoa, 2024). Security concerns significantly contribute to people’s reluctance to embrace digital banking. Many individuals question the safety of their data and the financial stability of online banks. Research indicates that adults have little trust in fintech companies, with this skepticism more pronounced among women and those over 55 (Krupa & Buszko, 2023). In this research, we aim to achieve several objectives, including: RQ1 How do both users and non-users perceive neobanks?, and RQ2: What specific concerns and motivations influence the adoption of neobank services?

This study employs a qualitative research approach to delve into the factors that deter individuals from using neobanks. Previous research has demonstrated that interviews and focus groups are effective in uncovering people’s attitudes towards digital banking (Lichtenstein & Williamson, 2006). These methods facilitate the exploration of trust issues, perceived usefulness, and security concerns. This study examines the barriers and incentives influencing the use of these technologies. This study contributes to a deeper understanding of the factors shaping perceptions of neobanks, offering insights that can inform future research and support practitioners in addressing user concerns and improving service design.

Methodology

RESEARCH DESIGN

This study employed a qualitative research design to delve into the perceptions of neobanks and corporate digital responsibility. It utilized two primary methods: semi-structured interviews and focus groups. The interviews facilitated the collection of profound personal insights and the exploration of new ideas while maintaining a consistent approach. Focus groups include dynamic discussions, which enable participants to build on each other’s ideas and highlight areas of agreement or disagreement. Each session was meticulously recorded, transcribed verbatim, and organized using NVivo software for comprehensive analysis.

DATA COLLECTION PROCESS

First, we created two interview guides, one for users and one for non-users. Simultaneously, we obtained all necessary permissions from the university’s ethics committee to protect participants’ privacy and prevent any harm. After receiving authorization, participants chose between group discussions and individual interviews when they signed up. We used a semi-structured interview method, which is more flexible than a structured interview and allows for better insights from participants (Jowsey *et al.*, 2021). We successfully

registered 40 participants, comprising both users and non-users. The interview sessions took place online on Microsoft Teams, and we asked them to record the sessions for further analysis while preserving anonymity. For the focus groups, seven participants were recruited from the non-user group and five from the user group. In addition, fourteen individual interviews were conducted with users and another fourteen with non-users. Each interview lasted 60 to 90 minutes, and group discussions lasted roughly 180 minutes, with a 5-minute break in the middle. Table 1 presents the demographic characteristics of our participants. All names have been fictionalized to ensure their anonymity (Scarano & Ertz, 2024).

TABLE 1 - Profile of the respondents

Participants	Status	Format	Gender	Occupation	Age	Language	Residence	Ethnicity
Individual Interviews								
Alex	User	Individual	Male	Retired	40+	English	Ontario	Canadian
Alice	User	Individual	Female	Employee	18_25	English	Ontario	Canadian
Amelia	User	Individual	Female	Analyst	26_40	English	New Brunswick	Canadian
Archie	User	Individual	Male	Engineer	26_40	English	British Columbia	Canadian
George	User	Individual	Male	Advisor	26_40	French	Quebec	Canadian
Isabella	User	Individual	Female	Consultant	26_40	English	Alberta	Canadian
Jack	User	Individual	Male	Student	18_25	English	Alberta	Canadian
John	User	Individual	Male	Constructor	26_40	English	Ontario	Canadian
Louis	User	Individual	Male	Retired	40+	French	Quebec	Canadian
Oliver	User	Individual	Male	Retired	40+	English	Quebec	Canadian
Raphael	User	Individual	Male	IT Consultant	26_40	French	Quebec	Canadian
Sophia	User	Individual	Female	Retired	40+	English	Ontario	Canadian
Stephen	User	Individual	Male	Retired	40+	English	Ontario	Canadian
Tommy	User	Individual	Male	Employee	26_40	English	Ontario	Canadian
Adrian	Non-User	Individual	Male	Student	18_25	English	Quebec	African
Anika	Non-User	Individual	Female	Teacher	26_40	English	Alberta	Asian
Benjamin	Non-User	Individual	Male	Teacher	26_40	English	Alberta	Canadian
Camila	Non-User	Individual	Female	Employee	26_40	English	Ontario	Canadian
Elisabeth	Non-User	Individual	Female	Teacher	26_40	French	Quebec	Canadian
Emma	Non-User	Individual	Female	Lawyer	26_40	English	Quebec	Canadian
Liam	Non-User	Individual	Male	Student	18_25	English	British C	Asian
Luna	Non-User	Individual	Female	Unemployed	40+	English	Ontario	African
Pascal	Non-User	Individual	Male	Employee	26_40	French	Quebec	Canadian
Sebastian	Non-User	Individual	Male	Self-employed	26_40	English	Alberta	Canadian
Sophie	Non-User	Individual	Female	Employee	18_25	French	Quebec	Canadian
Theodore	Non-User	Individual	Male	Employee	18_25	French	Quebec	Canadian
Yao	Non-User	Individual	Male	Student	18_25	English	Quebec	African
Zahir	Non-User	Individual	Male	Employee	26_40	English	Ontario	Asian
Focus Groups								
Arnaud	Non-User	Group	Male	Self-employed	40+	French	Quebec	Canadian
Charlotte	Non-User	Group	Female	Self-employed	26_40	French	Quebec	Canadian
Clément	Non-User	Group	Female	Student	18_25	French	Quebec	Canadian
Daniel	Non-User	Group	Male	Student	26_40	French	Quebec	Canadian
Mia	Non-User	Group	Female	Student	18_25	French	Quebec	Canadian
Samuel	Non-User	Group	Male	Student	26_40	French	Quebec	Canadian
Victor	Non-User	Group	Male	Student	18_25	French	Quebec	Canadian
Amanda	User	Group	Female	Retired	40+	English	Ontario	Canadian
Boris	User	Group	Male	Tech Writer	26_40	English	Ontario	Canadian
Eloise	User	Group	Female	Training Advisor	26_40	English	Quebec	European
Jennifer	User	Group	Female	Retired	40+	English	Ontario	Canadian
Liana	User	Group	Female	Student	26_40	English	Quebec	Asian

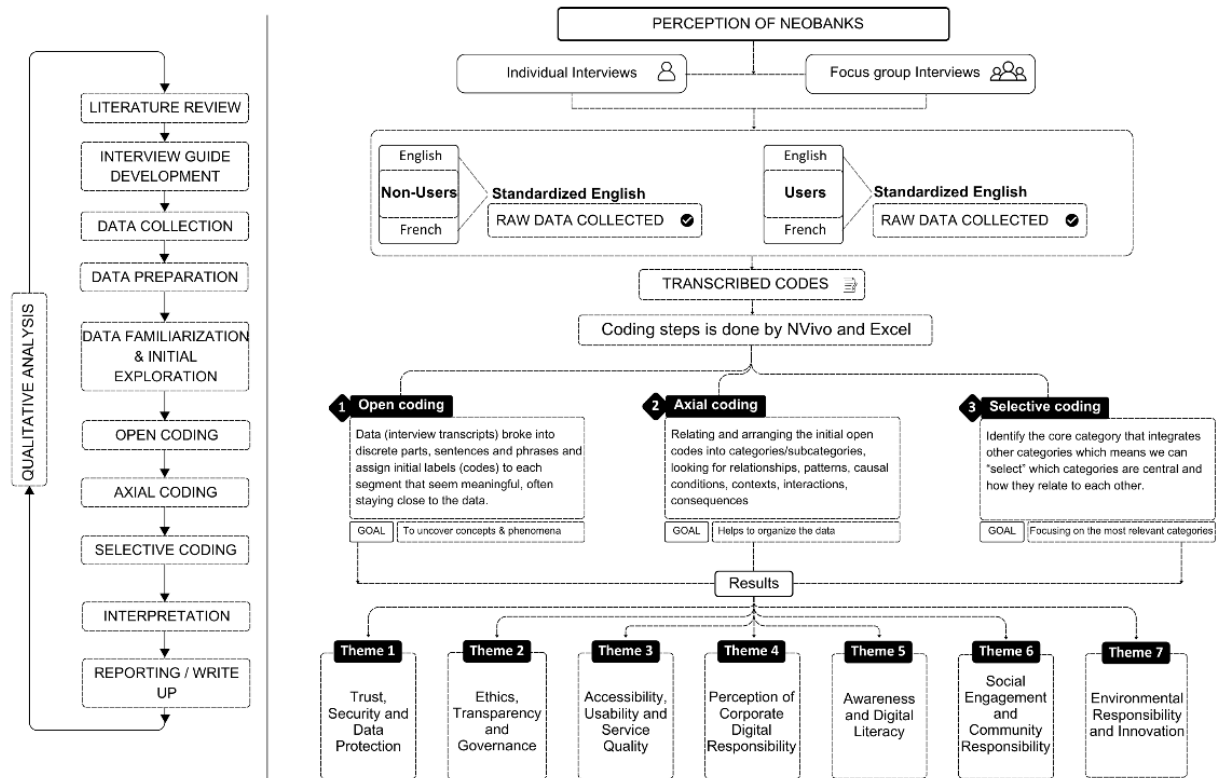


FIGURE 1 - Coding process (Source: Authors)

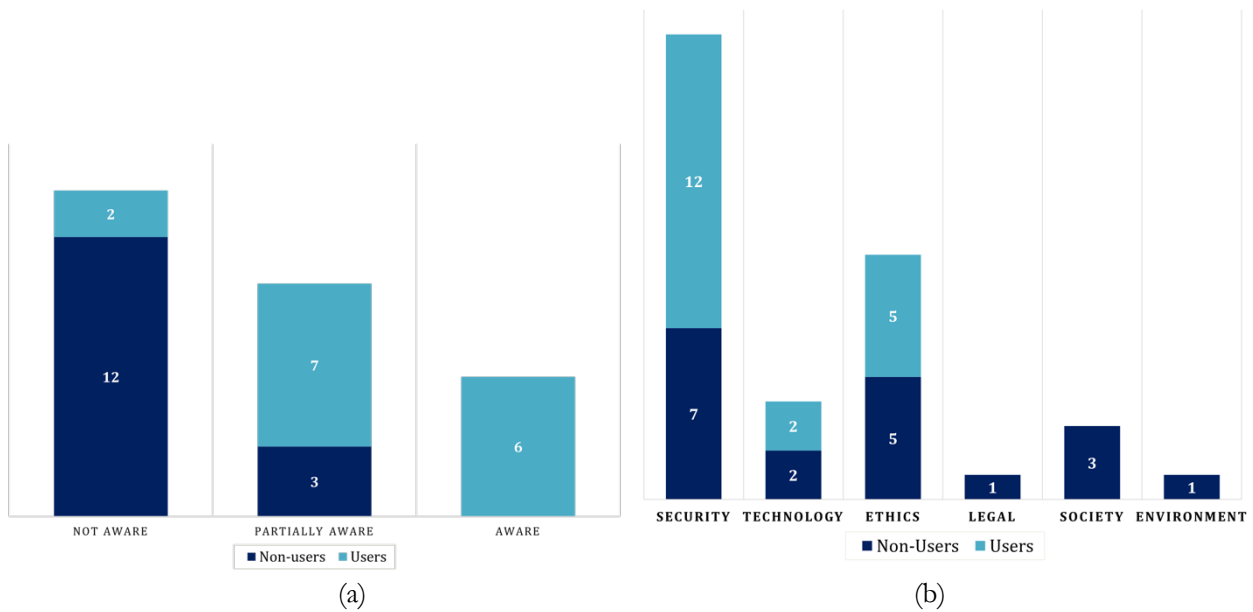


FIGURE 2 -(a) CDR Awareness, (b) perceived CDR definition (non-users vs users)

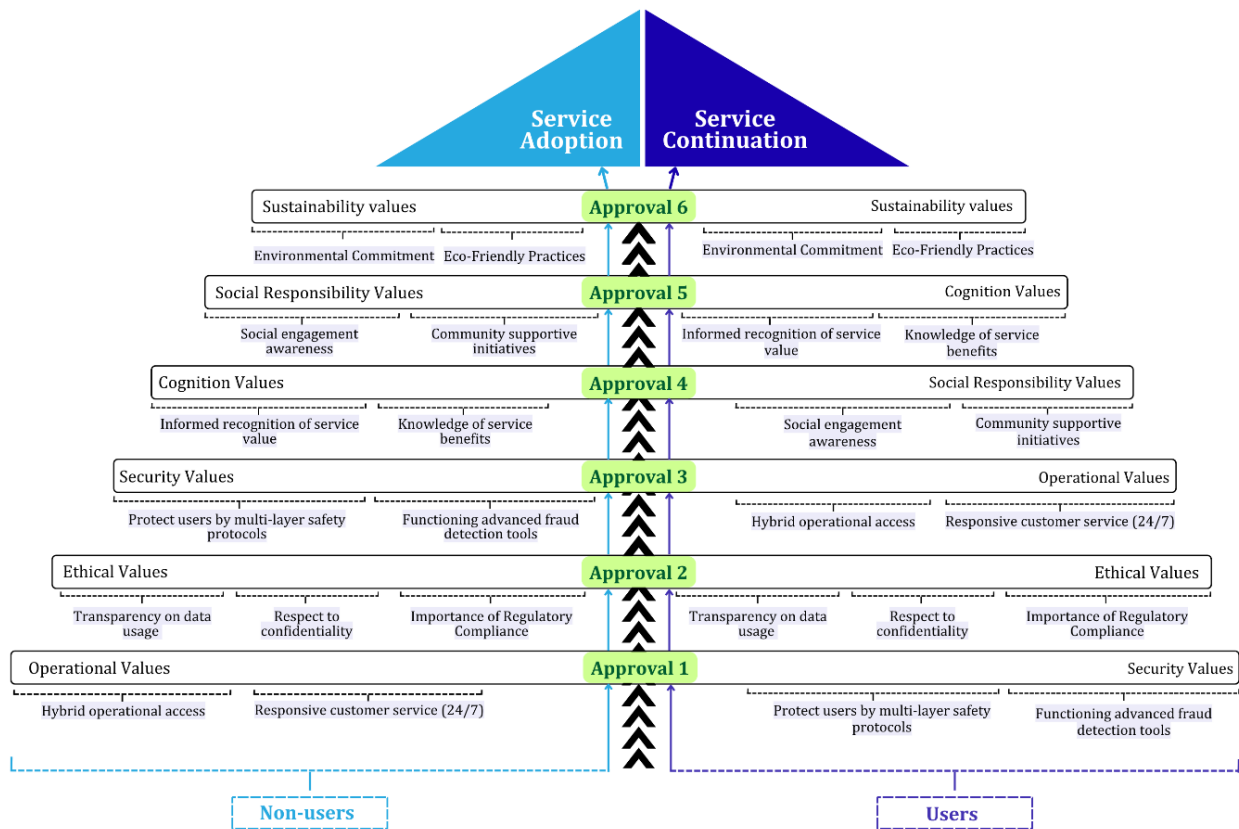


FIGURE 3 - Hierarchical layered model based on value prioritization

CODING PROCESS

In this step, we needed to apply an appropriate coding method based on our interview guides for both the user and non-user groups. We employed thematic analysis to identify patterns and themes in participants' narratives. Subsequently, we applied a collaborative approach to reach consensus-based decisions through coding by the two coders (Cascio *et al.*, 2019). We used the coding strategy developed by Glaser & Strauss (1967), who introduced three principal coding steps: open coding, axial coding, and selective coding. Two coders independently performed open coding to capture all meaningful textual units, followed by iterative comparison and discussion to refine the codebook and resolve any discrepancies. This participatory process facilitated consistency, eliminated redundancies, and enhanced conceptual accuracy. Through axial coding, 136 initial open codes (54 from non-users and 82 from users) were consolidated into eight broader thematic clusters (parent codes), which were subsequently refined via selective coding into six dominant value themes include: Operational Values, Ethical Values, Security Values, Cognition Values, Social Responsibility Values, and Sustainability Values, along with one integrative meta-theme, Corporate Digital Responsibility (CDR). Interviewees described CDR as interrelated dimensions of security, ethics, technology, legal responsibility, social engagement, and environmental stewardship. This multistage process enabled the development of a coherent and theoretically grounded thematic structure. The complete list of codes will be available in Appendix 1. Also, Figure 1 illustrates the coding framework and theme derivation.

Results

The prioritization of these six value themes was guided not by the frequency of code occurrence but by their perceived salience and significance within participants' narratives, assessed through the intensity of expression, elaboration, and linkage to decision-making rationales, an approach consistent with the interpretive orientation of general-purpose thematic analysis, which values meaning over count (Jowsey *et al.*, 2021). For non-users, the order of thematic prominence was Operational, Ethical, Security, Cognition,

Social Responsibility, and Sustainability, reflecting a focus on pragmatic enablers and trust-building preconditions for potential adoption. In contrast, users prioritized Security, Ethical, and Operational values, highlighting their lived concerns with data protection and trust maintenance within daily digital banking experiences. Also, non-users and users had different levels of awareness about the CDR concept (Figure 2a). CDR has emerged as an integrative construct, repeatedly manifesting through references to security, technology, ethics, legal and regulatory frameworks, and societal and environmental considerations. Figure 2b represents the differences in CDR perspectives among the two groups. Collectively, these qualitative priorities illuminate distinct value orientations that shape perceptions of neobanks: users emphasize protection and ethics, while non-users emphasize usability, ethics, and trustworthiness. Figure 3 visualizes the hierarchical structure of these prioritized value themes.

Conclusions and discussion

In this qualitative study, the comparative analysis of value prioritization between users and non-users of neobanks revealed a complex approval structure, where each value dimension serves as a prerequisite for advancing toward higher-order trust and adoption. For users, security values form the foundational layer, encompassing data protection, encryption, and advanced fraud detection systems. These features serve not only as safeguards but also as essential conditions for engaging with digital financial ecosystems. Once users perceive adequate security, they move to the next evaluative layer: ethical values, which include transparency in data handling, confidentiality, and adherence to regulatory frameworks. Ethical soundness bolsters user confidence and legitimizes continued participation. The third tier, operational values, reflects user expectations for accessibility, responsiveness, and technical efficiency, ensuring the perceived reliability of neobank operations and enabling seamless functionality. Beyond this, social responsibility values have emerged as indicators of institutional awareness of societal engagement and community support. Although less central, these values still contribute to users' identification with responsible banking practices. Cognition values then represent informed recognition and understanding of service benefits, suggesting that knowledge and comprehension enhance satisfaction, but rely on the trust established in prior layers. At the highest level, sustainability values, including environmental commitment and eco-friendly practices, extend the scope of neobanking to broader ecological considerations.

However, for non-users, the hierarchy was reversed, reflecting the different motivational and perceptual thresholds. Operational values have precedence, indicating that ease of use, reliability, and responsiveness are crucial entry points before trust can be established. Ethical values suggest that transparency and compliance are vital for building credibility among those who are not yet engaged. Security values come next, representing a concern that, while important, becomes significant only after functional and ethical assurance is met. Cognition values hold mid-level importance, implying that awareness and understanding of services may spark curiosity but do not necessarily lead to conversion. At lower levels, social responsibility and sustainability values continue to receive minimal emphasis, reflecting their limited effect on the initial decision to adopt.

Our grounded qualitative analysis indicates that both user and non-user attitudes toward neobanks can be interpreted using various established theoretical frameworks. The observed hierarchical structure reflects the conceptual foundations of Maslow's hierarchy of needs when applied to technology acceptance, in which foundational requirements must be satisfied before higher-order motivations become psychologically salient or operationally relevant (Maslow & Lewis, 1987). Similar to how physiological and safety needs are prerequisites for self-actualization in human motivation theory, security assurances serve as the existential threshold for engagement in digital banking ecosystems, where financial vulnerability is inherently elevated (Bernard *et al.*, 2005; Weck & Afanassieva, 2023). Specifically, our findings on trust and risk closely align with the Conservation of Resources (COR) theory, which posits that individuals are motivated to protect

their valued resources and experience stress when they are threatened (Hobfoll, 2011). These concerns have been discussed in several studies, confirming that prioritizing multichannel businesses over a single-channel model (exclusively digital and online) increases the likelihood of customer satisfaction (Chiou & Shen, 2012). This finding is further supported by Parasuraman *et al.* (1988), who identified five main service quality measurement dimensions in their service quality concept (SERVQUAL): Tangibility, Reliability, Responsiveness, Assurance, and Empathy.

This concept underscores the importance of brick-and-mortar branches for neobanks and their responsiveness in delivering prompt customer service. Non-users frequently expressed concerns that adopting a neobank might jeopardize their financial security and support networks. Consistent with COR's primacy-of-resource-loss principle, these participants emphasized that the absence of physical branches and face-to-face services can be seen as a disadvantage of neobanks. This mirrors recent research showing that resistance to neobank adoption often stems from data security fears and perceived risks (Bhatnagar & Rajesh, 2024). Similarly, in the Ability–Integrity–Benevolence (AIB) trust model, institutional ability (security) and integrity (regulatory adherence) are central to trust. In contrast, actual neobank users highlighted convenience and functionality, reflecting classic technology-acceptance constructs. According to the Technology Acceptance Model (TAM), perceived usefulness and ease of use drive adoption (Marangunić & Granić, 2015; Saadé & Bahli, 2005). Our users were satisfied with the mobile app features, particularly the smooth navigation and simple payment processes, which were strongly associated with trust in the neobank. In other words, users found neobanks “useful” because they facilitated faster and easier transactions, reinforcing the TAM's predictions (Shanti *et al.*, 2024). Conversely, non-users in our study had little positive experience with these conveniences, so their perceived usefulness remained low, and they did not overcome their concerns about resource protection.

In addition to stress- and acceptance-based explanations, cognitive heuristics provide further insights into user differences. A significant number of non-users appear to be influenced by the anchoring effect (Strack & Mussweiler, 1997). Their initial reference point, or “anchor,” is a traditional bank, rendering them resistant to new information regarding neobanks. Behavioral research suggests that anchoring bias considerably impedes fintech adoption, as individuals tend to overvalue their initial information or past experiences (Aftab *et al.*, 2025; Wang, 2023). Indeed, Canadians generally exhibit reluctance to abandon legacy banks, even when they perceive fintech offerings positively (Morales-Guzman, 2025). Even if a neobank offers lower fees or better apps, non-users often justify their inaction by citing loyalty or simplicity (“I know my local branch”). Concepts from prospect theory suggest that potential losses (e.g., fear of fraud or the need to learn a new system) are perceived as more significant than potential gains (Fung, 2015). Collectively, the data indicate that cognitive biases, such as anchoring on past banking experiences and general risk aversion, dampen neobank adoption among non-users. Finally, a synthesis of these perspectives reveals the multifaceted dynamics of adoption. Neobank users appear to occupy a cognitive space where the promise of new resources (time saved, transparency) outweighs perceived threats, aligning with COR's “resource investment” corollary (investing effort to gain resources). By contrast, non-users perceive a net resource loss, reinforcing a defensive stance. The results suggest that effective adoption depends on addressing both sides of this equation: enhancing perceived usefulness (as TAM prescribes) and mitigating fear of resource loss (as COR suggests). In practice, this implies that managers should not only streamline app usability and features, but also strengthen assurances (security, guarantees) to shift consumers' cognitive reference points. In sum, our grounded findings align with and enrich existing theories. By bridging COR's stress/resource view, TAM's acceptance model, and behavioral bias accounts, we gain a deeper understanding of why users and non-users diverge. This integrated theoretical lens helps explain patterns in our interview data and points toward targeted strategies to increase neobank acceptance.

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The importance of factors influencing consumers' choice of grocery stores following the entry of new competitors into the market

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Abstract. Grocery stores are important for families, as each year families spend a significant proportion of their income on buying groceries. Statistics Iceland figures show that food and other groceries account for over 15% of families' total expenditures and that if housing costs are excluded, the figure is around 25%. This research evaluates the factors that Icelandic consumers consider when choosing supermarkets and how new stores affect the importance of factors. These included the importance of location (home or workplace), low price, and quality of goods and services. As part of the research, two hypotheses were proposed: (1) location is of greater importance than both price and quality; and (2) consumers who prefer discount stores are more price-conscious than others. The results were based on two surveys conducted in the autumn of 2024 ($N = 1,822$) and 2025 ($N = 1,311$). All data was merged into one dataset comprising the 3,133 valid answers. For data analysis, the material was weighted for gender and population age. The findings demonstrate that location is similarly important, and that Hypothesis 1 was therefore not supported. The findings did support Hypothesis 2, since respondents who prefer discount shops agreed more with the statement about the importance of low prices than those who mentioned other stores.

Keywords: grocery market, location, price, quality, price sensitivity

Introduction

Marketing is inherently an interdisciplinary field and has undergone continuous change since the beginning of the last century (Converse, 1951; Hunt, 1976; Kotler *et al.*, 2022; Shaw, 2012). Early emphasis was placed on distribution channels and personal selling (Converse, 1951), but perspectives soon emerged suggesting that marketing and marketing management were also linked to issues such as consumer buying behavior, competitive advantage, and strategic management (Drucker, 1957; Levitt, 1960; Shaw, 2012). Despite the evolution of the discipline, many aspects of marketing organization have withstood the test of time, such as the so-called 4 p's model, introduced in 1960 (McCarthy, 1960). Marketing textbooks are still fundamentally structured around this framework (see, e.g., Fahy & Jobber, 2019; Kotler *et al.*, 2022).

The core idea behind the 4 p's model is that firms must offer the right product, at the right place, at the right price, and with the right promotion. The model's name derives from this logic, as the 4 p's stand for product, price, place, and promotion. Over recent decades, additional p's have been proposed, and in the

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context of services, the so-called 7 p's model is well known (Wilson *et al.*, 2016). Furthermore, several other extensions exist, such as the 11 p's model related to technical education at the university level (Mahajan, 2017; Mahajan & Golahit, 2019).

This paper focuses on place, price, and quality—factors that captured considerable scholarly attention in the early development of marketing, particularly within the retail sector (Converse & Mitchell, 1937; Converse, 1945). Location is a component of place and refers to the arrangements that enable customers to access the products or services offered (Kotler *et al.*, 2022). Research suggests that, in retailing, location is often a decisive factor for success (Litz & Rajaguru, 2012; Li & Liu, 2012; Yildiz & Tuysuz, 2019). Nevertheless, other factors such as price and quality also play a role, and the relative importance of these factors varies across consumer segments (Ahmed, 2019; Wolf *et al.*, 2021). In May 2017, the American wholesale corporation Costco opened a retail store in Iceland. Survey showed that Costco had a strong, positive, and unique placement according to the respondents, but this effect has minimized in survey of 2018-2021. In terms of long-term effects, Costco seems to primarily have had a significant impact on a single retail chain while the impact on other retail stores seems to have been insignificant. In August 2024 Pris (Price or good deal in English) opened its first store in Iceland. The store's focus is on low prices, and the value promise challenges typical discount store on the market. For these reasons, it is interesting to examine the impact of new entrants to the grocery market on the importance of attributes like location, low price and quality when choosing a grocery store.

THE 4P'S MODEL

One of the most well-known conceptual models in marketing is the 4P model, which dates to the mid-twentieth century (McCarthy, 1960). The four Ps stand for product, price, place, and promotion, and are sometimes referred to as the four controllable variables of marketing. It has been argued, however, that this terminology is too narrow and reflects a sales-oriented rather than a market-oriented perspective (Guðlaugsson, 2004). From the standpoint of market orientation, it is therefore more appropriate to refer to these elements as the marketing mix. The fundamental premise of the model is that firms must offer the right product, at the right place, at the right price, and with the right promotion to satisfy the needs of their target markets in a profitable manner (McCarthy, 1960, p. vi). From its inception to the present day, this model has remained central to the definition of professional marketing practice. Hunt (1976), Webster (1992), and Shaw (2012) all emphasize its foundational role in marketing theory. Even though the discipline has evolved substantially, contemporary marketing textbooks are still largely structured around this framework (e.g., Fahy & Jobber, 2019; Kotler *et al.*, 2022). This paper focuses on three of the four elements of the marketing mix: place, with an emphasis on location; price, with an emphasis on low price; and product, with an emphasis on quality.

LOCATION

Location is a component of place, which is often discussed in terms of distribution channels. Fundamentally, place refers to the arrangements that enable customers to access the products or services being offered (Kotler *et al.*, 2022). Location may take various forms, including distribution channels, inventory management, transportation, and logistics planning (Lauterborn, 1990). In the early years of marketing as a discipline, location and distribution were regarded as among the most important managerial concerns (Converse, 1951). Ghosh & Craig (1983) emphasized that formulating distribution strategies requires not only an assessment of the current market environment but also an evaluation of potential competition and anticipated demographic changes. Drezner (1994) stressed the importance of analyzing and evaluating firm location, an emphasis that has remained prominent for decades. To this day, location continues to be a critical aspect of marketing practice, particularly in retailing, where it is often considered a decisive factor for success (Birkin *et al.*, 1996; Kotler *et al.*, 2022; Litz & Rajaguru, 2008; Yildiz & Tuysuz, 2019). Birkin *et*

al. (1996) examined how geographic information systems (GIS) could be used to enhance planning and decision-making. They argued that it is a common misconception to assume that market share is primarily determined by price and other factors such as awareness and promotion. While brand strength, competitiveness, and promotion certainly play important roles in gaining market share, location is also highly influential in retailing, as consumers are increasingly unwilling to travel long distances to reach retail outlets far from their homes or workplaces. Litz and Rajaguru (2012) investigated the importance of location for the competitiveness of small retailers and found that distance from home or workplace had the greatest impact on competitiveness. Brown (2006) notes that although location and distribution channels—like other elements of the marketing mix—are continuously evolving, the theoretical approach to these factors has changed little since 1971. Li & Liu (2012) analyzed the performance of Walmart and Kmart stores in Cincinnati from a location perspective and concluded that store location largely explained differences in performance. A similar approach underpins the study by Yildiz & Tuysuz (2019) on optimizing grocery store location efficiency. Research further indicates that more than 90% of managers believe that location-based information is important for business success and for society, and that a substantial proportion of managers use geographic information systems to enhance organizational competitiveness (ESRI, n.d.).

PRICE AND QUALITY

Price has been a central element of marketing practice since the field's inception (Converse, 1951; Hunt, 1976; Kotler *et al.*, 2022; Shaw, 2012) and is often described as the first element of the 4P model (Chong, 2003). The importance of price in marketing has been the subject of extensive scholarly discussion (e.g., Begg *et al.*, 1987; Eaton & Eaton, 1988; Gabor, 1977; Gultinan & Gundlach, 1996; Kalyanam, 1996; Kotler *et al.*, 1996; Mazumdar & Monroe, 1990; Misra & Trivedi, 1997; Stern & El-Ansary, 1992). Price thus clearly plays a vital role in professional marketing practice. Kent B. Monroe is widely recognized for his contributions to pricing and pricing strategy and is one of a select group of scholars designated as a “Legend in Marketing” by Sage Publications (Sage, n.d.). His research focuses extensively on pricing issues. Dodds *et al.* (1991) examined the effects of price, brand, and in-store information on consumers' perceptions of product quality, value, and purchase intention. Their findings showed that price had a positive effect on perceived quality but a negative effect on perceived value and purchase intention. Strong brands, by contrast, positively influenced perceived quality, perceived value, and willingness to purchase.

These findings suggest a strong association between price and perceived quality, whereby higher prices signal higher quality, and lower prices have the opposite effect. Accordingly, price and quality are often examined jointly as image attributes (Kotler *et al.*, 2022), and numerous studies demonstrate that higher prices are more strongly associated with perceived quality (McConnell, 1968; Scitovszky, 1945; Shen & Yahya, 2021; Stafford & Enis, 1969; Tellis & Wernerfelt, 1987). One of the best-known models describing this relationship is the “Quality vs. Price 9-Box Matrix,” attributed to Kotler (Kotler *et al.*, 2016). The results of the present study strongly support these perspectives, as illustrated in Figure 1.

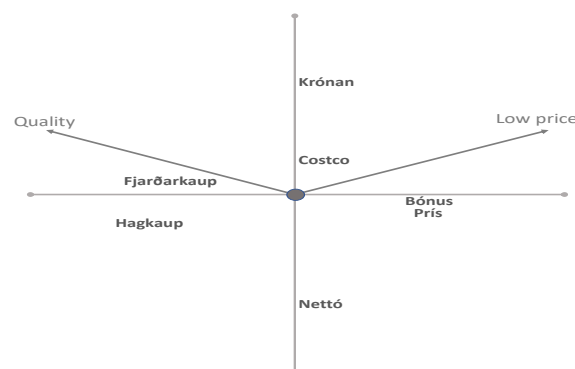


FIGURE 1 - Perceptual map based on low price and quality

The image dimensions are orthogonal, indicating that they represent opposing image attributes (Lilien *et al.*, 2017). This implies that consumers who associate certain stores with quality are unlikely to associate those same stores with low price, and vice versa.

Price sensitivity has become an increasingly important consideration in pricing strategy, as consumers today have access to more extensive price information than ever before, through online platforms, family members, and competitors' marketing activities (Namin & Dehdashti, 2019). Price sensitivity is closely related to the concept of price elasticity of demand, which concerns whether certain products are price elastic or not (Dodds *et al.*, 1991). While price elasticity relates to products, price sensitivity relates to consumers, although consumer behavior ultimately determines whether a product is price elastic. Price sensitivity thus reflects consumers' efforts to maximize utility based on perceived value relative to the price paid. Attention is therefore directed toward value rather than price alone. When consumers perceive a price as too high, the underlying reason is often that the perceived value does not justify the price. Value may derive from functional benefits or from emotional associations (Andersen & Kumar, 2006; Blomback & Axelsson, 2007; de Chernatony *et al.*, 2000; Grönroos, 2008). Price sensitivity is therefore closely linked to perceived value and varies across market segments, such as age groups, purchasing behavior, and the type of stores consumers consider top of mind (Ahmed, 2019; Kotler *et al.*, 2016; Wolf *et al.*, 2021). Based on these considerations, the following hypotheses are proposed: (i) Location is of greater importance than both price and quality, and (ii) Consumers who prefer discount stores are more price-sensitive than others. Although no separate hypothesis is proposed regarding quality beyond its inclusion in Hypothesis 1, it is useful to briefly clarify the concept. Quality is a multifaceted construct and may refer to performance or consistency and conformity (Kotler *et al.*, 2022). Performance relates to the extent to which a product meets specific requirements or expectations, whereas conformity refers to consistency across purchases. Quality may also be defined in terms of service quality, referring to the extent to which delivered services meet expected standards (Wilson *et al.*, 2021).

In this study, respondents were asked to assess the importance of quality in choosing a grocery store, with the concept intentionally left open to respondents' own interpretations. This approach is considered acceptable, as quality is not a central analytical focus of the study. Following this introduction, the paper presents methodology and data analysis, presentation of results, and finally a discussion of the findings.

Methodology

This section describes the research design, data collection procedures, and methods of data analysis used in the study

RESEARCH DESIGN

The results were based on two surveys conducted in the autumn of 2024 ($N = 1,822$) and 2025 ($N = 1,311$). Each year, the same questionnaire was used as a foundation. The questionnaire consisted of 27 questions divided into four sections. The first section included nine questions related to respondents' purchasing behavior and the factors they considered important when choosing grocery stores. The first question was open-ended, asking respondents which grocery store or chain came first to mind. This was followed by four questions addressing which grocery store respondents reported visiting most frequently and second most frequently, as well as how likely they were to recommend that store to friends or acquaintances. Four additional statements addressed factors respondents considered important in their grocery store choice, as well as their likelihood of using self-checkout when available. The present study focuses specifically on the items related to location, low price, and perceived quality.

TABLE 1 - Gender and age of the sample

	Frequency	Percent	Valid percent
Gender			
Male	810	25.9	34.6
Female	1,507	48.1	64.4
Other	24	0.7	.7
Missing	792	25.3	
Total	3,133	100	100
Age			
< 31 years old	925	29.5	39.6
31-50 years old	633	20.2	27.1
51 or older	780	24.9	33.4
Missing	795	25.4	
Total	3,133	100	100

The second section of the questionnaire asked respondents to assess how well nine image attributes applied to specific grocery stores. The stores included Fjarðarkaup, Nettó, Hagkaup, Bónus, Costco, Pris and Krónan. 98% of respondents indicated that they most frequently shopped at one of these stores; other stores mentioned were grouped under “Other.” The selected stores therefore reflect the primary options available to consumers when choosing a grocery store. The image attributes assessed were associations with freshness, low price, assortment, boring, different, high price, quality, extended opening hours, and fun. Although most of these attributes fall outside the main focus of the present study, they were used to capture perceived quality and low price, as illustrated in Figure 1, and to classify which stores respondents perceived as discount stores, as discussed later. The third section asked respondents how frequently they visited each of the aforementioned stores, using a scale from 1 (very rarely or never) to 9 (very often or exclusively). These data allow for the construction of a preference map, which is part of perceptual mapping methodology (Lilien *et al.*, 2017), although this analysis lies outside the scope of the present study. The fourth section included background questions regarding respondents’ gender, age, income, education, and place of residence based on postal code. Data collection typically lasted two to three weeks in October each year. Each year, data collection was conducted by eight to ten student work groups in collaboration with the researcher. After data collection, all datasets were merged into a single database after removing incomplete or invalid responses

SAMPLE

The population of interest in this study consists of grocery store customers aged 18 to 70 years. The total number of responses in which an acceptable number of questions were completed was 3,133, 1,822 in 2024 and 1,311 in 2025. The surveys were based on convenience samples, a method known to overrepresent women and younger respondents. This pattern was observed in the present study, as shown in Table 1, which presents the age and gender composition of the sample. Women accounted for 64.4% of respondents, and individuals younger than 31 years accounted for 39.6%.

To address these imbalances, the data were weighted by gender and age to reflect the population distribution of individuals aged 18 to 70 in Iceland during the years 2024-2025 (Statistics Iceland, n.d.). This procedure reduces the risk that overrepresented groups—such as young women—unduly influence the results. All statistical analyses were conducted using weighted data. After weighting and data cleaning, 2,313 valid responses remained, representing a reduction of approximately 26%. Valid responses from 2024 were 1,340 while valid responses from 2025 were 974.

TABLE 2 - The importance of location, low price and quality of product or service

The importance of	t-value	Df	p-value	Mean	Lower CI	Upper CI
Location	211,7	2.284	<.001	7.70	7.63	7.77
Low price	251,3	2.286	<.001	7.86	7.80	7.92
Quality	247,2	2.255	<.001	7.59	7.53	7.65

To test Hypothesis 1—that location carries more weight than low price and quality in grocery store choice—a one-sample t-test with a 95% confidence interval was employed. To examine whether respondents who had discount grocery stores top of mind were more price sensitive than others (Hypothesis 2), the open-ended top-of-mind question was recoded to match the grocery store categories used in the frequency-of-visit questions. Stores were then classified based on the strength of their association with the image attributes low price and high price. Differences between groups were examined using analysis of variance (ANOVA).

Results

The results are first presented with respect to whether location carries greater weight than price and quality in the choice of grocery store. This is followed by an examination of whether consumers who have discount grocery stores top of mind are more price sensitive than others, and finally whether younger respondents exhibit greater price sensitivity than other age groups. The results relating to Hypothesis 1 are presented in Table 2. The mean score for the importance of location is 7.7 on nine-point scale (SD = 1.74), with the lower bound of the 95% confidence interval at 7.63 and the upper bound at 7.77. The mean score for the importance of low price in the choice of grocery store is 7.86 (± 0.23), while the corresponding mean for quality is 7.59 (± 0.06).

As can be seen in Table 2, the confidence intervals for the importance of location and quality do overlap and therefore do not differ. However, low price has a higher value than both location and quality. These results therefore suggest that, in respondents' perceptions, low price is regarded as more important than both location and quality. This finding contrasts with earlier measurements, in which location and quality were rated as more important than low price (Gudlaugsson, 2018). These results may suggest that the market entry of Prís in the autumn of 2024, with a strong strategic focus on low pricing, has influenced consumer perceptions.

To examine Hypothesis 2, which posits that consumers who have discount grocery stores top of mind are more price sensitive than others, the analysis began by recoding the open-ended question in which respondents were asked to indicate which grocery store or grocery chain came first to mind (see Table 3).

TABLE 3 - Which grocery store is top of mind?

	FJ	Netto	Hagkaup	Bónus	Costco	Krónan	Prís	Other
2017	1.9%	5.4%	8.1%	49.0%	12.1%	19.5%		3.9%
<i>95% CI</i>	<i>0.5%</i>	<i>0.9%</i>	<i>1.0%</i>	<i>1.9%</i>	<i>1.2%</i>	<i>1.5%</i>		<i>0.7%</i>
2020	1.7%	7.4%	4.7%	46.5%	0.6%	36.9%		2.2%
<i>95% CI</i>	<i>0.5%</i>	<i>1.0%</i>	<i>0.8%</i>	<i>1.8%</i>	<i>0.3%</i>	<i>1.8%</i>		<i>0.5%</i>
2023	2.0%	7.1%	4.7%	46.7%	0.8%	36.4%		2.2%
<i>95% CI</i>	<i>0.7%</i>	<i>1.2%</i>	<i>1.0%</i>	<i>2.4%</i>	<i>0.4%</i>	<i>2.3%</i>		<i>0.7%</i>
2024	0.9%	4.6%	3.3%	46.9%	0.2%	40.2%	2.8%	1.2%
<i>95% CI</i>	<i>0.5%</i>	<i>1.1%</i>	<i>1.0%</i>	<i>2.7%</i>	<i>0.2%</i>	<i>2.6%</i>	<i>0.9%</i>	<i>0.6%</i>
2025	0.2%	4.3%	2.3%	43.9%	0.1%	45.6%	1.1%	2.5%
<i>95% CI</i>	<i>na</i>	<i>1.3%</i>	<i>0.9%</i>	<i>3.1%</i>	<i>na</i>	<i>3.1%</i>	<i>0.7%</i>	<i>1.0%</i>

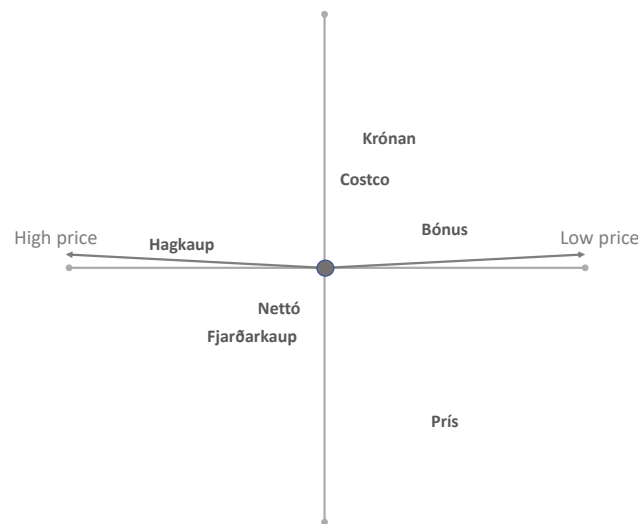


FIGURE 2 - The relationship between low price and high price

It can be observed that in 2017, when Costco entered the market, its top-of-mind awareness stood at just over 12%, while Bónus recorded the highest awareness level at just under 50%. In 2020 and 2023, Costco's awareness declined substantially, whereas awareness of Krónan increased markedly, reaching nearly 37%. In 2024, when Prís entered the market, its awareness level was just under 3%. During the same period, Krónan further increased its share, while Bónus maintained a stable level of awareness. In 2025, Prís experienced a decline in awareness, mirroring the pattern observed for Costco immediately following its market entry in 2018 and the subsequent years. At that point, Krónan recorded the highest awareness level, at 45.6%. Following this, the strength with which respondents associated grocery stores with the image attributes low price and high price was examined for the years 2024 and 2025. The results of this analysis are presented in Figure 2. As shown in the figure, respondents associate Prís, Bónus, Krónan, and Costco (those positioned on the right-hand side of the figure) more strongly with low prices than other stores, whereas Hagkaup, Fjarðarkaup, and Nettó are associated with high prices. Particularly pronounced positions are observed for Bónus and Prís, which display strong associations with low price and weak associations with high price, and for Hagkaup, which exhibits a strong association with high price and a weak association with low price. Analysis of variance (ANOVA) was employed to examine whether respondents who had Prís, Bónus, Krónan, and Costco top of mind—stores with a strong association with low prices—were more likely to agree with the statement regarding the importance of low price in the choice of grocery store than respondents who had Hagkaup, Fjarðarkaup, and Nettó top of mind—stores strongly associated with high prices. The ANOVA results indicated a statistically significant difference between groups depending on which store was top of mind, [$F(7, 2.279) = 16,897, p < 0.05$]. Post hoc analysis using Duncan's multiple range test identified the specific group differences, with the results presented in Table 4.

TABLE 4 - Agreement with the importance of low price (top-of-mind classification)

	1	2	3	4
Fjarðarkaup	6,58			
Hagkaup	6,91	6,91		
Nettó	7,17	7,17	7,17	
Krónan		7,68	7,68	7,68
Other		7,73	7,73	7,73
Bónus			8,14	8,14
Prís				8,38
Costco				8,50

Table 4 shows that respondents who have Bónus, Prís, and Costco top of mind are more likely to agree with the statement that low price plays an important role in the choice of grocery store than those who have Fjarðarkaup, Hagkaup, and Nettó top of mind. As shown in Figures 1 and 2, this finding supports the hypothesis that consumers who have discount grocery stores top of mind are more price sensitive than others, thereby providing support for Hypothesis 2. The calculated eta squared (η^2) is 0.046, indicating that approximately 5% of the variance in agreement with the statement can be explained by which store respondents have top of mind. This corresponds to a medium effect size (Cohen, 1988).

Conclusions and discussion

This article has sought to assess the importance of location, price—specifically low price—and quality in the choice of grocery stores. Two hypotheses were proposed: first, that location carries greater weight in grocery store choice than both low price and quality; and second, that consumers who have discount grocery stores top of mind are more price sensitive than others. The results showed that low price carried greater weight than both location and quality, leading to the rejection of the first hypothesis. This finding differs from earlier studies, in which both location and quality were found to be more important than low price (reference here). However, this result is not necessarily surprising, as research indicates that a large proportion of consumers most frequently or second most frequently shop at Bónus or Krónan—both of which, and particularly Bónus, position themselves strongly around low prices. The market entry of Prís has likely also contributed to this development. Although relatively few consumers select this store as their primary or secondary choice, Prís has pursued a highly visible promotional strategy emphasizing low prices. In recent years, Bónus and Prís have consistently offered the lowest prices in the market according to price comparison surveys.

The second hypothesis concerned whether consumers who have discount grocery stores top of mind are more price sensitive than others, based on the assumption that the importance attributed to low price is related to price sensitivity. The results indicate that this hypothesis can be supported, as respondents who had discount grocery stores top of mind were more likely to agree with the statement that low price plays a major role in their choice of grocery store. What is particularly noteworthy is the strong association between the store that is top of mind for respondents and the service provider they choose to patronize. This outcome is not self-evident, as research on tangible goods often shows that the brand that comes first to mind is not necessarily the brand that consumers own or use (Lilien *et al.*, 2017). In the context of services, however, it is common for the service provider with which respondents have an ongoing relationship to also be top of mind. This suggests that, although grocery stores sell tangible products, their operations may be perceived and defined more in terms of the service provided than the products offered. This observation is particularly intriguing and warrants further investigation.

The limitations of the study primarily stem from the use of a convenience sample. Although this issue was addressed by weighting the data by gender and age, it is not possible to fully rule out biases commonly associated with such sampling methods. In addition, respondents' attitudes could be examined in greater detail by place of residence, as such information was collected; however, the author considers this to be a topic more appropriately addressed in future research.

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Classifying older consumers by digital problem-solving styles: What drives their life satisfaction?

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Abstract. In the era of digital transformation, the digital divide among older adults has come to the fore as a key social issue, extending beyond simple technological access to directly impacting quality of life. Older adults encounter various challenges in digital environments, and their approaches to resolving these issues vary among individuals. These differences in digital problem-solving styles are not only directly linked to personal digital competencies but may also significantly influence life satisfaction. Therefore, the purpose of this study is to classify older consumers into distinct groups based on their digital problem-solving styles when encountering digital difficulties, and to examine the effects of digital competencies, digital attitudes, digital self-efficacy, and social capital on life satisfaction for each type. To this end, data from 1,775 individuals aged 60 and older from the 2024 Digital Divide Survey were analyzed using K-means cluster analysis and hierarchical multiple regression analysis. The results are as follows. First, older consumers' digital problem-solving styles were classified into four distinct groups: 'Help-Seeking,' 'Active Problem-Solving,' 'Self-Directed Problem-Solving,' and 'Passive Problem-Solving.' Second, regression analysis revealed that digital self-efficacy was a key variable positively influencing life satisfaction across all groups. In contrast, the effects of specific domains of digital service usage and social capital on life satisfaction showed different patterns depending on digital problem-solving style. These findings suggest that addressing the digital divide among older consumers requires tailored digital inclusion policies and digital literacy programs that reflect heterogeneity in digital problem-solving styles, rather than one-size-fits-all approach. In addition, the study confirms that enhancing digital self-efficacy is a critical factor in improving life satisfaction among older consumers, regardless of their digital problem-solving style.

Keywords: Older consumer; digital divide; digital problem-solving styles; digital competence; social capital; digital attitude and self-efficacy; life satisfaction

Introduction

The rapid acceleration of digital transformation, driven by advancements in artificial intelligence and the Internet of Things, has made digital literacy an essential determinant of social participation and quality of life. However, the benefits of this technological shift are not distributed equally. The digital divide persists as a critical source of social inequality, disproportionately marginalizing the rapidly growing older adult population. Despite having relatively adequate physical access to digital devices, older consumers continuously lag behind younger generations in actual digital competency and usage (Ministry of Science and ICT, 2024), leading to a profound digital exclusion in their daily economic and social activities (Wilson-Menzfeld *et al.*, 2025). Previous studies on the aging population have predominantly focused on the first-

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level (i.e., access) and second-level (i.e., skills) digital divides (Raihan *et al.*, 2025; Scheerder *et al.*, 2017). Yet, overcoming the digital divide for older adults requires more than just improving technical skills; it necessitates addressing critical psychosocial barriers such as technology anxiety, lack of self-efficacy, and social isolation (Jung *et al.*, 2010; Wu *et al.*, 2015). Despite its importance, empirical research examining how these psychosocial factors interact with digital capabilities to produce tangible real-world outcomes, commonly referred to as the third-level outcome divide (van Deursen & Helsper, 2015; Wei *et al.*, 2011), remains limited.

A critical limitation in the existing literature is treating older adults as a homogeneous demographic, which overlooks their diverse coping strategies and behaviors in digital environments. As digital services become more complex, understanding how older consumers respond to technical hurdles through specific problem-solving behaviors is a vital but underexplored area of study. Problem-solving capability during technical difficulties is a core strategic indicator of the second-level digital divide (Hargittai, 2002). The specific method an individual employs to resolve issues encountered while using digital services, including independent coping, informal help-seeking, or formal institutional support, strongly reflects their digital self-efficacy and accessible social resources (van Deursen & van Dijk, 2011). Therefore, categorizing digital problem-solving styles is imperative for understanding how older consumers navigate the digital landscape and achieve true digital inclusion.

To address this gap, this study conceptualizes digital problem-solving style as the specific behavioral strategies older consumers employ when facing digital difficulties (Hargittai, 2002). By utilizing this concept, the study aims to classify older consumers into distinct groups and empirically investigate the causal relationships connecting their problem-solving styles, digital competencies (digital utilization, citizenship, and service usage), psychosocial factors (social capital, digital attitudes and self-efficacy), and ultimate life satisfaction: RQ 1: How can older consumers be classified based on their digital problem-solving styles? RQ 2: How does the impact of digital competencies and psychosocial factors on life satisfaction differ across these consumer groups?

Methodology

Data were drawn from the 2024 Digital Divide Survey, a nationally representative dataset administered by the National Information Society Agency (NIA) and supported by the Ministry of Science and ICT of South Korea. Respondents were selected through stratified probability proportional to size (PPS) sampling, with field interviews conducted between October and December 2024. The sample in this study comprised 1,775 individuals aged 60 and older. While the United Nations typically defines the older population as those aged 65 and older, this study adopted 60 as the age criterion, following recent research (Yoon *et al.*, 2025) that emphasizes the distinct digital literacy characteristics of this age group. To classify older consumers into distinct groups, K-means cluster analysis was performed using five items assessing how respondents cope with digital difficulties when facing problems while using digital services. These items captured the extent to which individuals rely on independent coping, informal support (family/friends), and formal support (institutional help). The five items for problem-solving styles were measured on a four-point Likert scale and converted to Z-scores for standardization before the clustering process.

To examine how digital competencies and psychosocial factors are associated with life satisfaction across different consumer groups, key variables were defined as follows. Digital competencies were conceptualized based on the multidimensional perspective of the second-level digital divide. Specifically, digital utilization refers to the functional ability to practically use and leverage various digital devices and services in daily life. Meanwhile, digital citizenship reflects an individual's ability to engage in online communities and administrative services, manage security and privacy settings, and critically evaluate information while

safeguarding digital rights. In addition, digital service usage was categorized into three domains: informational and media, social and communicative, and transactional and practical services. Psychosocial factors were included to capture key dimensions associated with differences in third-level digital divide outcomes. Social capital was measured through two dimensions: social support and social connectedness. Social support refers to the perceived availability of practical and emotional assistance from an individual's social environment during challenging times. Meanwhile, social connectedness represents a psychological sense of belonging to a broader community and social networks. Additionally, digital attitudes reflect the perceived usefulness and convenience of technology and an individual's positive intention to further utilize it, while digital self-efficacy represents an individual's confidence in learning and using digital devices and the belief in their ability to master new technologies. Life satisfaction served as the outcome variable and was measured as an individual's subjective evaluation of their life, reflecting the alignment of current conditions with ideal standards and the perceived achievement of personal goals.

To assess construct validity and internal consistency, exploratory factor analysis (EFA) with varimax rotation was conducted, and Cronbach's α coefficients were calculated for all measurement scales. The results indicated acceptable convergent validity, with factor loadings exceeding .60. Sampling adequacy was confirmed with Kaiser–Meyer–Olkin (KMO) values above .80, and Bartlett's test of sphericity was statistically significant ($p < .001$). Reliability was also confirmed, as Cronbach's α coefficients for all constructs ranged from .82 to .96, exceeding the .70 threshold. Demographic variables, including gender, age, income, and residential area, were included as control variables.

To investigate the relationships among the key variables, a series of hierarchical multiple regression analyses were performed for each group. Three separate models were estimated, using digital attitudes, digital self-efficacy, and life satisfaction as the dependent variables, respectively. For each of the three regression analyses, demographic variables were entered in Model 1 as control variables. Model 2 incorporated digital competencies, social capital, and the three domains of digital service usage. In the model predicting life satisfaction specifically (Model 3), digital attitudes and self-efficacy were further included in the final stage to evaluate their unique predictive effects. All statistical procedures were performed using SPSS 26.0.

Results

A total of 1,775 respondents were included in the final sample. Of these, 54.25% were female. Respondents aged 65–74 constituted the largest group (50.76%), followed by those aged 60–64 (29.58%) and those aged 75 and older (19.66%). Approximately, 29% of respondents reported monthly household income below 2 million KRW, and 71% resided in urban areas. K-means cluster analysis identified four distinct groups based on digital problem-solving styles: Help-Seeking' (37.80%), Active Problem-Solving' (24.28%), Self-Directed Problem-Solving' (23.21%), and Passive Problem-Solving' (14.71%).

For the Help-Seeking group, the hierarchical regression models explained 7% (adj. $R^2 = .07$, $F = 14.17$, $p < .001$) and 20% (adj. $R^2 = .20$, $F = 16.40$, $p < .001$) of the variance in digital attitudes at Models 1 and 2, respectively. Age was the only significant demographic predictor in Model 1 ($\beta = -.24$, $p < .001$), while digital utilization ($\beta = .27$, $p < .001$), informational and media service usage ($\beta = .21$, $p < .05$), and social connectedness ($\beta = .20$, $p < .001$) emerged as significant positive predictors in Model 2. For digital self-efficacy, gender ($\beta = -.10$, $p < .01$), age ($\beta = -.25$, $p < .001$), income ($\beta = .10$, $p < .05$), and residential area ($\beta = -.10$, $p < .01$) were significant predictors in Model 1, explaining 12% of the variance (adj. $R^2 = .12$, $F = 22.94$, $p < .001$). In Model 2, digital utilization ($\beta = .34$, $p < .001$), digital citizenship ($\beta = .12$, $p < .05$), and social connectedness ($\beta = .18$, $p < .001$) were significant positive predictors. The model explained 32% of the variance (adj. $R^2 = .32$, $F = 27.82$, $p < .001$). The final model predicting life satisfaction explained 18.6% of the variance (adj. $R^2 = .19$, $F = 12.76$, $p < .001$), with income ($\beta = .12$, $p < .01$), and transactional

and practical service usage ($\beta = .27, p < .05$), social support ($\beta = .16, p < .001$), social connectedness ($\beta = .16, p < .01$), and digital self-efficacy ($\beta = .24, p < .001$) as significant positive determinants.

For the Active Problem-Solving group, age ($\beta = -.15, p < .01$) was negatively associated with digital attitudes, while income ($\beta = .16, p < .01$) showed a positive association. Model 1 explained 7% of the variance (adj. $R^2 = .07, F = 9.24, p < .001$). When digital competencies and psychosocial variables were added, the model explained 33% of the variance (adj. $R^2 = .33, F = 20.14, p < .001$), with digital utilization ($\beta = .30, p < .01$), informational and media service usage ($\beta = .24, p < .05$), and social connectedness ($\beta = .32, p < .001$) as significant positive predictors, while social and communicative service usage ($\beta = -.27, p < .01$) showed a negative association and social support ($\beta = .13, p < .05$) was a significant positive predictor. For digital self-efficacy, age ($\beta = -.20, p < .001$) and income ($\beta = .23, p < .001$) were significant demographic predictors, explaining 13% of the variance (adj. $R^2 = .13, F = 17.43, p < .001$). The addition of digital competencies and psychosocial variables increased the explained variance to 39% (adj. $R^2 = .39, F = 25.85, p < .001$), with digital citizenship ($\beta = .28, p < .001$), social and communicative service usage ($\beta = .27, p < .01$), and social connectedness ($\beta = .35, p < .001$) as significant positive predictors, while social support was negatively associated ($\beta = -.15, p < .01$). For life satisfaction, income ($\beta = .11, p < .05$), informational and media service usage ($\beta = -.34, p < .01$), social and communicative service usage ($\beta = .26, p < .01$), social support ($\beta = .24, p < .001$), social connectedness ($\beta = .16, p < .01$), and digital self-efficacy ($\beta = .43, p < .001$) were significant predictors. The model explained 40.6% of the variance (adj. $R^2 = .41, F = 23.63, p < .001$).

For the Self-Directed Problem-Solving group, hierarchical regression analyses were conducted across three dependent variables: digital attitudes, digital self-efficacy, and life satisfaction. Regarding digital attitudes, age ($\beta = -.24, p < .001$) was negatively associated with, while income ($\beta = .16, p < .01$) showed a positive association. The model explained 12% of the variance (adj. $R^2 = .12, F = 14.49, p < .001$). In Model 2, digital utilization ($\beta = .35, p < .001$), social and communicative service usage ($\beta = -.20, p < .05$), social support ($\beta = .31, p < .001$), and social connectedness ($\beta = .11, p < .05$) were significant predictors. The model explained 37% of the variance (adj. $R^2 = .37, F = 22.70, p < .001$). For digital self-efficacy, gender ($\beta = -.12, p < .01$), age ($\beta = -.25, p < .001$), and income ($\beta = .21, p < .001$) were significant in Model 1 (adj. $R^2 = .16, F = 20.60, p < .001$), while digital utilization ($\beta = .25, p < .01$), digital citizenship ($\beta = .21, p < .01$), and social support ($\beta = .13, p < .05$) were significant positive predictors in Model 2 (adj. $R^2 = .38, F = 23.80, p < .001$). The final model predicting life satisfaction explained 25.3% of the variance (adj. $R^2 = .25, F = 11.69, p < .001$), with income ($\beta = .15, p < .01$), residential area ($\beta = .13, p < .01$), social support ($\beta = .17, p < .01$), digital attitudes ($\beta = .16, p < .05$), and digital self-efficacy ($\beta = .21, p < .01$) as significant positive predictors.

For the Passive Problem-Solving group, due to multicollinearity among digital service usage variables, the three service usage domains (informational and media services, social and communicative services, and transactional and practical services) were combined into a single composite indicator. For digital attitudes, age ($\beta = -.20, p < .01$) negatively and income ($\beta = .24, p < .001$) positively predicted digital attitudes in Model 1 (adj. $R^2 = .12, F = 10.04, p < .001$). In Model 2, the composite digital service usage ($\beta = .22, p < .01$), social support ($\beta = .17, p < .05$), and social connectedness ($\beta = .20, p < .05$) were significant positive predictors (adj. $R^2 = .33, F = 15.15, p < .001$). For digital self-efficacy, age ($\beta = -.15, p < .05$) and income ($\beta = .31, p < .001$) were significant in Model 1 (adj. $R^2 = .17, F = 13.87, p < .001$). Digital citizenship was the only significant predictor in Model 2 ($\beta = .37, p < .001$), explaining 46% of the variance (adj. $R^2 = .46, F = 25.57, p < .001$). The final model predicting life satisfaction explained 43% of the variance (adj. $R^2 = .43, F = 18.51, p < .001$), with income ($\beta = .16, p < .01$), residential area ($\beta = .10, p < .05$), social connectedness ($\beta = .34, p < .001$), digital attitudes ($\beta = .17, p < .05$), and digital self-efficacy ($\beta = .17, p < .05$) as significant positive determinants.

Conclusions and discussion

The main goal of this study was to examine the digital divide among older consumers by focusing on digital problem-solving styles and investigating how digital competencies and psychosocial factors influence life satisfaction. The results showed that the significant predictors of life satisfaction varied distinctly across the four groups. In the Help-Seeking group, life satisfaction was primarily driven by transactional and practical service usage, social capital, and digital self-efficacy. For the Active Problem-Solving group, social and communicative service usage, social capital, and digital self-efficacy had positive impacts, while informational and media service usage was found to be a negative predictor. In the Self-Directed Problem-Solving group, social support, digital attitudes, and digital self-efficacy were identified as significant positive factors. Lastly, for the Passive Problem-Solving group, social connectedness, digital attitudes, and digital self-efficacy emerged as the key predictors of life satisfaction. These findings demonstrate that the impact of digital competencies and digital service usage on life satisfaction is contingent upon older consumers' digital problem-solving styles, revealing differential patterns across the groups.

This study contributes to the understanding of the digital divide among older consumers by demonstrating that differences are not limited to access or skill levels, but also to how older consumers employ different strategies when facing digital difficulties. By classifying older consumers based on their digital problem-solving styles, this study reveals that older consumers are not a homogeneous group, as the relationships among digital competencies, psychosocial factors, and life satisfaction vary across these styles. From a practical perspective, digital inclusion policies should adopt tailored approaches rather than one-size-fits-all strategies. Interventions should consider group-specific characteristics, such as strengthening support networks for the Help-Seeking group, providing advanced learning opportunities for Self-Directed and Active problem-solvers, and reducing psychological barriers for those in the Passive group. In addition, digital literacy programs should incorporate both digital competencies and psychosocial factors, while digital services should be designed with age-friendly and inclusive interfaces for older consumers. Despite its contributions, this study has limitations. The use of cross-sectional data restricts causal interpretation, and the reliance on quantitative data limits deeper understanding of older consumers' digital experiences. Future research could employ longitudinal and qualitative approaches for a more comprehensive understanding. In conclusion, addressing the digital divide among older consumers requires recognizing heterogeneity in problem-solving styles, as these differences play a critical role in shaping both digital competencies and life satisfaction.

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Endorsements in B2B marketing: a comparative framework

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Abstract. Endorsements are widely recognized in consumer markets, yet their role in business-to-business (B2B) marketing remains underexplored. This paper develops a comparative framework to analyze five key strategies: celebrity endorsements, celebrity organization endorsements, entrepreneur endorsements, customer referencing, and co-branding. While often conflated, these mechanisms differ across dimensions of endorser identity, motivation, appeal, brand fit, risk, cost, and reach. Building on models such as the source credibility and attractiveness frameworks, the match-up hypothesis, and the meaning transfer model, the paper adapts endorsement theory to B2B contexts where effectiveness relies more on credibility transfer, authenticity, and reputation than cultural symbolism. In B2B markets, which are characterized by high-value transactions, multiple decision-makers, and relational contracting, endorsements operate as signals of reliability and trust, helping firms manage risk and differentiate their brand. The analysis shows that celebrity endorsements generate broad awareness but involve high costs and reputational risks, while celebrity organization endorsements and co-branding provide reputational leverage through alliances. Entrepreneur endorsements embody authenticity and vision, and customer referencing offers powerful, low-cost peer validation. The paper contributes by clarifying distinctions among these strategies and offering managers a structured tool for strategic decision-making. Limitations are acknowledged, with future research encouraged to validate the framework empirically and explore digital-era endorsements.

Keywords: B2B marketing; endorsements; branding; reputation.

Introduction

Endorsements have long been a cornerstone of marketing communication in consumer markets (e.g., Chen *et al.*, 2011; Ferguson & Mohan, 2020; Swani *et al.*, 2020). From Hollywood and other celebrities promoting luxury goods to influencers showcasing lifestyle brands on social media, endorsements serve as powerful tools for shaping perceptions, transferring credibility, and ultimately driving purchase decisions. While business-to-consumer (B2C) contexts have been extensively studied, business-to-business (B2B) endorsement strategies remain underexplored, even though B2B marketing expenditure now exceeds \$37 billion annually in the United States alone (B2Bmarketingworld.com, 2025). Within this environment, understanding how endorsements function, what forms they take, and how they differ from adjacent practices such as co-branding and customer referencing is critical for both academics and practitioners (Canning & West, 2006; Ferguson & Mohan, 2020).

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The purpose of this paper is to build on emerging conceptual work by using a comparative framework to analyze the different types of endorsements relevant in B2B contexts. Specifically, we distinguish among five related strategies: (1) celebrity endorsements, (2) celebrity organization endorsements, (3) entrepreneur endorsements, (4) customer referencing, and (5) co-branding. While often conflated in practice, these strategies differ across multiple dimensions, including endorser identity, primary motivation, key appeal, endorser–brand fit, perceived risk, cost, and reach. By systematically unpacking these distinctions, the paper offers theoretical clarity and practical guidance.

The relevance of this work lies in its contribution to both scholarship and managerial practice. For academics, it extends endorsement theory beyond consumer markets into the B2B realm, highlighting the unique dynamics of organizational endorsements and reputation transfer. For practitioners, it provides a structured tool for making informed strategic choices about when and how to use different endorsement mechanisms depending on brand objectives, resources, and risk tolerance.

Literature background

Endorsement models and supporting theory in B2C markets

The study of endorsements in consumer markets is anchored in four main models that are underlined by a number of theories. The first model consists of the source credibility model, which holds that effectiveness depends on the endorser's perceived expertise and trustworthiness. It operates on the principle of *internalization*, where a consumer adopts the endorser's opinion because they believe it is accurate (Kelman, 1961). Expertise refers to the perceived knowledge, experience, or skills of the endorser, while trustworthiness is the perceived honesty, integrity, and objectivity of the source. For example, a scientist endorsing a pharmaceutical brand derives persuasive power from professional authority. The second model is the source attractiveness model, which argues that effectiveness is tied to familiarity, likability, and similarity (McGuire, 1985). The model is based on the concept of *identification*, where a consumer is persuaded by an endorser, they find attractive and want to be like. Consumers are more receptive to endorsers they admire or identify with. The third model is the celebrity-product match-up hypothesis. This holds that endorsements are most effective when the celebrity's image "fits" or aligns with the product's attributes, such as athletes promoting sports apparel (Kamins, 1990). This alignment enhances the persuasive power of the message and leads to more positive attitudes toward both the brand and the advertisement. For example, a sports celebrity endorsing athletic wear is perceived as a better "match" than an actor endorsing the same product. The fourth model is the meaning transfer model, proposed by McCracken (1989), which offers a deeper, more cultural explanation for celebrity endorsement effectiveness. It suggests that a celebrity's symbolic meaning, which is built from their public persona, roles, and status, is transferred to the brand through the endorsement. This rich cultural meaning is then "acquired" by the consumer when they purchase and use the product. The celebrity acts as a conduit of meaning, transferring cultural associations from their public self to the brand.

Underlying these four models is the halo effect that involves the tendency for an observer's overall impression of a person to spill over into evaluations of specific attributes. In endorsements, positive impressions of a celebrity influence perceptions of the endorsed product. Celebrity endorsements exert their influence in marketing communication through several theoretical frameworks that explain how consumers process persuasive messages and form brand-related judgments. The Elaboration Likelihood Model (ELM) (Cacioppo *et al.*, 1986; Petty & Cacioppo, 1986) provides a foundational explanation, positing two routes to persuasion. The central route applies when consumers are highly motivated and able to critically evaluate message arguments, whereas the peripheral route dominates when motivation or ability is low, leading individuals to rely on simple cues such as an endorser's attractiveness or credibility. In practice, celebrity endorsements usually operate via this peripheral route, where positive associations with the celebrity are

transferred to the brand with minimal cognitive effort. Closely aligned are dual-process theories of cognition (Evans, 2003; Evans & Stanovich, 2013), which distinguish between rapid, intuitive Type 1 processing and slower, more deliberate Type 2 processing. Endorsements often engage Type 1 thinking, meaning consumers develop favorable brand attitudes through automatic affective responses rather than rational evaluation. Beyond cognitive routes, the celebrity–product match-up model highlights the importance of “fit”, where a celebrity’s image aligns well with product attributes. The endorsement provides more “diagnostic” information that strengthens brand credibility and consumer attitudes. This logic draws from schema theory (Heit, 2006), which emphasizes consistency with existing mental frameworks, and social adaptation theory (Kahle & Homer 1985; Kamins 1990), which recognizes endorsements as tools for helping consumers achieve social or identity goals.

Building further, the meaning transfer model (McCracken, 1989) expands the focus beyond fit to emphasize the cultural and symbolic meanings celebrities carry, such as success, sophistication, or lifestyle, which can migrate from celebrity to brand, and eventually to the consumer. This process explains how endorsements not only signal product qualities but also allow consumers to express identity through brand association. Empirical evidence underscores the importance of these affective pathways: Knoll and Matthes’s (2017) meta-analysis shows that endorsements most strongly influence attitudes toward the advertisement itself, with more modest effects on brand knowledge or direct purchase intent. Together, these theories suggest that endorsements are powerful primarily because they leverage peripheral cues, cultural meanings, and symbolic associations, shaping consumer perceptions and attitudes through affective mechanisms rather than rational persuasion.

The B2B context: branding and reputation

B2B markets differ significantly from consumer markets, characterized by fewer but higher-value transactions, complex decision-making units, and long-term relational contracts. In this environment, branding, once considered less relevant, has become significant to securing competitive advantage. Strong corporate brands now serve as vital reputational signals, conveying reliability, expertise, and trustworthiness to buyers who face high financial and professional risks in their purchasing decisions. Unlike B2C firms, which often emphasize individual product branding, B2B firms managing large and diverse portfolios typically concentrate on building a single, powerful corporate brand that can underpin and differentiate their entire offering. This strategic focus reflects the importance of reputation as both a signaling device and a risk-reduction mechanism. The halo effect further reinforces branding in B2B: positive associations with one aspect of a firm, such as corporate responsibility or technological leadership, tend to extend across the company’s portfolio, enhancing overall credibility and buyer confidence.

Although B2B decision-making has long been portrayed as purely rational, recent research highlights the growing role of subjective and emotional factors in shaping decision-making (Swani *et al.*, 2020). Emotional engagement, long recognized in consumer markets, is now influencing B2B strategies as firms integrate more sophisticated communication approaches. This convergence between B2B and B2C marketing has led to the adoption of storytelling, endorsements, and other tools designed to combine rational information with affective appeal. While emotional messaging alone may capture attention, it is most effective when paired with detailed, evidence-based information that addresses functional requirements and risk concerns. Ultimately, branding in the B2B context operates on two levels by providing a rational assurance of quality and reliability, while also fostering emotional trust and differentiation in markets where reputational capital can decisively shape long-term buyer–seller relationships.

Extending endorsement theory to the b2b context

Applying consumer-focused endorsement theories to B2B requires adaptation. For instance, attractiveness in B2C often refers to physical or social appeal, whereas in B2B it may relate to organizational similarity or

managerial respect. The meaning transfer model is less relevant in B2B, where endorsements function more instrumentally to transfer reputation, expertise, or market access rather than cultural symbolism.

Within this adaptation, it becomes essential to distinguish endorsements from related practices. Table 1 offers a synthesis of five key strategies for leveraging external associations in B2B marketing that allow for differentiation among celebrity endorsers, celebrity organizations, entrepreneurs, customer references, and co-branding arrangements. Each represents a distinct form of third-party association that varies across critical strategic dimensions. Each strategy differs in identity, motivation, appeal, fit, risk, cost, and reach. The framework is valuable because it prevents conceptual overlap and provides a basis for strategic selection. In what follows, each type is examined in detail.

Deep dive into the five endorsement strategies

Celebrity endorsements in B2B

Celebrity endorsements involve well-known individuals, usually from entertainment or sports, endorsing a firm's offering. In B2B, examples include global consulting firm Accenture PLC who for years featured golf superstar Tiger Woods as a brand ambassador, leveraging his reputation for precision and excellence to appeal to corporate clients. Similarly, ITW Professional Automotive Products engaged motorsports personality Cristy Lee to promote its Full Throttle brand to professional mechanics and car care providers. Celebrities offer benefits because they can attract attention, lend credibility through perceived expertise, and humanize complex offerings. They are especially effective at cutting through advertising clutter and capturing managerial interest. Unfortunately, celebrity scandals can quickly damage corporate reputations. For example, Accenture cut ties with Tiger Woods following his personal controversies. Costs are also high, often involving multimillion-pound contracts. Additionally, poor endorser-brand fit can weaken persuasiveness. The match-up hypothesis suggests that alignment between celebrity traits and brand values is vital. In B2B contexts, this is less about physical appeal and more about symbolic associations such as precision, trust, or innovation.

Celebrity organization endorsements

A celebrity organization endorsement is a high-profile company that publicly recommends or supports another company or product offering. The celebrity organization endorsement is a strategic partnership that leverages the endorsing company's reputation and authority to enhance the credibility of the endorsed brand. While not widespread, these celebrity organization endorsements are powerful. For example, IBM's "Play to Win" campaign showcased its services through advertisements in leading business publications that featured major clients like the Financial Times, Ducati and eBay. This strategy leveraged IBM's reputation for reliability and trust, including the "nobody ever got fired for buying IBM" ethos, by associating its brand with the success of other reputable companies. Similarly, Microsoft has long used its own brand as an endorser in its marketing communications to promote its software solutions. It famously featured a long partnership with Lufthansa Cargo, and more recently with other clients like Heineken. In another case, KPMG has formed alliances with SAS and Microsoft, using their brands as endorsers in case-driven narratives to target B2B decision-makers. Following its 2015 corporate split, HP's marketing strategy shifted from a consumer-focused approach to a B2B emphasis, leveraging enterprise storytelling to showcase how its technology powers Disney's operations. Corporate endorsers provide benefits by lending their reputation, authority, and proven track record. They create credibility by signaling that an established leader trusts or partners with the endorsed brand. For instance, Microsoft's association with Lufthansa communicates reliability and scalability to other potential clients. Unlike celebrities, organizations are less likely to face scandal, but reputational risks exist. Poor performance or negative publicity for the endorsing company can spill over. Furthermore, alliances may become unbalanced if one partner is significantly

stronger. The costs of these arrangements vary. While they may not require direct financial payment, they often involve significant resource sharing, co-marketing budgets, or strategic alliances.

Entrepreneurial endorsements

Entrepreneur endorsements involve founders, CEOs, or senior executives whose identity is inseparable from their firm. Elon Musk with Tesla and SpaceX, Jack Ma with Alibaba, and Richard Branson with Virgin Media's Voom illustrate this type. Entrepreneur endorsers provide benefits because they embody authenticity and vision. They can powerfully differentiate a firm by lending personal charisma, passion, and authority. Their endorsement is not transactional but intrinsic. In such endorsements, the individual and company are inseparable, and reputational shocks directly affect the firm. For example, Elon Musk's controversies may create volatility for the image of his brands. Dependency on one individual also creates long-term risks for succession planning. However, financial costs are minimal, as the endorsement is part of the entrepreneur's role. However, reputational costs are potentially high.

Customer referencing

Customer referencing is a formalized word-of-mouth marketing strategy where a seller uses testimonials from past clients to build credibility with prospective buyers (Jaakkola & Aarikka-Stenroos, 2019). This type of endorsement involves using testimonials, reference lists, or case studies to demonstrate credibility. Examples include showcasing satisfied corporate clients in advertisements or sales collateral. The benefits of customer referencing are powerful in B2B because it provides authenticity and peer validation. Prospective buyers see that similar organizations have successfully used the product, reducing perceived risk. It is inexpensive and often highly persuasive. The main risk relates to issues of reach. References usually circulate within narrow networks or case studies, lacking the broad visibility of celebrity endorsements. Overuse may also dilute impact if prospects perceive them as generic or staged. However, costs are typically low and limited to developing case studies, creating marketing collateral, or providing minor incentives.

Co-Branding

Although a globally accepted definition of co-branding is lacking, research suggests it is a long-term collaboration where two or more brand names appear on a product with the primary goal of launching a new offering (Besharat, 2010). Examples include "Intel Inside" with HP laptops or Red Bull partnering with GoPro. The benefits of co-branding arise from the ability to leverage the combined value of both brands, enhancing perceived quality, innovation, and trust. It can open access to new customer bases and generate synergies in innovation. In terms of risk, co-branding ties the reputations of both partners together. Failures or negative publicity for one brand can harm the other. The strategy also requires significant investments in product development, shared marketing, and legal arrangements. Costs are often high. Since developing co-branded products involves significant financial and resource commitments, including integration of technologies and long-term contractual agreements.

Cross-dimensional comparison

The endorser identity strategies that can be adopted range from individuals (such as celebrities and entrepreneurs) to organizations (like celebrity firms and co-brands) and peers (customer references). In the B2B context, corporate endorsements are here defined as "strategic partnerships where a recognized individual or organization leverages their brand equity to publicly endorse another's products or services in marketing communications." These include three types of endorsers: individual celebrities, influential entrepreneurs, and high-profile celebrity organizations. By analyzing the five strategies across various dimensions, clear patterns become evident. In terms of motivation, there is considerable variation. Celebrities are financially motivated, organizations seek strategic alignment, entrepreneurs are driven by self-identity, references reflect peer experience, and co-brands pursue joint value creation. The key appeal of

each endorsement strategy is diverse. Therefore, celebrities rely on credibility and attractiveness; organizations emphasize reputation; entrepreneurs highlight authenticity; references focus on peer validation; co-brands stress combined innovation. In terms of both risk and cost, it is possible to identify a gradation. The highest risk is for celebrities and entrepreneurs since transgressions are not uncommon. Risk is moderate for co-branding, lower for organizations, and lowest for references. In terms of cost, the highest is for celebrities and co-branding, the lowest is for referencing, while it is variable for organizations, and implicit for entrepreneurs. Finally, in terms of reach, the broadest is for celebrities, targeted for organizations, narrow for references, specific for entrepreneurs, and shared for co-brands. This comparative analysis suggests that endorsement strategies are not interchangeable. Instead, they vary in suitability depending on objectives, budget, and risk tolerance.

Conclusions and future research

Discussion and managerial implications

This paper has used Table 1 as a comparative framework to clarify distinctions among five types of endorsements and related strategies in B2B marketing. By analyzing differences across dimensions of identity, motivation, appeal, fit, risk, cost, and reach, the paper demonstrates that endorsement strategies are not monolithic but context-dependent tools. For scholars, the framework extends endorsement theory from B2C to B2B, offering avenues for empirical validation while for practitioners, the framework provides a structured approach to selecting endorsement strategies. The use of corporate endorsement and related activities is not extensive in a B2B context. Managers wishing to pursue such strategies in their marketing communications face complex choices in selecting endorsement strategies. This framework offers some guidance. First, if the objective is awareness-building, celebrity endorsements are effective at capturing attention across industries, but must be carefully matched to avoid a misfit. Second, Celebrity endorsements can support credibility-building. Using Celebrity organization endorsements can provide strong reputational signals, especially when selling to risk-averse decision-makers. Third, entrepreneur endorsements can provide B2B firms with authenticity and differentiation. Entrepreneur endorsements resonate strongly with audiences seeking visionary leadership and innovative identity. Fourth, Customer referencing is highly effective for minimizing perceived risk, especially in high-stakes purchasing contexts. Finally, co-branding can provide a source of Innovation and market expansion. Co-branding can create synergies, enhance product value, and facilitate access to new customer bases. Strategically, firms may integrate multiple strategies across the buyer journey. For example, celebrity endorsements can build top-of-funnel awareness, while customer references provide reassurance at the decision-making stage. Entrepreneur endorsements can sustain loyalty, while co-branding initiatives enable long-term growth.

Limitations and future research

While this paper offers a structured comparative framework for understanding endorsement strategies in B2B contexts, several limitations should be acknowledged. First, the analysis is primarily conceptual, relying on secondary sources and illustrative examples rather than empirical data. Without validation through field studies, surveys, or experiments, the generalizability of the framework remains uncertain. Second, the discussion emphasizes large, high-profile firms such as IBM, Microsoft, and Tesla, which may limit its applicability to smaller or mid-sized B2B organizations with fewer resources and lower brand visibility. Third, endorsement practices are increasingly shaped by digital and social media environments, including micro-influencers and algorithmic recommendation systems. These emerging forms of endorsement are not fully captured by the current framework. Fourth, although the importance of cultural variation is acknowledged, the framework does not provide a detailed analysis of how endorsement effectiveness may differ across global contexts with varying institutional norms and power distance beliefs. Finally, the treatment of risk is somewhat broad, without fully disentangling financial, reputational, and relational risks that may manifest differently across strategies.

TABLE 1 - Distinguishing among corporate endorsement types, referencing and co-branding

Dimension	Celebrity Endorsements	Celebrity Organization Endorsements	Entrepreneur Endorsements	Customer Referencing	Co-branding
Endorser Identity	Well-known public figure, often from sports or entertainment.	A well-known, high-profile company or brand.	A business founder, CEO, or senior executive.	A satisfied existing customer (individual or company).	Two or more established brands, integrated into a single offering.
Primary Motivation	Primarily financial compensation.	Strategic partnership with mutual benefits.	Deep belief in the product; brand is an extension of the self.	A tactical consideration, such as a discount or referral bonus.	Create a new, enhanced offering and gain access to a partner's brand equity and customer base.
Key Appeal	Credibility (expertise, trustworthiness) and attractiveness.	Reputation, authority, and proven track record.	Authenticity, vision, and personal success.	Authenticity, peer validation, and reduced perceived risk.	Combined value of both brands that can enhance perceived quality, innovation, and trust.
Endorser-Brand Fit	Alignment of public persona with product image.	Strategic alignment of business goals and market position.	Inseparable - the person is the brand.	Demonstrated success and satisfaction with the product.	Close, functional, or symbolic alignment of product values and attributes, essential for creating a coherent offering.
Perceived Risk	High; personal scandals can damage brand reputation.	Lower, but poor performance by the endorsing company can cause reputational harm	High; individual's personal and professional actions directly linked to the company's fate.	Low; the reference is typically a peer with a similar need.	Moderate; if the co-branded product fails or one brand suffers a negative event, both brands can be damaged.
Cost to the Marketer	High; often involving	Variable; may involve no direct	Low to None; the endorsement is	Low; typically involves minor	High; involves significant

	significant fees for contracts and usage rights.	payment, but rather resource-sharing, co-marketing, or shared revenue	often a core part of the brand's identity and comms strategy.	incentives, resources for creating case studies, or a nominal discount.	resources for co-development, shared marketing, and long-term legal agreements.
Reach/Audience	Broad; Often crossing many demographics.	Varies; Depending on size and industry of endorsing firm.	Specific; Targeting audiences interested in their industry or personal brand.	Narrow; Typically, within a customer's personal or professional network.	The combined audience of both brands, often targeting the end consumer.
Examples	Tiger Woods endorsing Accenture; Cristy Lee endorsing ITW.	IBM and Microsoft leveraging prestigious clients (e.g., Ducati, FT, to enhance perceived trust and reliability.	Elon Musk with SpaceX; Jack Ma with Alibaba B2B.	A case study; a customer testimonial; a reference list.	Intel and HP

Future research should therefore focus on empirical testing of the propositions across diverse industries, firm sizes, and cultural contexts. The relative effectiveness of different strategies can be tested using experiments, surveys, or field studies across industries and cultures. Longitudinal and cross-cultural studies would be particularly valuable for assessing how endorsements impact brand equity and trust over time. Additionally, scholars should explore how new forms of digital endorsements interact with traditional strategies to influence B2B decision-making in increasingly hybrid marketing environments. Ultimately, endorsements in B2B are powerful, but they must be carefully calibrated to balance credibility, risk, cost, and reach.

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When AI goes wrong: definitions of AI service failures and insights from academic research

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Abstract. As AI becomes deeply embedded in frontline service delivery, failures generated by AI systems—referred to as AI service failure (AI-SERV-FAIL)—are increasingly inevitable. When AI systems malfunction, produce inappropriate outputs, or fail to meet user expectations, the consequences extend beyond technical breakdowns to shape consumers' cognitions, emotional responses, evaluations, and subsequent behavioral intentions. Despite these implications, existing research has largely examined AI-SERV-FAIL from engineering and system-design perspectives, paying comparatively limited attention to consumers' interpretive and evaluative roles in transforming technical malfunctions into meaningful service failures. Although consumer-focused AI research is emerging and expanding, it predominantly emphasizes adoption, attitudes, and usage under successful operating conditions rather than failure contexts. Moreover, research on AI-SERV-FAIL remains fragmented across distinct streams that examine “AI agent” characteristics, discrete “AI-induced service failure” events, or “AI service recovery” strategies in isolation. This fragmentation constrains the development of a cumulative, process-oriented understanding of how consumer responses unfold across the full AI service failure–recovery trajectory. To address this gap, we conducted a systematic review of 63 peer-reviewed articles published between 2015 and 2025. Moving beyond a purely technical lens, we synthesized theoretical foundations, key constructs (including antecedents, mediators, moderators, and outcomes), and empirical findings on consumer responses to AI-SERV-FAIL across diverse service industries. Based on this synthesis, we developed an integrative, process-oriented framework that maps the evolving mechanisms of consumer cognition, emotion, and behavior from AI failure to recovery, and we propose a structured agenda for future research.

Keywords: AI service agent; AI agent; AI service failure; AI service recovery; human-computer interaction

Introduction

Artificial intelligence (AI) is fundamentally transforming the nature of service delivery by reshaping who performs core service functions. Service encounters that once relied almost exclusively on human employees are now increasingly mediated, augmented, or fully executed by intelligent AI systems. In many contexts, AI is not merely supporting human roles but actively replacing them, enabling service provision with minimal or no human intervention. From AI-powered customer service agents that manage interactions end-to-end (NiCE, 2026) to automated systems that detect service disruptions and initiate corrective actions in real time (Business Wire, 2026), AI has moved from backstage operational support to the forefront of customer–firm interactions (McKinsey & Company, 2023). This transformation extends across industries

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such as hospitality, tourism, retail, healthcare, and finance, where firms increasingly embed AI technologies directly into customer-facing encounters through chatbots, virtual assistants, recommendation engines, and autonomous service agents—illustrating the rapid expansion of AI-enabled services.

As AI assumes a more central and autonomous role in service delivery, failures arising from these systems become not only possible but inevitable (Chen, 2024). Such failure—commonly referred to as AI service failure (AI-SERV-FAIL)—occurs when AI systems embedded within service encounters generate errors, inappropriate outputs, biased decisions, or otherwise suboptimal service outcomes (Fürst *et al.*, 2025). Because these breakdowns can undermine consumer trust, damage firm reputation, and hinder continued AI adoption, understanding AI-SERV-FAIL has become an increasingly important scholarly priority. To explain the causes of such failures, prior research has primarily approached AI-SERV-FAIL from a technology- and engineering-centered lens. Scholars have identified critical drivers of AI-SERV-FAIL, including algorithmic limitations (Nishant *et al.*, 2024), data quality and bias (Cooper, 2024; Morley *et al.*, 2021), system design vulnerabilities (Wang *et al.*, 2026), and infrastructure-level constraints (Cruzes, 2026), all of which can disrupt service delivery and undermine service performance. This stream of research has been instrumental in diagnosing the technical conditions under which AI-enabled services break down and in proposing solutions aimed at enhancing system robustness, reliability, and functional service quality.

Although research identifying the technical drivers of AI-SERV-FAIL has substantially advanced understanding of why systems malfunction, such explanations alone are insufficient for explaining how these malfunctions translate into meaningful service failures. A system malfunction becomes a consequential service failure only when consumers (users) perceive it and evaluate it negatively. Accordingly, the impact of AI-SERV-FAIL depends not only on technical deficiencies but also on how consumers interpret the failure (Chen, 2024; Song *et al.*, 2023).

This interpretive process is particularly critical because most consumers lack knowledge of the algorithms and system architectures underlying AI performance. Without access to these technical foundations, consumers rarely evaluate failures based on coding errors or model limitations. Instead, they rely on cues that are visible and experiential during the service encounter (Song *et al.*, 2023). For example, consumers may react more negatively to an incorrect recommendation when the AI agent is embodied and humanlike, yet show greater tolerance when the agent is clearly machine-like and disembodied.

Despite the centrality of consumer-level interpretation processes, scholarly attention to AI-SERV-FAIL from a consumer perspective remains limited. Many existing studies have focused on AI-enabled services under “normal” or “successful” operating conditions rather than on “failure” contexts, examining factors such as AI readiness (Flavián *et al.*, 2022), familiarity (Arce-Urriza *et al.*, 2025), attitudes (Bhuiyan *et al.*, 2024), emotional reactions (Pantano & Scarpi, 2022), and adoption intentions (Huang *et al.*, 2024) toward AI-delivered services. While this stream of research has advanced understanding of AI acceptance and routine usage, it offers limited insight into how consumers respond when AI systems “fail.”

Studying failure contexts—beyond AI services operating under normal conditions—is critical, as failures are more diagnostic than successes in revealing consumers’ underlying evaluative mechanisms and expectations. When AI systems perform as expected, they align with baseline consumer expectations and become normalized within the service encounter. As a result, such routine performance is typically taken for granted and generates little cognitive scrutiny or emotional response (Gonçalves *et al.*, 2025; Li *et al.*, 2023). While these routine successes reinforce existing beliefs about the technology, they provide limited insight into the thresholds of consumer trust, tolerance, and reliance.

TABLE 1 - Overview of the present systematic literature Review on AI-SERV-FAIL

Dimension		Description
Scope	Topical scope <i>What phenomenon does the review examine?</i>	• This review focuses specifically on AI service failure (AI-SERV-FAIL) and subsequent recovery efforts, rather than on routine, successful, or general AI-enabled service encounters. • The decision to delimit the review to AI-SERV-FAIL is theoretically grounded in the diagnostic value of failure contexts. • Unlike routine or successful service encounters—which are often normalized and taken for granted—failure episodes activate deeper cognitive appraisal, responsibility attribution, intensified emotional reactions, and consequential behavioral responses. These processes provide clearer insight into the boundaries of consumer trust, tolerance, and reliance than interactions in which AI systems perform as expected.
	Focal perspective <i>Whose viewpoint does the review prioritize?</i>	• This review adopts a consumer-centered perspective, examining AI service failures from the standpoint of users rather than from a technology-, engineering-, or system-design perspective. • The decision to prioritize the consumer viewpoint is theoretically grounded in the distinction between technical malfunction and perceived service failure. An AI system breakdown becomes a consequential service failure only when consumers notice it, interpret it negatively, and evaluate it as violating their expectations. • While engineering-oriented research explains why AI systems malfunction, it does not fully account for how such malfunctions translate into dissatisfaction or behavioral withdrawal. These outcomes depend on consumers' cognitive appraisals, emotional reactions, and attribution processes. Accordingly, understanding when, why, and how consumers perceive and respond to AI-SERV-FAIL is essential for designing, managing, and recovering AI-enabled services effectively, as consumer interpretations ultimately determine relationship continuity and long-term adoption.
	Contextual scope <i>In what service contexts is the phenomenon examined?</i>	• This review is not restricted to a single industry. Instead, it adopts a cross-sectoral perspective, encompassing AI service failures and recovery processes across diverse service domains. • This broad inclusion is intentional, as existing research on AI-SERV-FAIL is dispersed across multiple industries, resulting in context-specific insights that remain theoretically fragmented. Accordingly, the review includes sectors such as hospitality, tourism, retail, healthcare, finance, and other service industries in which AI systems play a substantive role in service delivery.
Rationale and contributions	Originality <i>What is novel about this research relative to existing studies and prior systematic reviews on AI-SERV-FAIL?</i>	• While systematic literature reviews on human-delivered service failures are theoretically mature, no comprehensive review has synthesized AI-SERV-FAIL research from a cross-industry, consumer-centered perspective that simultaneously integrates (1) AI agent characteristics, (2) AI service failure attributes—including type, severity, source, and contextual conditions—and (3) recovery efforts within a unified framework. This review is original in that it systematically consolidates these

three dimensions into a comprehensive, process-oriented framework that explains how AI service failures emerge, how consumers interpret and respond to them, and how recovery efforts reshape trust, evaluations, and behavioral intentions.

Rigor

Why is a systematic literature review appropriate?

- A systematic literature review is particularly appropriate when a research domain is emerging, fragmented, and theoretically under-integrated.
- Research on AI-SERV-FAIL fits this profile.
- It spans multiple disciplines (e.g., marketing, information systems, tourism, and service management) and service contexts, leading to dispersed findings and inconsistent conceptualizations.
- Furthermore, as mentioned earlier, existing studies on AI-SERV-FAIL often examine the phenomenon in isolation—focusing separately on (1) AI agent characteristics, (2) failure attributes, or (3) recovery strategies—without integrating these elements into a coherent explanatory framework.

Therefore, a systematic literature review was chosen as the most rigorous method for this study to systematically consolidate these isolated streams, establish conceptual coherence, and construct an integrated framework that advances cumulative theory development.

Significance

Why does this research matter?

- Theoretical significance: The findings of this review significantly advance understanding of how consumers perceive, interpret, and respond to AI-SERV-FAIL, as well as how recovery efforts reshape trust, evaluations, and behavioral intentions. By integrating fragmented research into a coherent, process-oriented framework, this study clarifies the mechanisms underlying consumer–AI relationship disruption and recalibration, strengthens the conceptual foundation of AI-SERV-FAIL research, and outlines critical directions for advancing the field in a more cumulative and theoretically rigorous manner.

Managerial significance: As AI-enabled services become increasingly pervasive, failures are not exceptional but inevitable. By detailing how consumers perceive, interpret, and respond to AI-SERV-FAIL across contexts, this review equips practitioners with evidence-based insights to design more resilient AI systems, implement effective recovery mechanisms, and therefore sustain long-term adoption.

Note. AI-SERV-FAIL refers to AI-driven service failure.

In contrast, service failures—similar to failures in human-delivered services—violate expectations and trigger deeper cognitive processing (Chen, 2024). When such breakdowns occur, consumers engage in more deliberate evaluations of what went wrong, attribute responsibility, and reconsider whether the AI system is trustworthy in future interactions. These moments also intensify negative emotional reactions, such as frustration and anger (Pavone *et al.*, 2023). Importantly, this heightened cognitive scrutiny and emotional arousal often translate into consequential behavioral responses, including complaints, negative word-of-mouth, reduced loyalty, and even service discontinuation (Li *et al.*, 2023; Peng *et al.*, 2024). As a result, AI-SERV-FAIL represents a critical inflection point in the consumer-AI relationship—one that prompts consumers to reassess both their continued usage intentions and their trust in the technology. Examining these failure episodes is therefore essential for understanding not only immediate consumer reactions but also the longer-term dynamics of trust recalibration, relationship continuity, and overall evaluations of AI-enabled service performance.

Although consumer-centered research on AI-SERV-FAIL and recovery is steadily emerging, it remains conceptually fragmented and theoretically unintegrated. By contrast, the literature on human-delivered service failures is relatively mature and well-integrated, providing systematic insights into when and why consumers perceive failures, how they respond, and how recovery strategies restore evaluations and relationships (Adil *et al.*, 2022; Sahaf & Fazili, 2024). AI-SERV-FAIL research, by comparison, tends to examine isolated aspects of the phenomenon—such as AI agent characteristics (Agnihotri & Bhattacharya, 2024), specific failure attributes (Keating *et al.*, 2025), or recovery strategies (Zhou & Chang, 2024)—without integrating these aspects into a coherent understanding of how failures are perceived, how consumer responses unfold, and how trust and behavioral intentions evolve. This fragmentation highlights the need for a comprehensive, process-oriented framework that systematically synthesizes existing research, maps the various dimensions of AI-SERV-FAIL, and provides a unified perspective that can guide and inspire future investigations.

To address these gaps, this study conducts a systematic literature review to consolidate fragmented findings and construct a coherent conceptual foundation for understanding consumer responses to AI-SERV-FAIL. Through this structured synthesis, we identify dominant theoretical perspectives, systematically map key constructs (antecedents, mediators, moderators, and outcomes), and clarify how consumer evaluations and behaviors evolve from failure occurrence to recovery efforts. The scope, rationale, and primary contributions of this review are summarized in Table 1.

Methodology

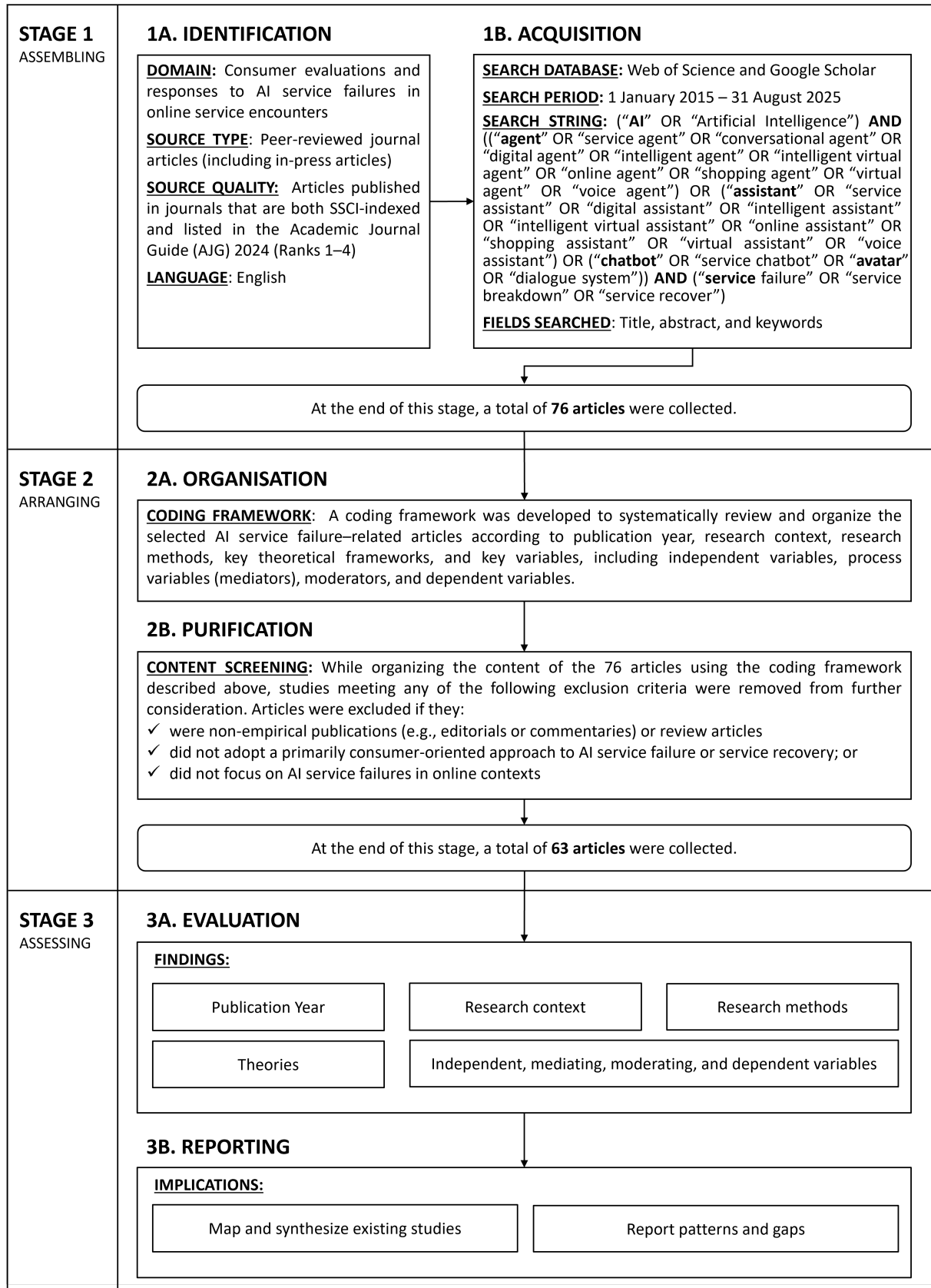
Given the conceptual fragmentation and cross-disciplinary dispersion identified in the previous section, a systematic literature review was deemed the most suitable methodology for this study. Research on AI-SERV-FAIL spans multiple service domains, theoretical traditions, and methodological approaches, resulting in a dispersed body of knowledge that lacks cumulative integration. A structured and transparent synthesis was therefore necessary to consolidate existing insights and establish a coherent foundation for theory development. A systematic literature review is an effective and rigorous method for such purposes, as it enables the comprehensive identification, evaluation, and synthesis of prior research on a common phenomenon across diverse contexts (Ki *et al.*, 2024). Additionally, because systematic literature reviews follow predefined procedures for study identification, selection, and analysis, they enhance methodological transparency and help reduce selection (Xue *et al.*, 2026). In our study, we followed the SPAR-4-SLR protocol proposed by Paul *et al.* (2021), which is widely recognized in business and management research. This protocol includes three sequential steps: 1) assembling – identifying and collecting relevant studies based on predefined inclusion and exclusion criteria, 2) arranging – organizing and categorizing the literature by descriptive attributes (e.g., publication year, research context, research method) and thematic features (e.g., theoretical frameworks and key variables), and 3) assessing – critically evaluating the studies to extract insights, identify recurring patterns, and pinpoint research gaps for future investigation.

Assembling

The first step, “assembling,” consisted of two sub-steps: (1a) identification and (1b) acquisition of relevant literature, as illustrated in Figure 1.

(A) IDENTIFICATION

In this sub-step, we established inclusion criteria to ensure alignment with our research objectives, focusing specifically on consumer responses to AI-SERV-FAIL in online service contexts. We confined the review to online settings because contemporary AI services are predominantly embedded in digitally mediated service encounters across industries, commonly manifested as chatbots, virtual assistants, and avatars. To ensure the reliability and quality of the included studies, we restricted sources to peer-reviewed journal articles, including in-press publications, and only those published in English.



Note. AI-SERV-FAIL refers to AI-driven service failure.

FIGURE 1 - Systematic literature review process of AI-SERV-FAIL research

To further ensure methodological rigor, we included only journals ranked 1 or higher in the Academic Journal Guide (AJG, 2024) and Q2 or higher in the Social Sciences Citation Index (SSCI, 2024), both of which are widely recognized as indicators of high-quality, internationally reputable journals across business and social science disciplines (Paul *et al.*, 2021). By using two complementary journal quality lists, we “identified” high-quality studies across relevant disciplines while maintaining strict methodological standards.

(B) ACQUISITION

Following the initial “identification” phase, we conducted a comprehensive search to “acquire” relevant literature. Two authoritative databases were used: Web of Science and Google Scholar, both widely recognized and commonly used in systematic literature reviews (Billore *et al.*, 2023). The search targeted article titles, abstracts, and keywords using a Boolean string that combined three main groups of terms: (1) *AI-related terms*, such as “AI” or “Artificial Intelligence,” as the review specifically focuses on AI-driven service failures rather than human employee-related failures; (2) a broad range of *AI service entity terms* to capture different conceptualizations of AI-enabled service interfaces. These included variations of “agent” (e.g., service agent, conversational agent, digital agent, intelligent agent, virtual agent, voice agent), “assistant” (e.g., service assistant, digital assistant, intelligent assistant, shopping assistant, voice assistant), as well as related terms such as “chatbot” and “avatar.” Including these variations minimized the risk of omitting relevant studies due to terminological differences across disciplines; and (3) *service failure-related terms*, including “service failure,” “service breakdown,” and “service recovery,” to capture studies examining negative service incidents and their consequences rather than AI services in general. The complete Boolean search string is presented in Figure 1. Together, these search parameters ensured a comprehensive retrieval of relevant studies while reducing the risk of selection bias across the fragmented AI-SERV-FAIL literature. Regarding the temporal scope of the review, the search was restricted to peer-reviewed journal articles published between 1 January 2015 and 31 August 2025. This approximately ten-year window was selected to capture the most relevant and contemporary research in this rapidly evolving domain. After removing duplicates, 76 articles were retained at the end of the assembling stage for further analysis.

Arranging

The second step consisted of two sub-steps: (2a) organization and (2b) purification.

(A) ORGANIZATION

In this sub-step, the research team developed a structured coding framework to systematically “organize” the 76 articles retained from the assembling stage. Each article was coded along two dimensions: (1) descriptive attributes and (2) thematic features. First, articles were coded according to *descriptive attributes*, including publication year, research context, and research method. This allowed us to quantitatively map the field, identifying trends in publication frequency over time, the primary industry contexts in which AI-SERV-FAIL has been studied, and the methodological approaches most commonly employed. This descriptive analysis provided a macro-level overview of the evolution and scope of the literature. Second, articles were further coded based on *thematic features*, including theoretical frameworks, key independent variables, mediating mechanisms, moderating factors, and dependent variables. This thematic coding moved beyond surface-level description to examine the underlying conceptual architecture of the field. Specifically, it enabled us to identify dominant theoretical paradigms and analyze how constructs are operationalized and interconnected.

(B) PURIFICATION

Following the “organization” stage, we conducted a “purification” step to ensure that all retained articles strictly aligned with the review’s scope and analytical objectives. While the assembling stage applied broad “inclusion” criteria, this step involved a more refined evaluation of content relevance and conceptual fit using specific “exclusion” criteria. Three exclusion criteria were applied: (1) *non-empirical publications* (e.g., editorials) and *review articles* were excluded, as they do not provide original empirical evidence and could lead

to duplication of findings; (2) studies without a *consumer-oriented perspective* on AI-related service failure or recovery were excluded, since the review specifically targets failure events rather than general AI service implementations or successes; and (3) studies that did not examine AI-related service failures in *online contexts* were removed, as they do not align with the defined research scope. During this stage, 13 articles were excluded for failing to meet the specified criteria, resulting in a final sample of 63 articles for analysis. This number was deemed sufficient, as it exceeds the minimum threshold of 40 studies recommended by Paul *et al.* (2021) to ensure adequate breadth and methodological rigor in systematic literature reviews.

Assessing

The third “assessing” step moved beyond the descriptive coding of the “arranging” phase to critically evaluate and synthesize the accumulated evidence and present the findings in a structured and theoretically meaningful manner. It consisted of two sub-steps: (3a) evaluation and (3b) reporting.

(A) EVALUATION

In the “evaluation” phase, we moved beyond description to critically interpret the coded results. Rather than reiterating individual studies, this phase comprehensively “evaluated” the AI-SERV-FAIL literature across disciplines to identify recurring patterns and synthesize them into an integrated foundation for understanding consumer responses to AI-induced service failure as a unified research domain. We conducted this evaluation in two ways. First, we examined patterns in descriptive attributes (e.g., publication year, research context, and research method) to assess the evolution and maturity of the field. Second, we examined the theoretical structure and construct-level patterns by analyzing the frameworks and key variables employed across studies.

(B) REPORTING

In the “reporting” phase, the insights derived from the evaluation stage were synthesized into a structured and integrative framework of the AI-SERV-FAIL literature. Rather than presenting isolated findings, we organized the reviewed studies into five interrelated thematic domains that collectively capture the intellectual structure of the field. Specifically, the literature was synthesized around five key thematic domains: (1) *AI-driven service failure “agent” research* – which examines how the characteristics, attributes, and perceived roles of AI service agents affect consumer responses to service failures; (2) *AI-driven “service failure” research* – which investigates the nature and characteristics of AI-related service breakdowns, including failure type, severity, frequency, and responsibility attributions; (3) *AI-driven service failure “recovery” research* – which explores how recovery strategies, such as who delivers the recovery (e.g., AI vs. human), what actions are taken, and when recovery occurs, affect consumer appraisals and subsequent behavioral outcomes; (4) *consumer appraisal mechanisms* – which examine how consumers cognitively, affectively, socially, and technologically evaluate failing AI agents, the service failures they produce, and subsequent recovery efforts; and (5) *consequential outcomes* – which capture the key attitudinal, behavioral, and affective consequences of AI-SERV-FAIL, highlighting how consumer appraisals translate into downstream behavioral responses. The overarching objective of this synthesis was twofold: to establish a comprehensive, process-oriented framework for the AI-SERV-FAIL field and to identify theoretical gaps that guide future research on AI-SERV-FAIL. The detailed findings are presented in the following sections.

Results

Descriptive analysis findings

RESEARCH PUBLICATIONS BY YEAR. The temporal distribution of the 63 articles revealed a clear and accelerating growth trajectory in AI-SERV-FAIL research. Although our review covered publications from 2015 to 2025, no studies were published prior to 2021 (see Figure 2). The field formally emerged in 2021, with only two publications, signaling the initial scholarly recognition of AI-SERV-FAIL as a distinct research domain. Following this initial emergence, research output expanded rapidly: publications quintupled to 10 in 2022, increased slightly to 11 in 2023, rose to 17 in 2024, and reached 23 in 2025—accounting for more

than one-third of all identified studies. This upward trajectory suggests that as AI systems/agents became increasingly embedded in frontline service encounters, the frequency, complexity, and visibility of AI-SERV-FAIL also grew, thereby stimulating related research streams, including AI service failure recovery. Overall, this publication pattern indicates the consolidation of AI-SERV-FAIL as an emerging and rapidly institutionalizing research stream, steadily approaching theoretical maturity and gaining scholarly significance comparable to traditional human-centered service failure research.

RESEARCH CONTEXTS. The analysis of industry contexts revealed a strong concentration of AI-SERV-FAIL research within consumer-facing service sectors—industries characterized by direct, high-frequency interactions between organizations and consumers. As illustrated in Figure 3, this concentration was primarily driven by three sectors: “hospitality” ($N = 31$, 32.29%), “tourism and travel” ($N = 25$, 26.04%), and “retail” ($N = 24$, 25.00%). The total number of recorded contexts ($N = 96$) exceeded the total number of reviewed articles ($N = 63$) because several studies examined multiple industry settings within a single publication. As noted earlier, “hospitality” emerged as the most frequently examined context (32.29%). Studies in this domain primarily focused on hotels and restaurants (Liu & Xu, 2023; Zhang *et al.*, 2025), where AI technologies such as AI assistants, chatbots, and voice-based systems were investigated as frontline service agents whose errors, malfunctions, or inappropriate responses triggered service failures.

The “tourism and travel” sector followed closely, accounting for 26.04% of the reviewed studies, covering contexts including tourist attractions (e.g., entertainment-featured parks; Liu & Xu, 2023), online travel agency services (Song *et al.*, 2023), airline services (Keating *et al.*, 2025), and itinerary change requests (Yao *et al.*, 2023), among others. Within these settings, researchers frequently examined AI chatbots, ChatGPT-based systems, and virtual service assistants as primary service interfaces through which consumers encountered AI-SERV-FAIL. These failures occurred when such AI-driven interfaces provided inaccurate information, mishandled booking or itinerary modification requests, responded inadequately to flight delays or cancellations, or delivered unsatisfactory support during ticket purchases and customer inquiries.

The “retail” industry ranked third, accounting for 25% of the reviewed studies. Research in this sector primarily examined AI applications in online retail environments—such as clothing and footwear, consumer electronics, and luxury fashion—as well as AI-enabled post-sale service interactions. Within these contexts, both conversational AI agents (e.g., chatbots and virtual shopping assistants) and embedded AI systems (e.g., intelligent service avatars) were frequently examined as AI-mediated service interfaces through which consumers experienced service failures. By contrast, comparatively fewer studies examined AI-SERV-FAIL in more credence-based service industries. Only five studies (5.21%) focused on “healthcare” contexts, primarily investigating AI doctor systems and AI chatbots. In these settings, service failures occurred when automated responses were perceived as inaccurate, insufficient, or inappropriate (Chen, 2024; Huo *et al.*, 2022). Similarly, five studies (5.21%) focused on “finance” contexts, including the insurance industry (Sands *et al.*, 2022), representing only a small proportion of the AI-SERV-FAIL literature. Additionally, six studies (6.25%) examined other service sectors, such as “streaming” services (Gonçalves *et al.*, 2025) and “telecommunications” services (Li *et al.*, 2023). Overall, this uneven distribution suggests that AI-SERV-FAIL research may reflect broader patterns of industry-level AI adoption. Experience-oriented industries such as hospitality, tourism, and retail are more readily automated or supplemented by AI systems. In contrast, expertise-intensive and high-stakes industries—such as healthcare and finance—require professional judgment and regulatory compliance, making the full replacement of human service providers more complex and cautious. Consequently, the research landscape appears to reflect practical implementation realities, with greater scholarly attention devoted to AI-SERV-FAIL in contexts where AI technologies are more visibly embedded in frontline service interactions.

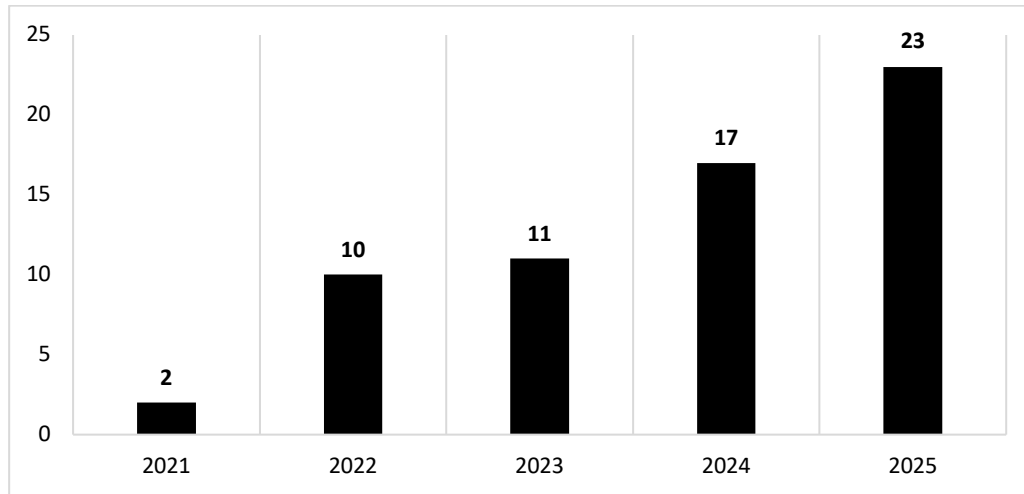
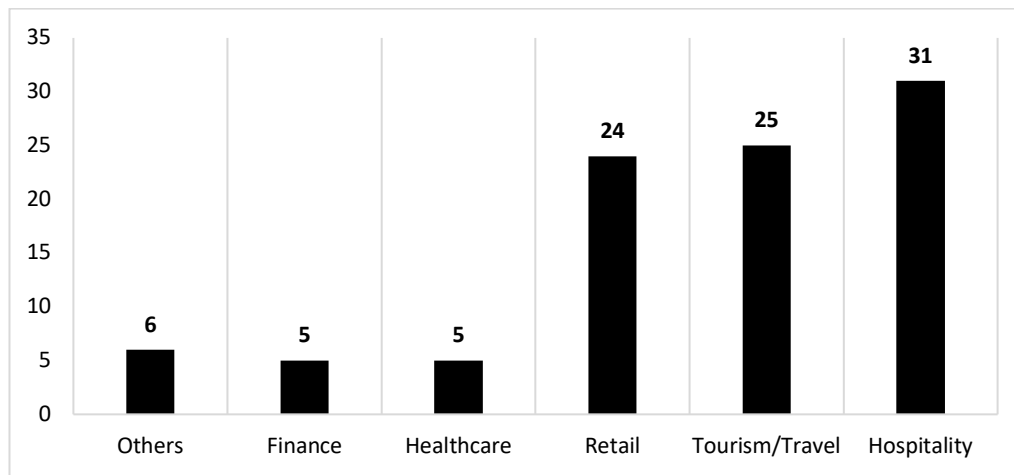


FIGURE 2 - Publication year of AI-SERV-FAIL studies (Article $N = 63$)



Note. Others include streaming, public service, and telecommunication.

FIGURE 3 - Distribution of specific contexts examined in AI-SERV-FAIL studies (Content $N = 96$)

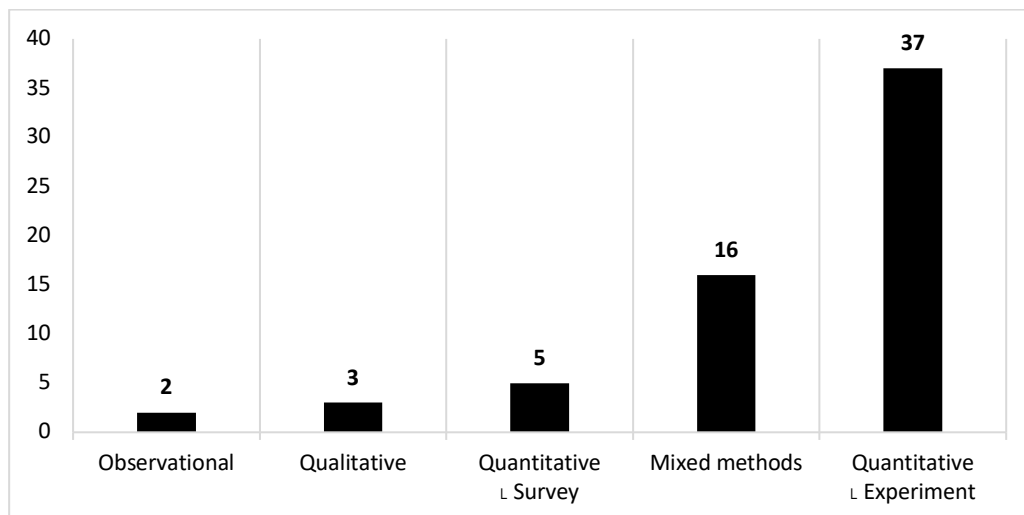


FIGURE 4 - Research methods adopted in AI-SERV-FAIL studies (Article $N = 63$)

RESEARCH METHODS. THE DESCRIPTIVE ANALYSIS FURTHER EXAMINED THE PREVAILING METHODOLOGICAL APPROACHES EMPLOYED ACROSS THE AI-SERV-FAIL LITERATURE. AS DEPICTED IN FIGURE 4, THE MAJORITY OF STUDIES ($N = 37$; 58.73%) ADOPTED “QUANTITATIVE – EXPERIMENTAL” DESIGNS. THIS WAS FOLLOWED BY “MIXED METHODS” APPROACHES ($N = 16$; 25.40%), WHICH TYPICALLY COMBINED QUALITATIVE INTERVIEW DATA WITH QUANTITATIVE EVIDENCE FROM ONLINE EXPERIMENTS. IN COMPARISON, ONLY FIVE STUDIES (7.94%) RELIED EXCLUSIVELY ON “QUANTITATIVE – SURVEY” METHODS. AN EVEN SMALLER NUMBER OF STUDIES EMPLOYED PURELY “QUALITATIVE METHODS” ($N = 3$; 4.76%) OR “OBSERVATIONAL APPROACHES” ($N = 2$; 3.17%) AS THEIR SOLE RESEARCH DESIGN. OVERALL, THIS DISTRIBUTION INDICATES A STRONG QUANTITATIVE (EXPERIMENTAL) ORIENTATION. THIS METHODOLOGICAL PATTERN SUGGESTS THAT THE FIELD HAS PROGRESSED BEYOND ITS INITIAL EXPLORATORY AND DESCRIPTIVE PHASE AND NOW PREDOMINANTLY ADOPTS THEORY-GUIDED, HYPOTHESIS-TESTING APPROACHES. BY RELYING HEAVILY ON STATISTICAL DESIGNS TO EXAMINE RELATIONSHIPS AND UNDERLYING MECHANISMS, THE LITERATURE REFLECTS A GROWING EMPHASIS ON SYSTEMATIC ASSOCIATIONS AND EMPIRICALLY GROUNDED LINKAGES, RATHER THAN PRIMARILY PURSUING EXPLORATORY INQUIRIES AIMED AT UNDERSTANDING WHAT THE PHENOMENON IS OR HOW IT MANIFESTS IN PRACTICE.

Thematic content analysis findings

Beyond the descriptive analysis, we conducted a thematic content analysis to examine the theoretical structure and construct-level patterns within the AI-SERV-FAIL literature. Specifically, we identified and analyzed the theories employed, as well as the independent, mediating, moderating, and dependent variables examined across the 63 reviewed articles.

THEORETICAL FOUNDATIONS OF AI-SERV-FAIL RESEARCH. This section presents the theoretical framework patterns identified across the 63 reviewed AI-SERV-FAIL studies. As summarized in Table 2, our inductive content analysis² reveals that the literature draws on six broad theoretical categories: (1) “cognitive oriented” theories ($N = 38$; 31.93%), (2) “social oriented” theories ($N = 33$; 27.73%), (3) “affective oriented” theories ($N = 14$; 11.76%), (4) “technology oriented” theories ($N = 3$; 2.52%), (5) “other” theories ($N = 24$; 20.18%), and (6) studies without an explicit theoretical foundation ($N = 7$; 5.88%).

Cognitive oriented theories. “Cognitive-oriented” theories ($N = 38$) were most frequently adopted, aligning with the fundamentally cognitive nature of service failure evaluation, regardless of whether the service provider is human or AI (Chen, 2024). In AI-driven service contexts, such performance-based cognitive evaluation may become particularly salient. Because AI agents are technological systems designed to deliver accuracy and efficiency (Li et al., 2025b), consumers are more likely to assess them through performance standards and outcome-based criteria. Moreover, AI interfaces may be perceived as less capable of delivering nuanced social or affective interaction (Huang & Rust, 2024), shifting evaluative attention toward functional competence. Consequently, when failures occur, consumers are especially likely to engage in cognitive judgment processes. Consistent with this evaluative orientation, as detailed in Table 2, *expectancy (dis)confirmation theory* ($N = 6$) emerged as the most frequently applied theoretical lens within the cognitive-oriented category. This theory posits that individuals’ responses to service performance—such as (dis)satisfaction—arise from comparing service performance and prior expectations (Oliver, 1977). When perceived performance falls short of expectations, negative disconfirmation occurs, leading to dissatisfaction and adverse behavioral responses. Extending this logic to AI-SERV-FAIL contexts, scholars have used it to explain how expectation violations shape consumers’ post-failure reactions. For example, Yao et al. (2023) found that in AI-SERV-FAIL situations, anthropomorphic AI customer service avatars portrayed as highly competent (rather than warm) triggered stronger negative consumer reactions, because competence cues

² Content analysis can be conducted using either an inductive or a deductive approach. An inductive approach derives categories directly from the data itself, allowing patterns and themes to emerge without relying on pre-established theoretical structures (Bae et al., 2024).

elevated performance expectations and thus intensified disappointment, ultimately reducing consumers' willingness to continue interacting with the AI.

TABLE 2 - Theories utilized in 63 reviewed AI-SERV-FAIL studies (Content N = 119)

Dimension	Exact Theory Name	Count	Reference
Cognitive oriented theories (31.93%)	Expectancy (dis)confirmation theory	6	Castillo <i>et al.</i> (2024); Fan <i>et al.</i> (2024); Liu & Xu (2023); Peng <i>et al.</i> (2024); Su & Li (2025); Yao <i>et al.</i> (2023)
	Attribution theory	5	Haupt <i>et al.</i> (2023); Huo <i>et al.</i> (2022); Li <i>et al.</i> (2024); Pavone <i>et al.</i> (2023); Zhang <i>et al.</i> (2024b)
	Cognitive appraisal theory	4	Liu <i>et al.</i> (2025); Pavone <i>et al.</i> (2023); Wang <i>et al.</i> (2025); Xie <i>et al.</i> (2025a)
	Information processing theory	4	Fan <i>et al.</i> (2024); Lv <i>et al.</i> (2021); Yang & Shao (2025); Zhang <i>et al.</i> (2022)
	Mind perception theory	3	Hu & Pan (2024); Tan <i>et al.</i> (2025); Xu <i>et al.</i> (2024)
	Congruity theory	2	Li <i>et al.</i> (2025b); Wang & Zhang (2025)
	Construal level theory	2	Meng <i>et al.</i> (2025b); Xie <i>et al.</i> (2025b)
	Mental accounting theory	2	Lu & Min (2025); Xing <i>et al.</i> (2022)
	AI quality confirmation model	1	Le <i>et al.</i> (2023)
	Expectation theory	1	Lu <i>et al.</i> (2024)
	Expectations violation theory	1	Tan <i>et al.</i> (2025)
	Functional theory of counterfactual thinking	1	Xie <i>et al.</i> (2025b)
	Lay belief theory	1	Zhang <i>et al.</i> (2023)
	Psychological distance theory	1	Meng <i>et al.</i> (2025b)
	Regulatory focus theory	1	Su & Li (2025)
	Schema congruity theory	1	Xie <i>et al.</i> (2025a)
	Signaling theory	1	Ozuem <i>et al.</i> (2025)
	Theory of mindfulness	1	Meng <i>et al.</i> (2025a)
	<i>Sub-total</i>	38	
	Stereotype content model	7	Dandotiya <i>et al.</i> (2024); Haupt <i>et al.</i> (2023); Huang & Sénécal (2023); Keating <i>et al.</i> (2025); Xu & Liu (2022); Yao <i>et al.</i> (2023); Zhou & Chang (2024)
Social oriented theories (27.73%)	Computers as social actors (CASA) theory	3	Agnihotri & Bhattacharya (2024); Huang & Sénécal (2023); Lu <i>et al.</i> (2024)
	Social cognitive theory	2	Chen & Mao (2025); Zhang <i>et al.</i> (2025)
	Social response theory	2	Lv <i>et al.</i> (2022b); Song <i>et al.</i> (2022)
	(Social) role congruity theory	2	Xing <i>et al.</i> (2022); Yang & Shao (2025)
	Trust theory	2	Fürst <i>et al.</i> (2025); Wang & Zhang (2025)
	Commitment-trust theory*	1	Le <i>et al.</i> (2023)
	Face-saving theory*	1	Song <i>et al.</i> (2023)
	Gender schema theory	1	Zhang <i>et al.</i> (2022)
	Gender stereotypes theory	1	Liang <i>et al.</i> (2024)
	Interdependence theory	1	Meng <i>et al.</i> (2025a)
	Need-threat model*	1	Lv <i>et al.</i> (2022a)
	Parasocial relationship theory	1	Zhang <i>et al.</i> (2025)
	Politeness theory	1	Song <i>et al.</i> (2023)
	Social exchange theory	1	Xu & Liu (2022)
	Social identity theory	1	Longoni <i>et al.</i> (2023)
	Social presence theory	1	Wang <i>et al.</i> (2025)
	Social relationship theory	1	Hu & Pan (2024)
	Social support theory	1	Zhou & Chang (2024)
	(Social) identity-based motivation framework	1	Gonçalves <i>et al.</i> (2025)
	(Social) norm orientation	1	Li <i>et al.</i> (2025b)

	theory		
	<i>Sub-total</i>	33	
	Stress and coping theory	3	Huang & Dootson (2022); Keating <i>et al.</i> (2025); Zhang <i>et al.</i> (2024c)
	Frustration-aggression theory	2	Ozuem <i>et al.</i> (2024); Ozuem <i>et al.</i> (2025)
	Affective coherence theory	1	Zhang <i>et al.</i> (2025)
	Benign violation theory	1	Liu & Xu (2023)
	Emotional competence theory	1	Zhang <i>et al.</i> (2023)
Affective oriented theories (11.76%)	Emotional congruence theory	1	Zhang <i>et al.</i> (2025)
	Emotional contagion theory	1	Xie <i>et al.</i> (2025a)
	Emotional intelligence theory	1	Le <i>et al.</i> (2023)
	Emotions as social information model	1	Zhang <i>et al.</i> (2025)
	Stress theory	1	Li <i>et al.</i> (2023)
	Stressor-strain-outcome framework	1	Peng <i>et al.</i> (2024)
	<i>Sub-total</i>	14	
Technology oriented theories (2.52%)	Task-individual-technology fit theory	1	Lu & Min (2025)
	Technology acceptance model	1	Zhang <i>et al.</i> (2022)
	The theory of system usage	1	Guo <i>et al.</i> (2025)
	<i>Sub-total</i>	3	
	Stimulus-organism-response theory	4	Chen & Mao (2025); Hu & Pan (2024); Xie <i>et al.</i> (2025b); Zaki & Al-Romeedy (2024)
	Anthropomorphism theory	3	Keating <i>et al.</i> (2025); Le <i>et al.</i> (2023); Pavone <i>et al.</i> (2023)
	Uncanny valley theory	3	Liu <i>et al.</i> (2025); Tan <i>et al.</i> (2025); Xie <i>et al.</i> (2025b)
	Justice theory	2	Koc <i>et al.</i> (2023); Park <i>et al.</i> (2025)
	Affordance(s) theory	1	Castillo <i>et al.</i> (2024)
	AI personality theory	1	Le <i>et al.</i> (2023)
	Communication accommodation theory	1	Xie <i>et al.</i> (2025a)
Other theories (20.18%)	Conservation of resources theory	1	Keating <i>et al.</i> (2025)
	Control theory	1	Meng <i>et al.</i> (2025a)
	Dehumanization theory	1	Chen v. (2024)
	Inoculation theory	1	Meng v. (2025b)
	Media naturalness theory	1	Lu <i>et al.</i> (2024)
	Resource risk interaction theory	1	Meng v. (2025a)
	Situational crisis communication theory	1	Li <i>et al.</i> (2025b)
	The big five model	1	Huo v. (2022)
	Time metaphor theory	1	Wang & Zhang (2025)
	<i>Sub-total</i>	24	
No theories (5.88%)	No theories were used in these articles.	7	Chen (2024); Huang & Philp (2021); Huang <i>et al.</i> (2025); Jeon & Kim (2025); Sands <i>et al.</i> (2022); Sun v. (2022); Xie <i>et al.</i> (2025c)
	<i>Sub-total</i>	7	
Total			119

Note. AI-SERV-FAIL refers to AI-driven service failure; The total theory count exceeds the article count because some articles employed multiple theories; Commitment-trust theory* is classified under *social-oriented theories* because it posits that the relationship between service providers and relational outcomes is mediated by trust in the exchange partner, and that it is through this trust that the trustor becomes committed to the relationship; Face-saving theory*, also known as politeness theory, is likewise classified under

social-oriented theories because it focuses on how individuals manage social relationships during interactions. It explains how people strategically use politeness strategies in conversation to protect both their own “face” and that of others. In this context, “face” refers to an individual’s reputation, dignity, social standing, and honor (e.g., *mianzi* in Chinese culture); The need-threat model* is also categorized as a *social-oriented theory* because it explains how social exclusion or ostracism threatens individuals’ basic social needs. Specifically, it shows that ostracism undermines relational needs (such as belonging and self-esteem) and efficacy needs (such as control and a sense of meaningful existence), which in turn motivates individuals to respond in ways aimed at restoring these needs.

Attribution theory ($N = 5$) was the second most frequently used framework within this cognitive category. The theory explains how individuals interpret the causes of negative events by assigning responsibility either internally to the service provider (e.g., the service provider’s competence) or externally to situational factors (e.g., technical issues or contextual constraints; Kelley & Michela, 1980). In AI-SERV-FAIL settings, researchers have applied attribution theory to examine whether consumers attribute AI-SERV-FAIL to the AI agent itself or to the firm that deploys and manages the technology. For example, Pavone *et al.* (2023) found that when AI-SERV-FAIL occurs, consumers tend to assign greater responsibility to the company rather than to the AI agent. This attribution elicits negative emotions—particularly frustration—which subsequently shapes consumers’ coping responses. Such patterns emerge because AI agents are generally perceived as lacking intentions and autonomous control, and thus are not viewed as fully responsible actors.

Beyond these dominant perspectives, several additional cognitive frameworks have been applied, including *cognitive appraisal theory* ($N = 4$), *information processing theory* ($N = 4$), *mind perception theory* ($N = 3$), *congruity theory* ($N = 2$), *construal level theory* ($N = 2$), and *mental accounting theory* ($N = 2$). For instance, drawing on *cognitive appraisal theory* - which posits that emotions arise from individuals’ cognitive evaluations of events rather than from the events themselves - Xie *et al.* (2025a) showed that consumers’ forgiveness following AI service failures followed a cognition–emotion sequence. Specifically, they demonstrated that emojis in apology messages shaped “cognitive” appraisals (perceived sincerity) first, which subsequently influenced emotional responses (forgiveness intentions). When failure severity was low, negative/sad emojis (😞) were perceived as more sincere, eliciting more positive emotions and greater forgiveness than positive/happy emojis (😊). In contrast, Lv *et al.* (2021), drawing on *information processing theory*, showed that consumers are more forgiving of AI service failures when the AI assistant is designed to appear highly cute—an effect that operates through two distinct processing systems. First, cuteness activates an “intuitive and emotional” processing system, eliciting feelings of tenderness. Second, it engages an “analytical and rational” processing system, shaping consumers’ performance expectations. Together, these dual processing systems contribute to greater tolerance of AI failures.

Social oriented theories. Social-oriented theories ($N = 33$) were the second most prevalent category in AI-SERV-FAIL research. This prominence suggests that scholars tend to conceptualize AI service agents not merely as technological systems evaluated in terms of cognitive or functional performance, but also as “social actors” assessed according to interpersonal norms and relational expectations. This perspective aligns with industry practices, where AI service agents are designed with human-like cues—such as names, anthropomorphic embodiments, and conversational styles—to foster socially engaging interactions that activate social-psychological mechanisms. When AI agents display these human-like characteristics, consumers may attribute social qualities to them, including warmth, social closeness, and appropriateness. Consequently, when service failures occur, they may be interpreted not only as technical malfunctions but also as violations of social or relational norms. To explain these socially grounded responses to AI service failures, researchers have increasingly drawn on social-oriented theories.

Within this category, the *stereotype content model* ($N = 7$) was the most frequently applied framework (e.g., Dandotiya *et al.*, 2024; Keating *et al.*, 2025). The model proposes that social targets are evaluated along two dimensions—warmth (i.e., perceived friendliness) and competence (i.e., perceived ability)—which jointly shape individuals’ attitudes and behavioral responses (Fiske *et al.*, 2002). Guided by this framework, Xu and

Liu (2022) treated AI agents as social targets and operationalized warmth and competence as the key evaluative dimensions through which consumers assess AI behavior. Specifically, they examined whether, after an AI agent committed a service failure, incorporating “humor” into its recovery response influenced consumers’ perceptions of the agent’s warmth and competence and, in turn, increased their tolerance of the failure. The results showed that humorous recovery responses did enhance perceived warmth and competence, which subsequently led to greater post-failure tolerance—reflecting the warmth–competence mechanism central to the stereotype content model.

Beyond the stereotype content model, several other social frameworks have also been applied, including *computers as social actors (CASA) theory* ($N = 3$), *social response theory* ($N = 2$), and *(social) role congruity theory* ($N = 2$). Drawing on CASA theory, Huang & Sénécal (2023) showed that consumers respond to AI voice assistants as if they were social beings. When the assistant was perceived as warmer and more friendly, consumers experienced less frustration after service failures and were more likely to revisit the restaurant it represented, compared to when it was perceived as less warm. Similarly, grounded in *social response theory*, Lv et al. (2022b) found that socially oriented responses from AI—such as expressing high empathy after a service failure—reduced customers’ psychological distance from the AI. This increased psychological closeness strengthened trust, which in turn improved recovery outcomes, including willingness to continue using the AI after failure. Lastly, drawing on *social role congruity theory*, Yang and Shao (2025) demonstrated that consumers were more likely to forgive service failures when recovery roles aligned with their social expectations of AI versus human agents. Forgiveness increased when AI agents provided economic compensation, while human employees offered emotional support and empathy. When each agent fulfilled its socially expected role, the recovery process was perceived as more appropriate, thereby enhancing forgiveness.

Affective oriented theories. Affective-oriented theories represented the third major category in AI-SERV-FAIL research ($N = 14$). This category encompasses theories that focus on consumers’ emotional responses to AI service failures, as well as those that examine how emotional cues expressed by AI agents during recovery—such as sadness displays, empathetic language, or emoji use—influence consumers’ subsequent emotions and behaviors. As reported in Table 2, *stress and coping theory* ($N = 3$) emerged as the most frequently adopted framework within this category. Originating from Lazarus and Folkman’s (1984) transactional model, *stress and coping theory* explains how individuals respond to stressful events, such as AI-induced service failures, by engaging in either emotion-focused or problem-focused coping. Employing this theoretical lens, Huang & Dootson (2022) found that when the availability of human assistance was disclosed late rather than early following an AI service failure, consumers were more likely to engage in emotion-focused coping (e.g., feeling upset or emotionally distressed). This coping response, in turn, led to more aggressive reactions toward the chatbot responsible for the failure, such as being rude to or ridiculing it.

Beyond stress-based perspectives, other affective frameworks have been used to examine how failing AI agents’ emotional expressions shape consumers’ post-failure behaviors. Drawing on *emotional contagion theory*, Xie et al. (2025a) found that emotional cues in chatbots’ recovery messages can transmit affective states to consumers. Because service failures typically elicit negative emotions, the use of sad emojis following a failure created emotional congruence. This emotional alignment heightened perceived empathy, which subsequently increased consumer forgiveness. Similarly, using the *emotions-as-social-information (EASI) model*, Zhang et al. (2025) demonstrated that AI chatbots’ expressions of sadness function as informational cues from which consumers draw inferences about the agent’s intentions and traits. Specifically, they found that sadness signaled greater sincerity but lower competence, thereby producing opposing effects on continued usage intentions. These findings are consistent with the EASI framework, which posits those emotional expressions influence behavior through observers’ inferential processes.

TABLE 2 - Theories utilized in 63 reviewed AI-SERV-FAIL studies (Content N = 119)

Dimension	Exact Theory Name	Count	Reference
Cognitive oriented theories (31.93%)	Expectancy (dis)confirmation theory	6	Castillo <i>et al.</i> (2024); Fan <i>et al.</i> (2024); Liu & Xu (2023); Peng <i>et al.</i> (2024); Su & Li (2025); Yao <i>et al.</i> (2023)
	Attribution theory	5	Haupt <i>et al.</i> (2023); Huo <i>et al.</i> (2022); Li <i>et al.</i> (2024); Pavone <i>et al.</i> (2023); Zhang <i>et al.</i> (2024b)
	Cognitive appraisal theory	4	Liu <i>et al.</i> (2025); Pavone <i>et al.</i> (2023); Wang <i>et al.</i> (2025); Xie <i>et al.</i> (2025a)
	Information processing theory	4	Fan <i>et al.</i> (2024); Lv <i>et al.</i> (2021); Yang & Shao (2025); Zhang <i>et al.</i> (2022)
	Mind perception theory	3	Hu & Pan (2024); Tan <i>et al.</i> (2025); Xu <i>et al.</i> (2024)
	Congruity theory	2	Li <i>et al.</i> (2025b); Wang & Zhang (2025)
	Construal level theory	2	Meng <i>et al.</i> (2025b); Xie <i>et al.</i> (2025b)
	Mental accounting theory	2	Lu & Min (2025); Xing <i>et al.</i> (2022)
	AI quality confirmation model	1	Le <i>et al.</i> (2023)
	Expectation theory	1	Lu <i>et al.</i> (2024)
	Expectations violation theory	1	Tan <i>et al.</i> (2025)
	Functional theory of counterfactual thinking	1	Xie <i>et al.</i> (2025b)
	Lay belief theory	1	Zhang <i>et al.</i> (2023)
	Psychological distance theory	1	Meng <i>et al.</i> (2025b)
	Regulatory focus theory	1	Su & Li (2025)
	Schema congruity theory	1	Xie <i>et al.</i> (2025a)
	Signaling theory	1	Ozuem <i>et al.</i> (2025)
	Theory of mindfulness	1	Meng <i>et al.</i> (2025a)
	<i>Sub-total</i>	38	
Social oriented theories (27.73%)	Stereotype content model	7	Dandotiya <i>et al.</i> (2024); Haupt <i>et al.</i> (2023); Huang & Sénécal (2023); Keating <i>et al.</i> (2025); Xu & Liu (2022); Yao <i>et al.</i> (2023); Zhou & Chang (2024)
	Computers as social actors (CASA) theory	3	Agnihotri & Bhattacharya (2024); Huang & Sénécal (2023); Lu <i>et al.</i> (2024)
	Social cognitive theory	2	Chen & Mao (2025); Zhang <i>et al.</i> (2025)
	Social response theory	2	Lv <i>et al.</i> (2022b); Song <i>et al.</i> (2022)
	(Social) role congruity theory	2	Xing <i>et al.</i> (2022); Yang & Shao (2025)
	Trust theory	2	Fürst <i>et al.</i> (2025); Wang & Zhang (2025)
	Commitment-trust theory*	1	Le <i>et al.</i> (2023)
	Face-saving theory*	1	Song <i>et al.</i> (2023)
	Gender schema theory	1	Zhang <i>et al.</i> (2022)
	Gender stereotypes theory	1	Liang <i>et al.</i> (2024)
	Interdependence theory	1	Meng <i>et al.</i> (2025a)
	Need-threat model*	1	Lv <i>et al.</i> (2022a)
	Parasocial relationship theory	1	Zhang <i>et al.</i> (2025)
	Politeness theory	1	Song <i>et al.</i> (2023)
	Social exchange theory	1	Xu & Liu (2022)
	Social identity theory	1	Longoni <i>et al.</i> (2023)
	Social presence theory	1	Wang <i>et al.</i> (2025)
	Social relationship theory	1	Hu & Pan (2024)
	Social support theory	1	Zhou & Chang (2024)
	(Social) identity-based motivation framework	1	Gonçalves <i>et al.</i> (2025)
	(Social) norm orientation theory	1	Li <i>et al.</i> (2025b)
	<i>Sub-total</i>	33	

Affective oriented theories (11.76%)	Stress and coping theory	3	Huang & Dootson (2022); Keating <i>et al.</i> (2025); Zhang <i>et al.</i> (2024c)
	Frustration-aggression theory	2	Ozuem <i>et al.</i> (2024); Ozuem <i>et al.</i> (2025)
	Affective coherence theory	1	Zhang <i>et al.</i> (2025)
	Benign violation theory	1	Liu & Xu (2023)
	Emotional competence theory	1	Zhang <i>et al.</i> (2023)
	Emotional congruence theory	1	Zhang <i>et al.</i> (2025)
	Emotional contagion theory	1	Xie <i>et al.</i> (2025a)
	Emotional intelligence theory	1	Le <i>et al.</i> (2023)
	Emotions as social information model	1	Zhang <i>et al.</i> (2025)
	Stress theory	1	Li <i>et al.</i> (2023)
Technology oriented theories (2.52%)	Stressor-strain-outcome framework	1	Peng <i>et al.</i> (2024)
	<i>Sub-total</i>	14	
	Task-individual-technology fit theory	1	Lu & Min (2025)
	Technology acceptance model	1	Zhang <i>et al.</i> (2022)
	The theory of system usage	1	Guo <i>et al.</i> (2025)
	<i>Sub-total</i>	3	
	Stimulus-organism-response theory	4	Chen & Mao (2025); Hu & Pan (2024); Xie <i>et al.</i> (2025b); Zaki & Al-Romeedy (2024)
	Anthropomorphism theory	3	Keating <i>et al.</i> (2025); Le <i>et al.</i> (2023); Pavone <i>et al.</i> (2023)
	Uncanny valley theory	3	Liu <i>et al.</i> (2025); Tan <i>et al.</i> (2025); Xie <i>et al.</i> (2025b)
	Justice theory	2	Koc <i>et al.</i> (2023); Park <i>et al.</i> (2025)
Other theories (20.18%)	Affordance(s) theory	1	Castillo <i>et al.</i> (2024)
	AI personality theory	1	Le <i>et al.</i> (2023)
	Communication accommodation theory	1	Xie <i>et al.</i> (2025a)
	Conservation of resources theory	1	Keating <i>et al.</i> (2025)
	Control theory	1	Meng <i>et al.</i> (2025a)
	Dehumanization theory	1	Chen v. (2024)
	Inoculation theory	1	Meng v. (2025b)
	Media naturalness theory	1	Lu <i>et al.</i> (2024)
	Resource risk interaction theory	1	Meng v. (2025a)
	Situational crisis communication theory	1	Li <i>et al.</i> (2025b)
No theories (5.88%)	The big five model	1	Huo v. (2022)
	Time metaphor theory	1	Wang & Zhang (2025)
	<i>Sub-total</i>	24	
	No theories were used in these articles.	7	Chen (2024); Huang & Philp (2021); Huang <i>et al.</i> (2025); Jeon & Kim (2025); Sands <i>et al.</i> (2022); Sun v. (2022); Xie <i>et al.</i> (2025c)
	<i>Sub-total</i>	7	
Total		119	

Note. AI-SERV-FAIL refers to AI-driven service failure; The total theory count exceeds the article count because some articles employed multiple theories; Commitment-trust theory* is classified under *social-oriented theories* because it posits that the relationship between service providers and relational outcomes is mediated by trust in the exchange partner, and that it is through this trust that the trustor becomes committed to the relationship; Face-saving theory*, also known as politeness theory, is likewise classified under *social-oriented theories* because it focuses on how individuals manage social relationships during interactions. It explains how people strategically use politeness strategies in conversation to protect both their own “face” and that of others. In this context, “face”

refers to an individual's reputation, dignity, social standing, and honor (e.g., *mianzi* in Chinese culture); The need-threat model* is also categorized as a *social-oriented theory* because it explains how social exclusion or ostracism threatens individuals' basic social needs. Specifically, it shows that ostracism undermines relational needs (such as belonging and self-esteem) and efficacy needs (such as control and a sense of meaningful existence), which in turn motivates individuals to respond in ways aimed at restoring these needs.

Technology oriented theories. Technology-oriented theories constituted the least frequently adopted category in AI-SERV-FAIL research ($N = 3$). Unlike cognitive-, social-, and affective-oriented perspectives—which primarily examine consumers' evaluative, relational, or emotional responses to AI service failures—technology-oriented frameworks emphasize the AI system's functional alignment with task requirements and service contexts. From this perspective, AI-induced service failures are seen as structural mismatches among technological capabilities, task characteristics, and user needs, framing failure as a problem of system–task fit. Key theories in this category include task–individual–technology fit theory, the technology acceptance model, and the theory of system usage, all of which examine how technological characteristics shape user evaluations and continued use. For instance, drawing on the *task–individual–technology fit theory*, Lu and Min (2025) proposed and empirically demonstrated that the effectiveness of service recovery depends on the alignment between task type and recovery agent. Specifically, when an AI chatbot failed during a search task (e.g., providing product information), recovery handled by the chatbot itself led to higher customer satisfaction than recovery handled by a human agent. In contrast, when the failure occurred during a complaint task (e.g., reporting a post-purchase problem), recovery handled by a human agent led to greater customer satisfaction than recovery handled by the AI chatbot.

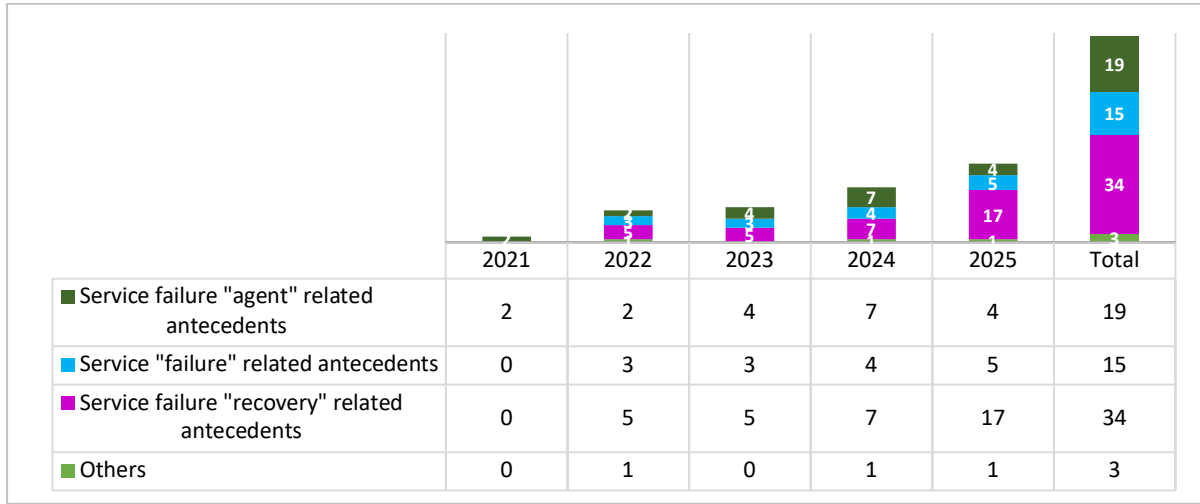
Other theories. A further group of AI-SERV-FAIL studies drew on a diverse set of theoretical perspectives to capture psychological mechanisms underlying consumers' responses to AI-related service failures ($N = 24$). Within this category, *stimulus-organism-response (SOR) theory* emerged as the most frequently applied framework ($N = 4$). In AI-SERV-FAIL research, this framework has been used to conceptualize service failure and recovery as a structured process in which AI-related cues functioned as stimuli (S), consumers' cognitive or affective evaluations represented organismic states (O), and post-failure reactions constituted behavioral responses (R). For example, Chen and Mao (2025) employed SOR theory to examine how anthropomorphic apology styles of AI voice assistants (S) influenced consumers' perceptions of warmth and competence (O), which in turn enhanced their satisfaction with the service recovery provided by the AI assistant. Beyond SOR, additional theoretical lenses have been applied, including *anthropomorphism theory* ($N = 3$), *uncanny valley theory* ($N = 3$), and *time metaphor theory* ($N = 1$). For instance, drawing on *anthropomorphism theory*, Pavone et al. (2023) demonstrated that when AI chatbots with human-like visual features caused service failures, consumers were more likely to blame the AI itself rather than the company. This occurred because anthropomorphic cues made the AI seem as if it had intentions and control over its actions, leading consumers to view it as capable of bearing responsibility. In contrast, grounded in *uncanny valley theory*, Tan et al. (2025) found that overly human-like service recovery messages generated by ChatGPT triggered feelings of discomfort and reduced perceived authenticity, which in turn led to more negative evaluations of the recovery effort.

Finally, informed by *time metaphor theory*—which suggests that people understand time as movement, either as themselves moving forward toward the future (ego-moving perspective) or as events moving toward them (event-moving perspective)—Wang & Zhang (2025) examined how different chatbot trust-repair strategies influence consumers' continuous interaction intentions in tourism service contexts. They found that ego-moving trust-repair messages were more effective than event-moving messages in enhancing consumers' intentions to continue interacting with the chatbot after a service failure. Collectively, these diverse theoretical perspectives have further enriched AI-SERV-FAIL research by illuminating the roles of environmental stimulus processing, anthropomorphic attribution, affective discomfort, and temporal framing in shaping consumers' responses to AI service failures.

TABLE 3 - Independent variables distribution in AI-SERV-FAIL studies (Content $N = 71$)

Category	Independent variable (Sample operationalization)	Count	Reference
Service failure “agent” related antecedents	Agent type		
	Human vs. AI	4	Huang & Philp (2021); Longoni <i>et al.</i> (2023); Sands <i>et al.</i> (2022); Xie v. (2025b)
	AI vs. Interactive voice response system	1	Li v. (2024)
	Agent design features and attributes		
	Anthropomorphism	1	Agnihotri & Bhattacharya (2024)
	Level (low vs. modest vs. high)	1	Liu <i>et al.</i> (2025)
	Form (without vs. with human names and avatars)	2	Lu <i>et al.</i> (2024); Yao <i>et al.</i> (2023)
	Behavior (task-oriented vs. social-oriented)	2	Huang & Senecal (2023); Lu <i>et al.</i> (2024)
	Gender (female vs. male vs. genderless)	1	Liang <i>et al.</i> (2024)
	Cuteness (low vs. high)	2	Ly <i>et al.</i> (2021); Zhang <i>et al.</i> (2022)
	Sadness (absent vs. present)	1	Zhang <i>et al.</i> (2025)
	Other attributes (reliable, responsive, empathetic)	3	Agnihotri & Bhattacharya (2024); Dandotiya v. (2024); Le v. (2023)
	Agent role framing		
	Relationship role (servant vs. partner)	1	Huang <i>et al.</i> (2025)
	<i>Sub-total</i>	19	
	Service outcome type	2	
	Success vs. Failure		
	Service failure type		
	Functional and technical failures	1	
Service “failure” related antecedents	Non-functional vs. Functional service failure	1	
	Presenteeism vs. Response delay vs. Irrelevant information	1	
	Aesthetic vs. Functional failure vs. Information failure vs. Interaction vs. System failure	1	
	Information failure vs. System failure		
	Relational and interactional failures		
	Being rejected vs. Being ignored	1	
	Failure to understand, Failure to personalize, Lack of competence, Lack of assurance	1	
	Service failure severity		
	Low vs. High	1	
	Service failure source		
	Failure origins		
	Infrastructure, scene flexibility, voice interactivity, automated decision-making, exceptional risk, conversational personalization, extended services, privacy/security, and profitability value	1	
	Responsibility attribution (agent vs. firm responsibility)	1	
	Service failure context		
	Utilitarian-dominant vs. Hedonic-dominant context	2	
	Search task vs. Complaint task	1	
	Voluntary vs. Forced AI-user interaction context	1	
	<i>Sub-total</i>	15	
Service failure	Recovery agent type		

“recovery” related antecedents	Human vs. AI	7	Fürst <i>et al.</i> (2025); Guo <i>et al.</i> (2025); Lu & Min (2025); Song <i>et al.</i> (2022); Su & Li (2025); Tan <i>et al.</i> (2025); Zhang <i>et al.</i> (2023)
	Presentation sequence (Human-AI vs. AI-human)	1	Yang & Shao (2025)
	Recovery strategy		
	Recovery approach		
	Informational recovery vs. Emotional recovery	1	Zhou & Chang (2024)
	AI’s symbolic recovery	1	Zaki & Al-Romeedy (2024)
	AI’s politeness recovery (apology vs. appreciation)	2	Song <i>et al.</i> (2023); Lv <i>et al.</i> (2022a)
	Interpretability of AI decisions (control vs. enhanced by post-hoc explanations)	1	Chen (2024)
	Recovery delivery		
	Humor (absent vs. present; affiliative vs. self-defeating humor)	3	Liu & Xu (2023); Xie <i>et al.</i> (2025c); Xu & Liu (2022)
			Fan <i>et al.</i> (2024); Fan <i>et al.</i> (2024); Guo <i>et al.</i> (2025); Haupt <i>et al.</i> (2023); Lv <i>et al.</i> (2022b); Xu <i>et al.</i> (2024)
	Empathy (low vs. high)	6	
	Cuteness (literal vs. whimsical vs. kindchenschema)	2	Chen & Mao (2025); Hu & Pan (2024)
	Warmth (low vs. high)	1	Wang <i>et al.</i> (2025)
	Emojis usage (positive/happy vs. negative/sad emojis)	1	Xie <i>et al.</i> (2025a)
	Social presence (without vs. with human profile picture)	1	Park <i>et al.</i> (2025)
	Social mindfulness of AI in recovery (low vs. high)	1	Meng <i>et al.</i> (2025a)
	Recovery process		
	Sequence (economic-emotional vs. emotional-economic)	1	Yang & Shao (2025)
	Number of compensation options offered by AI (low vs. high)	1	Park <i>et al.</i> (2025)
	Timing (immediate vs. delayed compensation)	2	Huang & Dootson (2022); Jeon & Kim (2025)
	Trust repair strategies (ego- vs. event-moving)	1	Wang & Zhang (2025)
	Recovery attributes		
	Dimensions of managerial recovery responses to AI service failures (redress, timeliness, facilitation, apology, attentiveness, credibility)	1	Koc <i>et al.</i> (2023)
	<i>Sub-total</i>	34	
Other consumer related antecedents	Customer inoculation strategy before AI service failure (control vs. full satisfaction guarantees vs. customer inoculation)	1	Meng <i>et al.</i> (2025b)
	Self-responsibility attribution for AI service failure	1	Huo <i>et al.</i> (2022)
	Perceived privacy concern toward the failing AI	1	Agnihotri & Bhattacharya (2024)
	<i>Sub-total</i>	3	



Note. AI-SERV-FAIL refers to AI-driven service failure; The *service failure "agent" related antecedents* category includes studies examining whether and how consumer responses to AI-SERV-FAIL vary based on characteristics of the service agent. The *service "failure" related antecedents* category encompasses studies that conceptualize characteristics of the failure itself—such as its type, severity, source, and contextual conditions—as key antecedents and examine how these variations systematically shape consumer perceptions and responses. The *service failure "recovery" related antecedents* category includes research on how characteristics of post-failure recovery efforts influence consumer evaluations, emotions, and behavioral responses following AI-SERV-FAIL; Finally, the *"others"* category captures additional influences that do not fit neatly into the agent-, failure-, or recovery-related domains.

FIGURE 5 - Distribution of independent variables in AI-SERV-FAIL research by publication year

No theories. Compared with the preceding AI-SERV-FAIL studies, a small subset of research ($N = 7$) did not explicitly adopt a formal theoretical framework to guide model development (e.g., Chen, 2024; Sands *et al.*, 2022; Sun *et al.*, 2022). Instead, these studies primarily employed phenomenon-driven or empirically oriented approaches to investigate AI-related service failures, developing hypotheses and research models without grounding them in a clearly articulated theoretical lens.

Theoretical summary. Overall, consumer behavior research on AI-SERV-FAIL predominantly adopted cognitive-oriented theories (31.93%), followed by social-oriented theories (27.73%) and affective-oriented theories (11.76%). Surprisingly, technology-oriented theories accounted for only a small proportion of the literature (2.52%). This distribution likely reflects the consumer-behavior focus of the reviewed studies. As a result, AI service failure has been largely conceptualized as a consumer appraisal process—similar to traditional human-delivered service failures—rather than as a technology-embedded phenomenon. In other words, scholars have primarily examined how consumers cognitively interpret failures (e.g., attribution), socially evaluate them (e.g., relational norms), and emotionally react to them (e.g., feeling upset), instead of investigating how specific technological characteristics shape the occurrence and perception of failures.

INDEPENDENT VARIABLES OF AI-SERV-FAIL STUDIES. Having identified the theoretical lenses adopted in prior research, we next examined the independent variables investigated across AI-SERV-FAIL studies. Analyzing independent variables is important because they represent the foundational explanatory factors and causal drivers that scholars theorize or experimentally manipulate to account for consumers' responses to AI service failures, including reactions to the failing agent, the failure event itself, and subsequent recovery efforts. To identify underlying patterns in how these causal factors are framed, we conducted iterative coding to develop a higher-order typology of antecedents. This process yielded four analytically distinct domains: (1) service failure agent-related antecedents, (2) service failure-related antecedents, (3) service failure recovery-related antecedents, and (4) other antecedents. This classification is grounded in the sequential logic of AI service failure episodes—who the failing agent is, what type of failure occurs, how recovery efforts are enacted, and which additional contextual or individual factors shape subsequent consumer responses. As shown in Figure 5, between 2021 and 2025, a total of 71 antecedents were identified across

the reviewed studies. The annual distribution increased steadily over time: 2021 ($N = 2$), 2022 ($N = 11$), 2023 ($N = 12$), 2024 ($N = 19$), and 2025 ($N = 27$). In terms of content, AI service failure recovery-related antecedents ($N = 34$) were the most frequently examined, followed by AI service failure agent-related antecedents ($N = 19$) and AI service failure-related antecedents ($N = 15$). Other antecedents received comparatively limited attention ($N = 3$). A closer examination of the temporal distribution reveals a clear developmental pattern. Early work in 2021 ($N = 2$) focused exclusively on service failure-related antecedents. Beginning in 2022, not only did the number of AI-SERV-FAIL studies increase substantially ($N = 11$), but the scope of examined antecedents also expanded to encompass all four categories. Notably, recovery-related antecedents became the most frequently studied category ($N = 5$), followed by failure-related antecedents ($N = 3$) and agent-related antecedents ($N = 2$). This recovery-oriented emphasis continued in 2023, alongside growing attention to agent-related antecedents. In 2024, both agent-related and recovery-related antecedents emerged as the most intensively examined categories, each showing clear growth compared to the previous year. By 2025, when the annual number of identified antecedents reached its peak ($N = 27$), the literature exhibited a pronounced concentration on recovery-related antecedents ($N = 17$).

We next provide a detailed examination of the specific antecedents within each category, proceeding in the following order: *agent*-related, *failure*-related, *recovery*-related, and *other* antecedents, drawing on the overview presented in the Appendix and the detailed coding scheme summarized in Table 3.

Service failure “agent” related antecedents. This category encompasses studies examining whether and how consumer responses to AI service failures vary depending on characteristics of the *service agent*. As shown in Table 3, the literature broadly distinguishes among three dimensions: (1) agent type, (2) agent design features and attributes, and (3) role framing. First, a substantial portion of studies investigated differences in *agent type* by contrasting AI agents with human agents to examine whether consumers responded differently when a failure was attributed to an AI versus a human employee (Huang & Philp, 2021; Longoni *et al.*, 2023; Xie *et al.*, 2025b). For example, Huang & Philp (2021) found that consumers exhibit a lower willingness to share negative word-of-mouth after service failures caused by AI recommendation systems, compared to failures caused by human employees.

Second, another substantial stream of research focused on how specific *design features and attributes of AI agents* shape consumer reactions following service failures. Frequently examined features included anthropomorphic cues (Liu *et al.*, 2025), the presence versus absence of human names and avatars (Lu *et al.*, 2024), gender presentation (e.g., male vs. female vs. genderless; Liang *et al.*, 2024), and varying levels or styles of cuteness (e.g., whimsical vs. kindchenschema cuteness; Zhang *et al.*, 2022). In addition, research on the attributes of AI agents has examined characteristics such as their reliability, responsiveness, and interactivity (Le *et al.*, 2023). Collectively, these studies demonstrated that even subtle design choices in AI representation—anthropomorphic cues (form or behavioral anthropomorphism), gender, or key attributes—could meaningfully influence consumers’ cognitive, social, and affective responses, as well as their overall post-failure evaluations.

Third, beyond structural design attributes, some studies examined how the *relational role assigned to AI agents* influences post-failure reactions. For instance, framing an AI assistant as a partner versus a servant altered consumers’ attributional processes and subsequent behavioral intentions following a service failure (Huang *et al.*, 2025).

Overall, this body of research demonstrated that consumer reactions to AI service failures extend beyond the failure event itself and are critically shaped by how the failing agent is categorized (agent type), designed (design features), and socially positioned (role framing) within the service interaction.

Service “failure” related antecedents. This category encompasses studies that conceptualize characteristics of the failure itself—such as its type, severity, source, and contextual conditions—as key antecedents and examine how these variations systematically shape consumer perceptions and responses. Broadly, the literature distinguishes among five dimensions: (1) service outcome type, (2) service failure type, (3) service failure severity, (4) service failure source, and (5) service failure context. First, a small number of studies examined whether the *outcome of an AI-driven service interaction*—specifically, success versus failure—differentially influenced consumer responses. For example, Gonçalves *et al.* (2025) showed that AI service outcomes significantly affect consumers’ emotional arousal, which in turn shapes downstream behaviors such as like/dislike responses and complaint intentions. These findings suggest that even the valence of the service outcome itself constitutes a critical antecedent in understanding consumer reactions within AI-mediated contexts. Second, the largest body of research within this category explored differences in *failure type*. These studies distinguished among various forms of AI service failures and examined how distinct failure types elicited different consumer responses. For instance, prior research differentiated between “functional” versus “non-functional” failures (Xing *et al.*, 2022) and between “information failures” versus “system failures” (Zhang *et al.*, 2024b). More fine-grained classifications further distinguished between “failure to understand (consumer input)” versus “failure to personalize (service to consumer)” (Chen *et al.*, 2024). These nuanced typologies demonstrate that not all AI service failures are perceived equivalently; rather, consumers’ cognitive attributions, emotional reactions, and subsequent behavioral intentions vary depending on the specific nature of the service breakdown. Third, *service failure severity*—typically operationalized as high versus low severity—also emerged as an important antecedent (Keating *et al.*, 2025). Higher-severity failures intensified consumers’ stress appraisal and lowered the positive word of mouth about the AI service recovery experience. Fourth, research also examined whether the *source of the service failure*—particularly whether responsibility was attributed to the AI agent itself or to the company deploying the AI system—significantly shaped consumers’ emotional responses, including anger and frustration, as well as their subsequent coping strategies (Pavone *et al.*, 2023). Finally, several studies investigated *contextual conditions* under which failures occur. These contextual factors included whether the service interaction takes place in a hedonic versus utilitarian setting (Su & Li, 2025), as well as the type of task involved (e.g., search versus complaint handling; Lu & Min, 2025). Overall, this body of research showed that consumer reactions to AI service failures are shaped not only by the presence of a failure but also by the specific characteristics of that failure—its valence, type, severity, source, and situational context.

Service failure “recovery” related antecedents. This category encompasses research examining how characteristics of post-failure recovery efforts influence consumer evaluations, emotions, and behavioral responses following AI service failures. As summarized in Table 3, the literature distinguishes between two primary dimensions: (1) recovery agent type and (2) recovery strategy. First, a substantial stream of studies investigated whether the identity of the *recovery agent* influences post-failure outcomes. Specifically, scholars compared AI-led versus human-led recovery efforts (e.g., Fürst *et al.*, 2025; Lu & Min, 2025; Zhang *et al.*, 2023), as well as different collaborative recovery sequences (e.g., human-AI vs. AI-human order; Yang & Shao, 2025). Collectively, these studies suggest that the identity and sequencing of the recovery agent play a critical role in shaping consumer forgiveness, trust repair, satisfaction restoration, and continued usage intentions. Second, an equally large body of research focused on comparing specific *recovery strategies* employed after AI service failures. These strategies varied widely and included informational versus emotional recovery responses (Zhou & Chang, 2024), appreciation versus apology framing (Song *et al.*, 2023), empathy-seeking versus solution-offering messages (Haupt *et al.*, 2023), and high versus low empathic recovery intensity (Fan *et al.*, 2024). Across these variations, scholars consistently demonstrated that the communicative framing, emotional tone, and perceived sincerity of recovery messages significantly shape consumers’ post-failure evaluations and behavioral intentions. Overall, this body of research indicated that effective AI service recovery depends not only on *who* delivers the recovery but also on *how* it is framed and communicated.

Others. The “other” category captures additional influences that do not fall neatly within agent-, failure-, or recovery-related domains. These antecedents primarily included *individual-level characteristics* that shape how consumers interpret and respond to the same AI service failure. For example, studies showed that users’ individual characteristics, including self-responsibility attribution for AI service failure (Huo *et al.*, 2022) and privacy concern toward the failing AI chatbot (Agnihotri & Bhattacharya, 2024), influenced their reactions to AI failures.

Independent variable summary. Overall, these findings highlight that consumer responses to AI service failures are contingent not only on service design and recovery efforts but also on individual differences. A full mapping and categorization of antecedents and their distribution are presented in Table 3.

PROCESS VARIABLES OF AI-SERV-FAIL STUDIES. Having examined the theoretical foundations and the independent variables of AI-SERV-FAIL research, we next examined the process variables (mediators) employed in the reviewed studies. Whereas antecedents represent the causal triggers of consumer responses, mediators capture the underlying psychological mechanisms through which these triggers translate into downstream outcomes—such as through forgiveness, trust repair, or satisfaction restoration. Examining mediators therefore provides insight into how prior research has theorized the processes linking AI service failures to consumer reactions. In rigorous, theory-driven consumer behavior and service research, mediators are not introduced post hoc or selected merely for statistical significance. Rather, they are typically specified a priori and logically derived from the theoretical framework guiding the study (Baron & Kenny, 1986). That is, the chosen theory determines the explanatory mechanism through which antecedents influence outcomes. Accordingly, mediators should reflect the core psychological or relational processes implied by the underlying theoretical perspective, rather than serving as ad hoc statistical connectors between variables. Given the theoretical distribution identified in Section 3.2.1—where cognitive-oriented theories dominated, followed by social-, affective-, and technology-oriented frameworks—we used a deductive classification approach³ to examine mediating mechanisms. All mediators reported in the sampled studies were coded according to these established theoretical categories, ensuring conceptual consistency between theoretical foundations and process-level explanations. This procedure yielded five categories of mediating mechanisms: (1) cognitive, (2) social, (3) affective, (4) technological, and (5) other mechanisms.

Cognitive mediators. As shown in the Appendix, prior AI-SERV-FAIL studies grounded in cognitive-oriented theories have examined mediating mechanisms such as *disconfirmation of expectations*, defined as the perceived discrepancy between consumers’ prior expectations and actual service performance (Castillo *et al.*, 2024), *expected responsibility*, which refers to the extent to which consumers believe the service agent should be held accountable for the failure (Yang & Shao, 2025), and *counterfactual thinking*, defined as consumers’ mental simulation of “what if” scenarios—how the service failure might have been avoided or handled differently. Using this perspective, Xie *et al.* (2025b) demonstrated that service failures caused by human employees lead to higher levels of counterfactual thinking and, in turn, lower customer satisfaction compared to failures caused by AI. This effect occurs because consumers perceive AI behavior as driven by fixed programs and algorithms, making it seem less flexible or adaptable than human behavior. As a result, they are less likely to imagine how the AI could have acted differently. Overall, these cognitive process variables suggest that prior research has primarily focused on evaluative, attributional, and inferential mental processes that explain how consumers translate AI service failure characteristics into downstream responses. Specifically, these mechanisms clarify how consumers assess expectation discrepancies, assign responsibility, mentally simulate alternative outcomes, and ultimately form judgments that shape satisfaction, forgiveness, and other post-failure reactions.

³ Unlike an inductive approach, a deductive classification approach involves applying pre-defined theories or conceptual frameworks to categorize and interpret the data (Hsieh & Shannon, 2005).

Social mediators. In contrast, studies drawing on social-oriented theories focused on mediators reflecting consumers' socially grounded perceptions and relational concerns. Frequently investigated mediators include *perceived social presence of the AI agent* (Wang et al., 2025), *social cognitions of AI*, including perceived warmth and perceived competence (Xu & Liu, 2022), and *psychological distance*, which reflects how close or distant consumers feel to the AI agent (Lv et al., 2022b). Another important mediator is *perceptions of group homogeneity*, defined as the extent to which members of a group are seen as similar and interchangeable rather than as distinct individuals. In the context of AI, Longoni et al. (2023) showed that AI systems are often perceived as more homogeneous than humans. Consequently, negative information about one AI system (e.g., a failure) is more likely to be generalized or transferred to other AI systems—a phenomenon referred to as algorithmic transference. Additional social-related mediators are summarized in the Appendix. Together, these social mediators illustrate that prior research has emphasized how consumers' relational perceptions and social categorizations shape their responses to AI service failures.

Affective mediators. Another stream of studies has examined mediators that reflect consumers' emotional reactions and affective experiences arising from AI service failures and subsequent recovery strategies. Representative mediators include diverse forms of emotional valence, such as *disappointment* (Yao et al., 2023), *anger*, and *frustration* (Pavone et al., 2023); the *intensity of specific emotions* (e.g., level of positive emotion; Liu & Xu, 2023); and *empathy experience*, referring to the degree to which consumers feel that the AI agent understands and shares their emotional state (Xie et al., 2025a; see the Appendix). Collectively, these affective mediators highlight that consumer responses to AI service failures extend beyond rational evaluations and involve meaningful emotional processes. Rather than relying solely on cognitive assessments of responsibility or expectation discrepancies, consumers undergo affective experiences that significantly shape their post-failure judgments and behaviors. These emotional processes constitute a critical psychological pathway through which AI service failures and recovery efforts influence attitudinal outcomes (e.g., liking) and behavioral outcomes (e.g., reuse intentions).

Technical mediators. Although few in number, some studies have examined mediators that capture consumers' perceptions of AI as a technological system. These include *perceived ability*, referring to consumers' evaluation of the AI chatbot's competence, knowledge, and effectiveness in delivering solutions and fulfilling its service role (Agnihotri & Bhattacharya, 2024), and *perceived convenience*, which reflects the extent to which interacting with the AI system—particularly during service recovery—is perceived as easy, efficient, and requiring minimal effort (Lu & Min, 2025). These technological mediators highlight that evaluations of the system's functional performance and technological capabilities constitute an additional explanatory pathway linking AI service failures to consumer responses.

Other mediators. Lastly, a limited number of studies have examined mediators that reflect additional psychological processes not fully captured by the preceding categories. These include *satisfaction* (i.e., the extent to which consumers are pleased with or satisfied by the AI chatbot service; Park et al., 2025) and *perceived dehumanization of oneself*, referring to consumers' perception of being treated as non-human due to AI chatbot service failures (Chen et al., 2024). These relatively underexplored mediators suggest that AI service failures may also trigger broader evaluative and self-related psychological responses that extend beyond purely cognitive, social, affective, or technological mechanisms.

MODERATOR VARIABLES OF AI-SERV-FAIL STUDIES. We further categorized the moderators examined in previous AI-SERV-FAIL studies to provide a more nuanced understanding of the factors that influence the effects of AI service failures. As shown in Table 4, our inductive content analysis revealed four key groups of moderators: (1) context-related moderators ($N = 35$), (2) service agent-related moderators ($N = 18$), (3) consumer-related moderators ($N = 11$), and (4) other moderators ($N = 2$). Below, we describe each group and present representative examples.

TABLE 4 - Moderator variables distribution by category in AI-SERV-FAIL studies (Content $N = 66$)

Category	Moderator Variable (Sample Operationalization)	Count	Reference
Context related moderators	Service failure severity (Low vs. High)	9	Castillo <i>et al.</i> (2024); Chen & Mao (2025); Liu <i>et al.</i> (2025); Lv <i>et al.</i> (2021); Sands <i>et al.</i> (2022); Wang <i>et al.</i> (2025); Xie <i>et al.</i> (2025a); Xie <i>et al.</i> (2025c); Zhang <i>et al.</i> (2022)
	Time-pressure (Low vs. High)	4	Lv <i>et al.</i> (2021); Song <i>et al.</i> (2023); Xu & Liu (2022); Zaki & Al-Romeedy (2024)
	Failure frequency (Second success vs. Second failure)	2	Haupt <i>et al.</i> (2023); Lu & Min (2025)
	Recovery strategy (Apology vs. Appreciation)	2	Fürst <i>et al.</i> (2025); Liang <i>et al.</i> (2024)
	Service failure attribution (Customer vs. Company failure)	2	Fürst <i>et al.</i> (2025); Haupt <i>et al.</i> (2023)
	Service failure type (Information vs. System)	2	Castillo <i>et al.</i> (2024); Wang & Zhang (2025)
	Task urgency (Not urgent vs. Urgent)	2	Guo <i>et al.</i> (2025); Meng <i>et al.</i> (2025a)
	Personalization (No vs. Yes)	1	Huang & Philp (2021)
	Platform type (Commercial vs. Social)	1	Peng <i>et al.</i> (2024)
	Relationship between AI and consumer (Assistant vs. Friend)	1	Zhang <i>et al.</i> (2025)
	Relationship norms (Communal vs. Exchange)	1	Hu & Pan (2024)
	Service failure sources (Algorithmic vs. Human mistakes)	1	Chen (2024)
	Service outcome (Success [no failure] vs. Failure)	1	Huang <i>et al.</i> (2025)
	Service provider's empathy level (Low vs. High)	1	Xie <i>et al.</i> (2025b)
	Service type (Service co-creation vs. Service recovery)	1	Dandotiya <i>et al.</i> (2024)
	Task criticality (Routine vs. Critical task)	1	Lu <i>et al.</i> (2024)
	Task scenarios (Practical vs. Hedonic)	1	Meng <i>et al.</i> (2025a)
	Task type (Objective vs. Subjective)	1	Chen (2024)
	Tourism type (Leisure vs. Business)	1	Wang & Zhang (2025)
	<i>Sub-total</i>	35	
Service agent related moderators	AI anthropomorphism (Cartoon-like vs. Human-like; Low vs. High)	6	Jeon & Kim (2025); Liu & Xu (2023); Pavone <i>et al.</i> (2023); Xu <i>et al.</i> (2024); Yao <i>et al.</i> (2023); Zhou & Chang (2024)
	AI's emotional response (Weak vs. Moderate vs. Strong)	2	Chen <i>et al.</i> (2024); Le <i>et al.</i> (2023)
	AI intelligence level (Low vs. High)	2	Song <i>et al.</i> (2022); Xing <i>et al.</i> (2022)
	AI embodiment (Absent vs. Present)	1	Keating <i>et al.</i> (2025)
	Agent identity (Human vs. Chatbot)	1	Pavone <i>et al.</i> (2023)
	AI chatbot-side uncertainty (i.e., disclosure, ambidexterity)	1	Fan <i>et al.</i> (2024)
	Decision-making source (AI decision fully replacing human vs. Human decision vs. AI decision under human oversight)	1	Longoni <i>et al.</i> (2023)
	Human intervention (Without vs. With)	1	Wang <i>et al.</i> (2025)
	Humor in AI's complaint handling (Without vs. With)	1	Park <i>et al.</i> (2025)
	Intelligence stage (Weak vs. Strong)	1	Chen (2024)

	Interaction modality (Text-only vs. Text and voice)	1	Lv et al. (2022b)
	<i>Sub-total</i>	18	
	Consumers' personality traits (Agreeableness, Extraversion, Gender, Conscientiousness, Neuroticism, Openness, Technology anxiety)	2	Huo et al. (2022); Zhang et al. (2022)
	Consumers' discomfort with technology	1	Longoni et al. (2023)
	Consumers' motives to utilize AI (Not salient vs. Salient)	1	Gonçalves et al. (2025)
	Consumers' need for human interaction (Low vs. High)	1	Guo et al. (2025)
Consumer related moderators	Consumers' participation level (Low vs. High)	1	Huang & Dootson (2022)
	Consumers' regulatory focus (Prevention vs. Promotion)	1	Su & Li (2025)
	Consumers' time or financial constraints (Absent vs. Present)	1	Keating et al. (2025)
	Perceived diagnosticity of lay beliefs (Low vs. High)	1	Zhang et al. (2023)
	Perceived psychological distance (Near vs. Far)	1	Xie et al. (2025b)
	Perceived trust toward the service (Low vs. High)	1	Le et al. (2023)
	<i>Sub-total</i>	11	
Other moderators	Customer inoculation (Absent vs. Present)	1	Xu & Liu (2022)
	Employee-side uncertainty	1	Fan et al. (2024)
	<i>Sub-total</i>	2	
Total		66	

Context-related moderators. These moderators encompassed a wide range of external conditions that shaped the effects of AI service failures. They included characteristics of the service failure itself, such as *failure severity* (Castillo et al., 2024; Chen & Mao, 2025), *failure frequency* (Haupt et al., 2023; Lu & Min, 2025), and *failure type* (Castillo et al., 2024; Wang & Zhang, 2025). In addition, prior research examined broader temporal- and task-related factors, including *time pressure* (low vs. high), *task urgency* (not urgent vs. urgent), *task criticality* (routine vs. critical task), and *task scenarios* (practical vs. hedonic). Another set of context-related moderators involved situational characteristics, such as *platform type* (Peng et al., 2024), *tourism type* (leisure vs. business; Wang & Zhang, 2025), and *overall service context* (service co-creation vs. service recovery; Dandotiya et al., 2024).

Service agent-related moderators. This category comprised attributes of the AI service agent that conditioned the effects of service failures and subsequent recovery efforts on consumer outcomes. Key moderators included the AI's *level and form of anthropomorphism* (Jeon & Kim, 2025; Liu & Xu, 2023; Pavone et al., 2023).

Although anthropomorphism was examined as an antecedent in many studies, other research treated it as a boundary condition that moderated the impact of AI service failures. Additional agent-related moderators included the AI's *emotional expressiveness* (weak vs. moderate vs. strong; Chen et al., 2024; Le et al., 2023) and *intelligence level* (low vs. high; Song et al., 2022; Xing et al., 2022). Further boundary conditions involved the *presence of human intervention* (Wang et al., 2025), the use of *humor* in complaint handling (Park et al., 2025), and the *interaction modality* (text-only vs. text and voice; Lv et al., 2022b). Collectively, these findings indicate that the design, functional, and expressive attributes of the AI agent conditioned consumers' responses to AI service failures.

Consumer-related moderators. This category comprised individual difference variables that conditioned consumers' responses to AI service failures and recovery efforts. Frequently examined moderators included consumers' *personality characteristics*—such as gender, openness, and technology anxiety as well as discomfort with technology (Huo et al., 2022; Longoni et al., 2023; Zhang et al., 2022). Additional motivational and attitudinal moderators included consumers' *motives to utilize AI* (not salient vs. salient; Gonçalves et al., 2025), *need for human interaction* (low vs. high; Guo et al., 2025), *regulatory focus* (prevention vs. promotion; Su & Li, 2025), and *participation level in service delivery* (low vs. high; Huang & Dootson, 2022). Furthermore, perceptual moderators—such as *perceived psychological distance* (Xie et al., 2025b) and *perceived trust toward the service* (Le et al., 2023)—influenced how consumers evaluated and responded to AI service failures. Collectively, these findings indicate that consumers' dispositional traits, motivational orientations, and subjective perceptions systematically shaped the magnitude and direction of their attitudinal and behavioral reactions to AI service failures.

Other moderators. A very small number of additional moderators were identified that did not fit neatly into the preceding categories. These included *customer inoculation* (absent vs. present; Xu & Liu, 2022) and employee-side uncertainty (Fan et al., 2024). A complete list of the 66 identified moderators is presented in Table 4.

DEPENDENT VARIABLES OF AI-SERV-FAIL STUDIES

Finally, we examined the dependent variables investigated in prior AI-SERV-FAIL research to understand how consumers respond to AI service failures and the types of outcomes these failures produce. The analysis identified four primary categories: (1) attitudinal outcome variables ($N = 47$), (2) behavioral outcome variables ($N = 43$), (3) affective outcome variables ($N = 4$), and (4) other outcome variables ($N = 2$).

Attitudinal outcome variables. As shown in Table 5, attitudinal outcomes were the most frequently examined category. Among them, *(dis)satisfaction* was by far the most commonly studied dependent variable (Chen & Mao, 2025), followed by *forgiveness* (Agnihotri & Bhattacharya, 2024), *trust* (Dandotiya et al., 2024), *tolerance* (Liu et al., 2025), and *acceptance* (Huo et al., 2022). Additional attitudinal outcomes included *attitude toward the service failure* and *(dis)like*. The prominence of attitudinal outcomes reinforces the dominance of a cognitive-evaluative perspective in the AI-SERV-FAIL literature, whereby service failures are conceptualized as judgment-eliciting events that shape consumers' assessments of both the service encounter and the service provider. In particular, the central emphasis on satisfaction and forgiveness underscores the importance of post-failure evaluation and relational repair processes in explaining consumer responses.

Behavioral outcome variables. Beyond attitudes, a substantial number of studies examined behavioral consequences of AI service failures. The most frequently investigated behavioral outcome was *(re)usage intention* (Guo et al., 2025), followed by *word of mouth* (Huang & Philp, 2021) and *(re)purchase intention* (Le et al., 2023). Other commonly examined behaviors included *complaint behavior*, *(dis)continuance*, *interaction intention*, and *loyalty*. The substantial attention devoted to behavioral outcomes highlights scholars' interest in understanding whether AI-enabled service relationships can be sustained and how long-term consumer engagement can be maintained even after an AI-driven service failure.

Affective outcome variables. Although less frequently examined, a small stream of research investigated affective outcomes. These included *emotional arousal* (Huang & Sénécal, 2023), *discrete emotional responses* (Sands et al., 2022), and *technology exhaustion* (Sun et al., 2022). The relatively limited attention to affective outcomes suggests that prior research has focused more heavily on cognitive evaluations and behavioral intentions, while emotional consequences of AI-driven service failures remain comparatively underexplored.

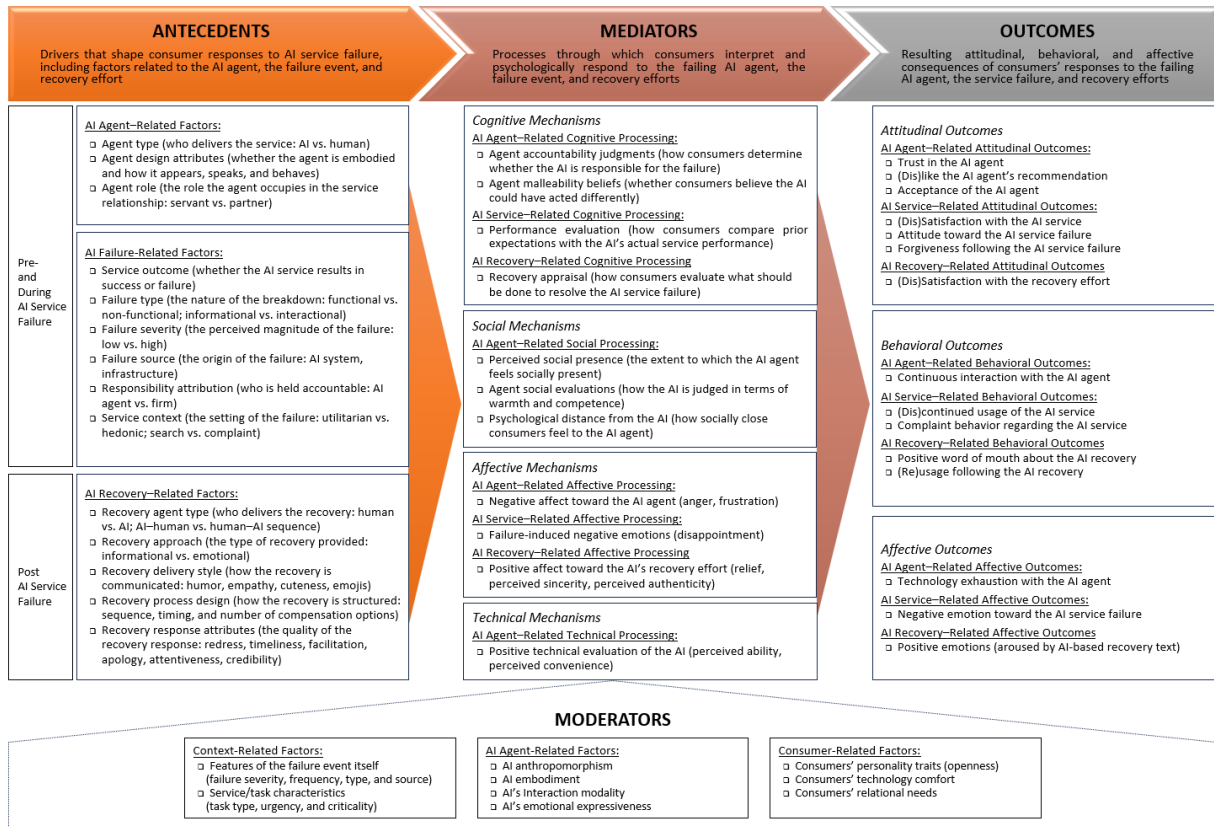


FIGURE 6 - Integrative conceptual framework of AI-SERV-FAIL research

Other outcome variables. Finally, two studies examined outcome variables that did not fit into the preceding categories: *self-control* (Pavone *et al.*, 2023) and the *transference of one brand's failure to another brand* (Longoni *et al.*, 2023). Although rare, these outcomes indicate that AI-SERV-FAIL may influence broader self-regulatory processes and spillover effects across brands. A complete list of all identified dependent variables is presented in Table 5.

Conclusions and discussion

Integrating the variables discussed above, Figure 6 presents a comprehensive conceptual framework that synthesizes the antecedents, mediators, moderators, and outcomes identified in existing AI-SERV-FAIL research. This unified model consolidates previously fragmented findings and provides a holistic view of how consumer responses to both AI-driven service failures and recovery efforts have been conceptualized. By bringing together constructs that have often been examined independently, the framework clarifies their interrelationships and offers a structured overview of the field's current knowledge base. Building on this integrative framework, we move beyond synthesis to critical reflection. While the model captures the dominant constructs and relationships examined over the past decade of AI-SERV-FAIL research, it also reveals important blind spots and underexplored dimensions. By identifying these conceptual and empirical gaps, we seek to advance the field toward greater theoretical coherence, methodological sophistication, and practical relevance. In the sections that follow, we outline several priority directions to guide the next stage of research development.

Expanding AI-SERV-FAIL Antecedents to Incorporate Ethical Concerns

Research on AI-SERV-FAIL antecedents has evolved around three primary domains: (1) AI agent-related factors, (2) AI failure-related factors, and (3) AI recovery-related factors.

AI agent-related factors. Scholars have made meaningful progress in identifying how characteristics of the AI agent shape consumer responses to service failures. These include *agent type* (e.g., AI vs. human), *agent*

design attributes (e.g., embodiment, anthropomorphic appearance, voice, and behavioral style), and *agent role* (e.g., servant vs. partner in the service relationship). Collectively, this stream of research has deepened our understanding of how the form, behavioral cues, and social positioning of AI agents influence consumer reactions in online service failure contexts.

AI failure-related factors. A substantial body of research has also examined how the nature of the failure itself shapes consumer responses. Key variables include *service outcome* (success vs. failure), *failure type* (e.g., functional vs. non-functional; informational vs. interactional), *failure severity* (low vs. high), *failure source* (e.g., AI system vs. infrastructure), *responsibility attribution* (AI agent vs. firm), and *service context* (e.g., utilitarian vs. hedonic; search vs. complaint settings). Together, these studies have clarified when and why certain failures generate stronger negative reactions.

AI recovery-related factors. A third stream of research has focused on variables related to service recovery following AI-driven failures. This body of work examines the *type of recovery agent delivering the response* (e.g., human vs. AI) as well as *sequential recovery configurations* (e.g., AI-human vs. human-AI). It also considers the *approach adopted in the recovery effort* (e.g., informational vs. emotional strategies); the *communication style* used in delivering the recovery (e.g., humor, empathy, cuteness, or the use of emojis); and the *structural design* of the recovery process (e.g., timing, sequencing, and the number of compensation options provided). Additionally, scholars have investigated the *quality attributes of the recovery response*, including redress, timeliness, facilitation, apology, attentiveness, and credibility. Collectively, these studies have provided a comprehensive understanding of how firms design and implement recovery strategies in response to AI-induced service failures in order to mitigate their negative consequences.

The missing ethical considerations. While these three streams have generated rich insights into the functional, design, and procedural drivers of AI-SERV-FAIL, comparatively limited attention has been devoted to the *ethical and normative evaluations* that increasingly shape consumer responses to AI-driven service interactions. This represents a critical omission. Specifically, prior work has not sufficiently accounted for how consumers assess whether AI systems—and the firms deploying them—adhere to fundamental ethical principles such as fairness, non-discrimination, and inclusivity. For example, as AI systems become deeply embedded in service delivery, consumers may question whether these systems are trained on sufficiently diverse datasets, whether they adequately represent racial and ethnic minorities, and whether they accommodate individuals with disabilities. Concerns regarding algorithmic bias, exclusion, and unequal treatment are no longer confined to human actors; they increasingly apply to AI agents as well.

Recent marketplace evidence underscores the urgency of this issue by highlighting instances of AI-enabled service failures rooted in ethical deficiencies. For example, widely reported news cases have revealed that certain commercial facial recognition systems exhibit significantly higher error rates for darker-skinned women compared to lighter-skinned individuals (Hardesty, 2018), representing a failure of equitable service performance. Similarly, platform-based service systems have faced public criticism for discriminatory outcomes, such as lower acceptance rates for guests with Black-sounding names in accommodation marketplaces (Cui et al., 2020), reflecting failures in fair and inclusive service access. These examples illustrate that AI-enabled service systems may reproduce or even amplify structural inequalities.

Service, at its core, is intended to create value, enhance access, and promote consumer well-being. When AI systems produce biased or exclusionary outcomes, they do not merely underperform—they violate fundamental moral expectations embedded in service relationships. Whereas functional failures may primarily trigger dissatisfaction, due to unmet performance expectations, as evidenced in our findings, ethical failures may evoke value-laden responses such as moral outrage, perceived injustice, and heightened scrutiny of corporate responsibility. Accordingly, future research should move beyond a purely performance-based view of AI-SERV-FAIL and examine the role of ethical evaluations as a distinct class

of antecedents. In particular, scholars should investigate whether and how consumers differentiate ethical from non-ethical AI service failures, the psychological mechanisms underlying these evaluations, and their broader individual and societal consequences.

Incorporating moral mechanisms in AI-SERV-FAIL mediators

As illustrated in Figure 6, research on AI-SERV-FAIL mediators has progressed along four dominant streams, reflecting the theoretical perspectives adopted in prior studies: (1) *cognitive mechanisms*, (2) *social-relational mechanisms*, (3) *affective mechanisms*, and (4) *technology-centered perceptions*. Collectively, this body of work has substantially advanced understanding of the psychological processes through which consumers interpret and respond to AI-induced service failures and recovery efforts—whether through evaluative judgments (e.g., performance appraisal), relational assessments (e.g., social presence, social closeness, and perceived warmth), emotional reactions (e.g., anger, frustration, and disappointment)—similar to patterns observed in human-induced service failures—or technology-based evaluations (e.g., perceived ability and perceived convenience).

Cognitive mediators. This stream can be further organized into three subcategories: (1) *AI agent–related cognitive processing*, (2) *AI service–related cognitive processing*, and (3) *AI recovery–related cognitive processing*. Research on “AI agent” related cognitive processing has examined mechanisms such as accountability judgments—how consumers determine whether the AI agent is responsible for the failure—and agent malleability beliefs—whether consumers believe the AI could have acted differently. Studies focusing on “AI service” related cognitive processing have explored performance evaluations, reflecting comparisons between prior expectations and the AI system’s actual service performance. Finally, work on “AI recovery” related cognitive processing has investigated recovery appraisals, referring to how consumers evaluate what should be done to resolve the AI-induced service failure.

Social mediators. While cognitive mediators span AI agent–, AI service–, and AI recovery–related processing, the social-relational stream centers primarily on consumers’ perceptions of the *AI agent* itself. This focus stems from the tendency to construe anthropomorphized AI systems as social actors rather than purely technological tools. Accordingly, identified mediators include perceived social presence (i.e., the extent to which the AI agent is experienced as socially present), social evaluations of the agent (e.g., perceived warmth), and psychological distance (i.e., the degree of perceived closeness to the AI system). These mechanisms have explained how consumers relationally interpret AI failures, particularly when AI agents are anthropomorphized or positioned as social actors within the service encounter.

Affective mediators. Similar to cognitive mechanisms, affective mediators span (1) *AI agent–*, (2) *AI service–*, and (3) *AI recovery–*related processing. Across these substreams, prior research has consistently conceptualized emotional responses as mediating mechanisms that transmit the effects of AI-induced service failures and recovery efforts to downstream outcomes. Within “AI agent” related affective processing, studies focused on negative affect directed toward the AI agent, such as anger and frustration, during or after service failure caused by AI. In “AI service” related affective processing, research highlights emotions induced by the service failure itself, particularly disappointment resulting from unmet expectations. Finally, “AI recovery” related affective processing captures emotional responses to AI’s recovery efforts, including relief, perceived sincerity, and perceived authenticity.

Technical mediators. Finally, technology-centered mechanisms have focused almost exclusively on evaluations of the *AI agent’s* technical attributes. These include perceived ability, competence, efficiency, and convenience. Such evaluations have shaped whether consumers view the AI system as capable, reliable, and functionally effective in delivering service.

TABLE 5 - Dependent variable distribution in AI-SERV-FAIL studies (Content N = 96)

Category	Dependent variable	Count	Reference
Attitudinal outcome variables	(Dis)satisfaction	21	Chen & Mao (2025); Dandotiya <i>et al.</i> (2024); Fürst <i>et al.</i> (2025); Haupt <i>et al.</i> (2023); Jeon & Kim (2025); Koc <i>et al.</i> (2023); Li <i>et al.</i> (2025b); Liang <i>et al.</i> (2024); Lu & Min (2025); Meng <i>et al.</i> (2025b); Sands <i>et al.</i> (2022); Song <i>et al.</i> (2022); Song <i>et al.</i> (2023); Sun <i>et al.</i> (2022); Tan <i>et al.</i> (2025); Xie <i>et al.</i> (2025b); Xie <i>et al.</i> (2025c); Xu <i>et al.</i> (2024); Zhang <i>et al.</i> (2022); Zhang <i>et al.</i> (2023); Zhou & Chang (2024)
	Forgiveness*	10	Agnihotri & Bhattacharya (2024); Chen (2024); Hu & Pan (2024); Lv <i>et al.</i> (2022a); Su & Li (2025); Xie <i>et al.</i> (2025a); Xie <i>et al.</i> (2025c); Xing <i>et al.</i> (2022); Yang & Shao (2025); Zaki & Al-Romeedy (2024)
	Trust	4	Dandotiya <i>et al.</i> (2024); Longoni <i>et al.</i> (2023); Meng <i>et al.</i> (2025a); Zaki & Al-Romeedy (2024)
	(Responsibility) attribution	3	Castillo <i>et al.</i> (2024); Huang <i>et al.</i> (2025); Sands <i>et al.</i> (2022)
	Tolerance	3	Liu <i>et al.</i> (2025); Lv <i>et al.</i> (2021); Xu & Liu (2022)
	Acceptance	1	Huo <i>et al.</i> (2022)
	Attitude (toward service failure)	1	Chen (2024)
	(Dis)like	1	Gonçalves <i>et al.</i> (2025)
	Expectations	1	Tan <i>et al.</i> (2025)
	Perceived severity of AI service failure	1	Chen <i>et al.</i> (2024)
	Service agents' customer orientation	1	Sands <i>et al.</i> (2022)
	<i>Sub-total</i>	47	
Behavioral outcome variables	(Re)usage	10	Guo <i>et al.</i> (2025); Haupt <i>et al.</i> (2023); Huang <i>et al.</i> (2025); Li <i>et al.</i> (2025b); Liu & Xu (2023); Lv <i>et al.</i> (2022b); Meng <i>et al.</i> (2025b); Wang <i>et al.</i> (2025); Zhang <i>et al.</i> (2024b); Zhang <i>et al.</i> (2025)
	Word of mouth	7	Agnihotri & Bhattacharya (2024); Chen (2024); Huang & Philp (2021); Keating <i>et al.</i> (2025); Le <i>et al.</i> (2023); Sands <i>et al.</i> (2022); Xie <i>et al.</i> (2025c)
	(Re)purchase	6	Chen (2024); Le <i>et al.</i> (2023); Li <i>et al.</i> (2024); Sands <i>et al.</i> (2022); Tan <i>et al.</i> (2025); Zhang <i>et al.</i> (2022)
	Complaint	2	Li <i>et al.</i> (2023); Meng <i>et al.</i> (2025b)
	(Dis)continuance	2	Peng <i>et al.</i> (2024); Sun <i>et al.</i> (2022)
	Interaction intention	2	Wang & Zhang (2025); Yao <i>et al.</i> (2023)
	Loyalty	2	Fürst <i>et al.</i> (2025); Sands <i>et al.</i> (2022)
	Active coping	1	Zhang <i>et al.</i> (2024c)
	Aggression*	1	Huang & Dootson (2022)
	Confrontive (coping)	1	Pavone <i>et al.</i> (2023)
	Consumer propensity to apply for public services	1	Longoni <i>et al.</i> (2023)
	Expressive support seeking	1	Zhang <i>et al.</i> (2024c)
	Recommendation	1	Zhang <i>et al.</i> (2022)
	Reconciliation	1	Zaki & Al-Romeedy (2024)
	(Re)patronage	1	Huang & Sénécal (2023)
	Retention	1	Fan <i>et al.</i> (2024)

	(Re)visit	1	Park <i>et al.</i> (2025)
	Switching	1	Lu <i>et al.</i> (2024)
	Withdrawal	1	Zhang <i>et al.</i> (2024c)
	<i>Sub-total</i>	43	
Affective outcome variables	Emotional arousal	2	Huang & Sénécal (2023); Tan <i>et al.</i> (2025)
	Emotion	1	Sands <i>et al.</i> (2022)
	Technology exhaustion	1	Sun <i>et al.</i> (2022)
	<i>Sub-total</i>	4	
Other outcome variables	Self-control	1	Pavone <i>et al.</i> (2023)
	Transference of one brand's failure to another	1	Longoni <i>et al.</i> (2023)
	<i>Sub-total</i>	2	

Note. AI-SERV-FAIL refers to AI-driven service failure; The total count exceeds the number of articles reviewed because some articles examined more than one dependent variable; “Forgiveness”* is classified as an attitudinal (rather than emotional) evaluation because it reflects how consumers judge the service agent, as shown in items such as: “*I would think favorably of the AI algorithm assistant*”; “Aggression”* is classified as a behavioral outcome (not affective) because it reflects consumers’ hostile actions toward the service agent, as shown in items such as: “*I would say to Morgan, the chatbot assistant, that it is stupid*”.

The missing moral mechanisms. Although AI-SERV-FAIL research has identified a wide range of mediating mechanisms—grounded in 119 theories across four main perspectives (see Table 2)—these pathways largely reflect a shared underlying assumption: service failure is primarily a breakdown in performance, relationship quality, or technological functioning. Consequently, consumer responses have been theorized mainly in terms of cognitive evaluations, relational judgments, emotional reactions, or assessments of technical adequacy.

Yet this framing may be incomplete. As AI systems increasingly shape service interactions that bear on fairness, inclusion, and distributive outcomes (Hermann *et al.*, 2024), consumer evaluations are unlikely to remain confined to questions of competence or satisfaction. Instead, they may invoke a qualitatively different evaluative lens—one centered on moral judgment. The relevant question therefore shifts from “*Did the AI system perform well?*” or “*Was the interaction socially or technically satisfactory?*” to “*Was the AI’s service right or wrong—just, fair, or ethically appropriate?*”. This moral evaluative frame reflects judgments about justice, norm adherence, and ethical appropriateness—considerations that extend beyond dissatisfaction or disappointment. Accordingly, incorporating moral mechanisms would not simply add another mediator to existing models. Instead, it would reposition AI-SERV-FAIL research within a broader ethical framework that more accurately reflects the societal stakes of contemporary AI deployment.

Extending AI-SERV-FAIL consequences to firm- and brand-level outcomes

Finally, research on AI-SERV-FAIL consequences has predominantly examined three categories of outcomes: (1) *attitudinal*, (2) *behavioral*, and (3) *affective consequences*. These outcomes have captured consumer responses directed toward the AI agent, the service experience, or the recovery effort.

Attitudinal outcomes. Attitudinal consequences can be differentiated according to the focal target of evaluation: (1) *attitudes toward the AI agent*, (2) *attitudes toward the AI service failure*, and (3) *attitudes toward the AI recovery effort*. Attitudes toward the “AI agent” included *trust* in the AI, *liking* of the agent, and *acceptance* of the AI as a service provider. Attitudes toward the “AI service or service failure” captured evaluations of the service experience itself, including *dissatisfaction* with the AI-delivered service failure and *forgiveness* following AI-induced failures. Finally, attitudes toward the “AI recovery effort” reflected evaluations of corrective actions, typically assessed through *satisfaction* with the recovery.

Behavioral outcomes. Behavioral consequences have similarly varied by evaluative target, including (1) the *AI agent*, (2) the *AI service failure*, and (3) the *AI recovery effort*. Behavioral responses toward the “AI agent” included intentions to *continue interacting* with the AI system. Behavioral responses toward the “AI service failure” included *continued or discontinued usage* and *complaint behavior*. Behavioral responses toward the “recovery effort” included *positive word-of-mouth* following recovery and intentions to *reuse the service* after corrective action. Overall, these outcomes reflected whether consumers maintained, reduced, or terminated their engagement with the AI system and the service following failure and recovery experiences.

Affective outcomes. Affective consequences have likewise spanned the same three evaluative targets: (1) the *AI agent*, (2) the *AI service failure*, and (3) the *AI recovery effort*. “AI agent” related affect included emotions such as *technology exhaustion* with the AI agent. “AI service” related affect included *negative emotions* toward the AI’s service failure event. “AI recovery” related affect included positive emotional responses elicited by recovery efforts.

The missing firm- and brand-level consequences. Despite this extensive examination of consumer responses toward the AI agent, the service failure, and the recovery effort, prior research has remained largely confined to the immediate service encounter. Specifically, it has not sufficiently examined whether AI-induced service failures spill over to influence evaluations of the firm and its brand. This omission is theoretically consequential. AI systems and agents operate as extensions of the organization and function as brand representatives in customer interactions (Bergner et al., 2023). When failures occur—particularly those involving ethical concerns—consumers may attribute responsibility beyond the technological interface to the firm that designed, deployed, and governs the system. As a result, negative reactions may generalize to the firm or brand level, undermining brand trust, perceived corporate integrity, brand equity, and brand loyalty, thereby transforming transactional dissatisfaction into broader reputational damage.

Extending AI-SERV-FAIL research to firm- and brand-level outcomes is therefore imperative. Such an extension can reorient the theoretical lens from a narrow, encounter-level focus toward a broader examination of organizational accountability and brand-level consequences. This reframing positions AI service failures not merely as discrete service breakdowns, but as events with the potential to erode firm value and reputational capital. Accordingly, we encourage future researchers to systematically examine the spillover effects of AI-induced service failures on firm- and brand-level outcomes, as well as the conditions under which such spillovers are amplified or mitigated. By doing so, future research can advance more robust theorizing on AI governance, reputational risk, and crisis management in AI-enabled service environments.

Limitations

Despite its rigorous design and systematic execution, this review is not without limitations. First, although the use of strict inclusion and exclusion criteria ensured a focused and high-quality sample—specifically by restricting the review to AJG- and SSCI-indexed journals—this approach may have excluded relevant insights, including emerging findings and applied perspectives published in non-indexed journals or practitioner-oriented outlets. Future reviews could therefore broaden the range of included sources to develop a more comprehensive and nuanced understanding of AI-SERV-FAIL phenomena. Second, this review primarily focused on consumer responses to AI-induced service failures. As a result, it did not systematically integrate the technical or system-level origins of AI failures, such as algorithmic design flaws, data biases, infrastructure limitations, or governance structures. This separation may limit the ability to fully connect consumer-level consequences with the technological and organizational causes that give rise to AI-induced service failures in the first place.

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APPENDIX - Comprehensive overview of key theories and variables examined in the AI-SERV-FAIL studies (Article N = 63)

Reference	Research Context (<i>Industry/AI/Service Context</i>)	Research Method	Theory	Independent Variable	Process Variable
Huang & Philp (2021)	- Tourism/Travel; Hospitality; Finance - AI recommendation system - Service failure agent (Type)	Quantitative Experiment	N/A	- Service failure agent - Human vs. AI	Self-AI connection
Lv <i>et al.</i> (2021)	- Hospitality - AI assistant - Service failure agent (Characteristics)	Quantitative Experiment	Information processing theory	- Cuteness of failing AI assistant - Low vs. High	- Tenderness - Performance expectancy
Huang & Dootson (2022)	- Retail - AI chatbot - Service failure recovery (Strategy: Disclosure time)	Quantitative Experiment	Stress and coping theory	- Disclosure time of human assistance in AI service failure - Early vs. Late	- Emotion-focused coping - Problem-focused coping
Huo <i>et al.</i> (2022)	- Healthcare - AI doctor - Others (User-related)	Quantitative Survey	- Attribution theory - The big five model	Patients' self-responsibility attribution for AI service failure	Trust
Lv <i>et al.</i> (2022a)	- Tourism/Travel; Hospitality - AI chatbot system - Service failure (Type) & Service failure recovery (Strategy: Message framing)	Quantitative Experiment	The need-threat model	- Service failure type of AI ↳ Being rejected vs. Being ignored - Communication recovery strategies of failing AI chatbot - Apology vs. Gratitude	- Relational needs - Efficacy needs
Lv <i>et al.</i> (2022b)	- Tourism/Travel; Hospitality - AI service system - Service failure recovery (Strategy: Empathy level)	Quantitative Experiment	Social response theory	- Empathic recovery response of failing AI chatbots - Low vs. High	- Psychological distance - Trust
Sands <i>et al.</i> (2022)	- Retail; Finance - AI virtual service agent - Service failure agent (Type)	Quantitative Experiment	N/A	- Service failure agent - Human vs. Virtual	N/A
Song <i>et al.</i> (2022)	- Tourism/Travel; Hospitality; Retail - AI chatbot - Service failure	Quantitative Experiment	Social response theory	- Recovery agent type - Human vs. AI recovery	- Perceived value of service ↳ Perceived functional

	recovery (Agent type)				value
					└ Perceived experience value
					Perceived privacy risk
Sun et al. (2022)	- N/A - AI personal assistant - Service failure (Type)	Quantitative Survey	N/A	- Service failure type └ Functional service failure (presenteeism) └ System service failure (response delay) - Information service failure (irrelevant information)	- Invasion of privacy - IT control - Self-disclosure - Information overload - Cognitive overload
Xing et al. (2022)	- Retail - AI chatbot - Service failure (Type)	Quantitative Survey	- Mental accounting theory - Role congruity theory	- Service failure type - Non-functional vs. Functional service failure	- Robot service recovery - Human service recovery - Perceived governance └ Perceived justice └ Perceived privacy protection - Perceived friendliness
Xu & Liu (2022)	- Tourism/Travel; Hospitality - AI agent/assistant - Service failure recovery (Strategy: Use of humor)	Quantitative Experiment	- Social exchange theory - Stereotype content model	- Humorous recovery response of the failing AI agent - Absent vs. Present	- Perceived warmth - Perceived competence
Zhang et al. (2022)	- Retail - AI chatbot - Service failure agent (Characteristics)	Quantitative Experiment	- Gender schema theory - Information processing theory - Technology acceptance model	- Acting-cute strategies of the failing AI chatbot - Whimsical vs. Kindchenschema strategy	Negative emotion
Haupt et al. (2023)	- Retail - AI chatbot - Service failure recovery (Strategy: Message framing)	Quantitative Experiment	- Attribution theory - Stereotype content model	- Recovery message type - Control vs. Empathy-seeking message vs. Solution-offering message	- Social cognitions └ Perceived warmth - Perceived competence
Huang & Senecal (2023)	- Hospitality - AI voice assistant - Service failure agent ((Warmth)	Quantitative Experiment	- Computers as social actors theory - Stereotype content model	Warmth communication mode of the failing AI agent	Frustration

	communication mode)			Verbal warmth vs. Verbal × vocal warmth	
Koc et al. (2023)	• Tourism/Travel; Hospitality • ChatGPT Service failure recovery (Strategy)	• Mixed methods: Expert evaluation Survey	Justice theory	• Dimensions of managerial recovery responses to AI service failures └ Redress └ Timeliness └ Facilitation └ Apology └ Attentiveness - Credibility	• Perceived justice dimensions └ Distributive └ Procedural - Interactional
Le et al. (2023)	• Retail • AI virtual service assistant - Service failure agent (Characteristics)	• Mixed methods: Experiment Survey	• Anthropomorphism theory • Emotional intelligence theory • AI quality confirmation model • Commitment-trust theory - Theory of AI personality	• Attributes of a failing AI agent └ Understandable └ Reliable └ Responsive └ Guaranteed └ Interactive - Empathetic	Customer satisfaction with the service
Li et al. (2023)	• Telecommunication • AI conversational agent - Service failure (Outcome type)	Observational	• Stress theory	• AI service outcome Success (no failure) vs. Failure	Customer emotion
Liu & Xu (2023)	• Tourism/Travel; Hospitality • AI agent - Service failure (Context) & Service failure recovery (Strategy: Use of humor)	• Quantitative Experiment	• Benign violation theory - Expectancy disconfirmation theory	• Service failure context └ Utilitarian-dominant vs. Hedonic-dominant • AI's humor recovery response for its service failure - Self-deprecating vs. Self-enhancing	• Positive emotion - Inferred negative motives
Longoni et al. (2023)	• Public service • AI algorithm/system - Service failure agent (Type)	• Quantitative Experiment	Social identity theory	• Service failure agent - Human vs. AI	• Perceptions of group homogeneity - Inferential judgment
Pavone et al. (2023)	• Tourism/Travel • AI chatbot - Service failure (Responsibility attribution)	• Quantitative Experiment	• Anthropomorphism theory • Attribution theory - Cognitive appraisal theory	• Responsibility attribution in AI service failure - Agent responsibility vs. Company responsibility	• Anger - Frustration
Song et al. (2023)	• Tourism/Travel; Hospitality; Retail • AI chatbot - Service failure recovery (Strategy:	• Quantitative Experiment	• Face-saving theory - Politeness theory	• AI's politeness recovery strategies following its service failure - Apology vs. Appreciation	Face concern

	Message framing)				
Yao <i>et al.</i> (2023)	• Tourism/Travel; Retail • AI intelligent customer service avatar Service failure agent (Anthropomorphic traits)	• Quantitative Experiment	• Expectancy (dis)confirmation theory • Stereotype content model	• Anthropomorphic image of the failing AI agent • Warmth vs. Competence	• Expectation Disappointment
Zhang <i>et al.</i> (2023)	• Tourism/Travel; Hospitality • AI chatbot Service failure recovery (Agent type)	• Quantitative Experiment	• Emotional competence theory • Lay belief theory	• Recovery agent type • Human vs. Chatbot	• Perceived naturalness • Perceived sincerity
Agnihotri & Bhattacharya (2024)	• Retail • AI chatbot Service failure agent (Anthropomorphic traits; Characteristics) & Others (User-related)	• Mixed methods: └ Interview • Survey	Computers as social actors theory	• Anthropomorphism of the failing AI chatbot • Perceived privacy concern toward the failing AI chatbot • Perceived empathy of the failing AI chatbot	• Perceived trustworthiness • Perceived ability • Perceived benevolence • Perceived integrity
Castillo <i>et al.</i> (2024)	• Hospitality; Finance; Streaming • AI chatbot Service failure (Type of user-AI interaction)	• Mixed methods: └ Interview • Experiment	• Affordance theory • Expectancy (dis)confirmation theory	• Type of user-AI interaction in AI service failure • Voluntary vs. Forced	Disconfirmation of expectations
Chen (2024)	• Retail; Healthcare; Public service • AI algorithm Service failure recovery (Others)	• Quantitative Experiment	N/A	• Interpretability of AI decisions • Control vs. Enhanced by post-hoc explanations	Blame attribution
Chen <i>et al.</i> (2024)	• Tourism/Travel; Hospitality; Retail; Healthcare; Finance • AI chatbot Service failure (Type)	• Mixed methods: └ Interview └ Survey • Experiment	Dehumanization theory	• AI service failure type └ Failure to understand └ Failure to personalize └ Lack of competence • Lack of assurance	• Consumer perceived dehumanization └ Dehumanization of human nature • Dehumanization of human uniqueness
Dandotiya <i>et al.</i> (2024)	• Tourism/Travel • AI virtual service assistant Service failure agent (Characteristics)	• Mixed methods: └ Experiment • Survey	Stereotype content model	• Service quality dimensions of a failing AI agent └ Assurance └ Interactivity └ Reliability └ Responsiveness • Understandability	• Perceived warmth • Perceived competence
Fan <i>et al.</i> (2024)	• Hospitality • AI chatbot Service failure recovery (Agent type; Strategy: Empathy)	• Mixed methods: └ Experiment • Survey	• Expectancy (dis)confirmation theory • Information processing theory	• Empathic recovery response source └ AI vs. Human • Empathic recovery response extent	N/A

	level)			Low vs. High	
Hu & Pan (2024)	• N/A • AI conversational agent - Service failure recovery (Strategy: Message framing)	• Quantitative Experiment	• Mind perception theory • Social relationship theory - Stimulus-organism-response theory	• AI service failure recovery language - Literal vs. Whimsical vs. Kindchenschema cuteness	• Perceived warmth - Perceived competence
Li et al. (2024)	• Tourism/Travel • AI agent - Service failure agent (Type)	• Observational	Attribution theory	• Service failure agent type - AI vs. Interactive voice response system	Customer involvement
Liang et al. (2024)	• Hospitality; Retail • AI chatbot - Service failure agent (Gender)	• Quantitative Experiment	Gender stereotypes theory	• Gender of the failing AI chatbot - Female vs. Male vs. Genderless	Perceived empathy
Lu et al. (2024)	• Retail • AI chatbot - Service failure agent (Anthropomorphism traits)	• Mixed methods: └ Interview └ Experiment - Survey	• Computers as social actors theory • Expectation theory - Media naturalness theory	• Form anthropomorphism (appearance) in a failing AI chatbot └ Without vs. With human names and avatars • Behavioral anthropomorphism (communication style) in a failing AI chatbot - Task oriented vs. Social oriented	• Functional service recovery expectation - Emotional service recovery expectation
Ozuem et al. (2024)	• Retail • AI chatbot - N/A	• Qualitative Interview	Frustration–aggression theory	• Based on 47 in-depth interviews with millennials from four countries (the United States, France, Italy, and the United Kingdom), and using thematic analysis, the study yields two key findings: └ First, the study uncovers the dynamic processes underlying customer-chatbot interactions during service recovery, including: (1) customers' priorities in the recovery process and (2) customers' expectations of chatbots in service contexts. - Second, the study develops a chatbot-led service failure recovery typology, identifying four distinct customer types based on their interactions with chatbots, their emotional responses (i.e., frustration and aggression), and the effects of these interactions on brand loyalty and intentions to use chatbots: (1) Greenness, (2) Aesthetic Appreciators, (3) Connoisseurs, and (4) Groundspeeders.	
Peng et al. (2024)	• Streaming • AI streamer - Service failure (Type)	• Quantitative Survey	• Expectancy (dis)confirmation theory - Stressor-strain-outcome framework	• AI-oriented live streaming service failure type └ Aesthetic failure └ Functional failure	• Disappointment - Emotional exhaustion

				- Information failure - Interaction failure	
				System failure	
Xu <i>et al.</i> (2024)	- Tourism/Travel; Hospitality - AI agent Service failure recovery (Strategy: Empathic accuracy level)	Quantitative Experiment	Mind perception theory	- Empathic accuracy in AI service failure recovery - Low vs. High	- Perceived experience - Perceived agency
Zaki & Al-Romeedy (2024)	- Tourism/Travel; Hospitality - AI chatbot Service failure recovery	Quantitative Survey	Stimulus-organism-response theory	AI's symbolic recovery	Customer empathy
Zhang <i>et al.</i> (2024b)	- Healthcare - AI chatbot Service failure (Type)	- Mixed methods: - Interview - Experiment - Survey	Attribution theory	- AI service failure type - Information failure - System failure	- Functional experiences - Emotional experiences - Trust Satisfaction
Zhang <i>et al.</i> (2024c)	- N/A - AI chatbot N/A	Qualitative Interview	Stress and coping theory	- Based on 23 in-depth interviews conducted in the United Kingdom, and using thematic analysis, the study yields three key findings: - First, the study identifies common areas in which chatbots fail to meet user expectations, leading to service failures, including chatbots' inability to comprehend user needs and provide accurate information, excessive requests for personal or sensitive information, inauthentic displays of humanity, poor integration with human agents, and limited capability to resolve complex user queries. - Second, the study reveals users' emotional responses to chatbot-induced service failures, including anger, frustration, feelings of betrayal, and passive defeat. - Third, the study uncovers four coping strategies adopted by users following chatbot-induced service failures: (1) expressive support seeking, (2) active coping, (3) acceptance, and (4) withdrawal.	
Zhou & Chang (2024)	- Tourism/Travel - AI chatbot Service failure recovery (Strategy: Message framing)	Quantitative Experiment	- Social support theory - Stereotype content model	- Strategies of AI self-initiated recovery - Informational self-recovery vs. Emotional self-recovery	- Perceived warmth - Perceived competence
Chen & Mao (2025)	- N/A - AI voice assistant Service failure	Quantitative Experiment	- Social cognitive theory - Stimulus-organism-	AI's anthropomorphic apology styles	- Perceived warmth - Perceived

	recovery (Strategy: Anthropomorphic apology styles)		response theory	following service failure Literal vs. Cute	competence
Fürst <i>et al.</i> (2025)	- Healthcare; Finance - AI virtual agent Service failure recovery (Agent type)	Quantitative Experiment	Trust theory	- Service recovery agent type - Human vs. AI	- Perceived competence - Perceived benevolence - Perceived integrity - Perceived trustworthiness
Gonçalves <i>et al.</i> (2025)	- Streaming - AI recommendation/classification system Service failure (Outcome type)	Mixed methods: Interview Experiment	Identity-based motivation framework	- Type of AI service outcome - Success (no failure) vs. Failure	- Consumer self-identification - Consumer emotional arousal
Guo <i>et al.</i> (2025)	- Tourism/Travel - AI chatbot Service failure recovery (Agent type, Strategy: Empathy level)	Quantitative Experiment	Theory of system usage	- Service failure recovery agent type - Human vs. AI - Empathy level in AI recovery responses to service failure - Low vs. High	N/A
Huang <i>et al.</i> (2025)	- Hospitality - AI virtual assistant Service failure agent (Role)	Quantitative Experiment	N/A	- Relationship role of AI - Servant vs. Partner	- Self-expansion - Self-efficacy
Jeon & Kim (2025)	- Hospitality; Retail - AI chatbot Service failure recovery (Strategy: Compensation timing)	Quantitative Experiment	N/A	- Type of compensation for AI service failure - Immediate vs. Delayed	Anger
Keating <i>et al.</i> (2025)	- Tourism/Travel; Retail - AI chatbot Service failure (Severity)	Mixed methods: Experiment Survey	- Anthropomorphism theory - Conservation of resources theory - Stereotype content model - Stress and coping theory	- Severity of service failure in AI-led service recovery - Low vs. High	Customer stress appraisal
Li <i>et al.</i> (2025b)	- N/A - AI voice assistant Service failure (Source type)	Mixed methods: Observational Interview Survey	- Congruity theory - Norm orientation theory - Situational crisis communication theory	- AI service failure sources - Infrastructure - Scene flexibility - Voice interactivity - Automated decision making - Exceptional risk - Conversation personalization - Extended services - Privacy security - Profitability value	- Failure features - Scenario failure - Personalization failure - Value failure - Remedial strategy - Reconstruction strategy - Reduction strategy - Reinforcement strategy
Liu <i>et al.</i>	Hospitality	Quantitative	Cognitive appraisal	Level of	Likability

(2025)	- AI agent - Service failure agent (Anthropomorphic traits)	Experiment	- theory - Uncanny valley theory	- anthropomorphism in a failing AI agent - Low vs. Modest vs. High	
Lu & Min (2025)	- Retail - AI chatbot - Service failure recovery (Agent type) & Service failure (Failure task type)	- Mixed methods: - Interview - Experiment	- Mental accounting theory - Task-individual-technology fit theory	- Service failure recovery agent type - Human vs. Chatbot - Type of task involved in the AI service failure - Search task vs. Complaint task	- Perceived convenience - Perceived empathy
Meng <i>et al.</i> (2025a)	- Hospitality - AI intelligent customer service - Service failure recovery (Strategy: Social mindfulness level)	Quantitative Experiment	- Control theory - Interdependence theory - Resource risk interaction theory - Theory of mindfulness	- Social mindfulness of AI in service recovery - Low vs. High	- Perception of social mindfulness - Perceived risks - Relationship-based self-esteem
Meng <i>et al.</i> (2025b)	- Hospitality - AI chatbot - Others (Customer-related)	- Mixed methods: - Experiment - Survey	- Construal level theory - Inoculation theory - Psychological distance theory	- Customer inoculation strategy before AI service failure - Control vs. Full satisfaction guarantees vs. Customer inoculation	Psychological distance
Ozuem <i>et al.</i> (2025)	- Retail - AI chatbot - N/A	Qualitative Interview	- Frustration–aggression theory - Signaling theory	- Based on 52 in-depth interviews conducted with participants from the United States, France, Italy, and the United Kingdom, and using thematic analysis, the study yields two key findings: - First, the study elucidates the dynamic processes unfolding between customers and chatbots during the service recovery journey, including customers’ priorities and expectations of chatbot-led service recovery. - Second, the study delineates three customer typologies based on customers’ interactions with chatbots during chatbot-led service failure recovery and their associated emotional responses: (1) devotees, (2) skeptics, and (3) dismissers.	
Park <i>et al.</i> (2025)	- Hospitality - AI chatbot - Service failure recovery (Strategy: Number of compensation options; Agent characteristics: Social presence)	Quantitative Experiment	Justice theory	- Recovery strategies following AI service failure - Consumer perceived control (through the number of compensation options offered by AI): Low vs. High - Social presence of	Satisfaction

				AI: Without vs. With (human profile picture)	
Su & Li (2025)	• Tourism/Travel; Hospitality • AI agent Service failure recovery (Agent type) & Service failure (Shopping context)	• Quantitative Experiment	• Expectancy (dis)confirmation theory • Regulatory focus theory	• Type of service failure recovery agent • Human vs. AI • Type of shopping context in service failure • Utilitarian vs. Hedonic	Disappointment
Tan et al. (2025)	• Tourism/Travel; Hospitality • AI chatbot Service failure recovery (Agent type)	• Mixed methods: Interview Experiment	• Expectations violation theory • Mind perception theory • Uncanny valley theory	• Type of service failure recovery agent • Human text vs. AI text	• Perceived authenticity • Uncanniness
Wang & Zhang (2025)	• Tourism/Travel; Hospitality • AI chatbot Service failure recovery (Strategy)	• Quantitative Experiment	• Congruity theory • Time metaphor theory • Trust theory	• AI's trust repair strategies following its service failure • Ego-moving vs. Event-moving	Trust toward AI
Wang et al. (2025)	• Hospitality; Retail • AI agent Service failure recovery (Strategy: Warmth level)	• Quantitative Experiment	• Cognitive appraisal theory • Social presence theory	• Warmth level of AI recovery responses to service failure • Low vs. High	Social presence
Xie et al. (2025a)	• Tourism/Travel; Hospitality; Retail • AI chatbot Service failure recovery (Strategy: Emoji valence)	• Quantitative Experiment	• Cognitive appraisal theory • Communication accommodation theory • Emotional contagion theory • Schema congruity theory	• Emojis used when AI apologizes for its service failure • Positive emojis vs. Negative emojis	• Perceived ambiguity • Perceived empathy
Xie et al. (2025b)	• Retail • AI customer service Service failure agent (Type)	• Quantitative Experiment	• Construal level theory • Stimulus-organism-response theory • Functional theory of counterfactual thinking • Uncanny valley theory	• Service failure agent • Human vs. AI	Counterfactual thinking
Xie et al. (2025c)	• Tourism/Travel; Hospitality; Retail • AI conversational agent Service failure recovery (Strategy: Type of humor)	• Quantitative Experiment	N/A	• Type of humor used by AI in service failure recovery • Affiliative humor vs. Self-defeating humor	• Positive emotion • Relief
Yang & Shao (2025)	• Hospitality • AI customer service agent Service failure	• Quantitative Experiment	• Information processing theory • Role congruity theory	• Human-AI collaborative recovery sequence • Human-AI vs.	• Emotional empathy • Expected responsibility

	recovery (Recovery agent sequence; Recovery strategy sequence)			AI-human	
				• Service failure recovery strategy sequence	
				Economic-emotional vs. Emotional-economic	
Zhang <i>et al.</i> (2025)	• Tourism/Travel; Hospitality; Retail	• Mixed methods: Experiment	• Affective coherence theory	• Sadness expression by a failing AI agent	• Perceived sincerity
	• AI chatbot	Single-paper	• Emotional congruence theory	Absent vs. Present	Perceived competence
	Service failure agent (Emotional expression)	meta-analysis	• Emotions as social information model		
			• Parasocial relationship theory		
			Social cognitive theory		



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Perceived omnichannel integration and consumer outcomes: the moderating role of omnichannel journeys

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Abstract. As the availability of digital technologies increases in retailing environments, consumers increasingly engage in complex omnichannel journeys that involve multiple physical and digital touchpoints. While firms invest heavily in channel integration to enhance the customer experience and downstream outcomes, understanding how this integration translates into experience and behavior across heterogeneous journey configurations remains a relevant theoretical and managerial gap. Drawing on the Stimulus–Organism–Response Model, we adopt a survey-based design to explore these issues. We collected data from 480 consumers engaged in omnichannel purchasing across personal lifestyle categories. Then, we applied Latent Class Analysis to identify distinct journey configurations based on channel–action usage, and PLS-SEM with multigroup analysis to test the structural relationships. The results confirm a robust S-O-R mechanism: perceived integration enhances the customer experience, which in turn drives advocacy. However, findings reveal a systematic asymmetry: journey configurations moderate how integration translates into experience, but not how experience translates into advocacy. Specifically, the integration–experience link is strongest in digitally integrated exploratory journeys and weaker in more sequential or functionally structured journeys, whereas the experience–advocacy relationship remains stable across configurations. At the end, we discuss the theoretical and managerial implications of our findings.

Keywords: Omnichannel integration; customer experience; advocacy; latent class analysis; journey types

Introduction

The expansion of digital technologies has transformed the customer experience in retailing, leading to complex omnichannel journeys across physical, digital, and social touchpoints. Accordingly, recent research demonstrates that consumers shape global experiences by using multiple channels throughout the purchase journey, rather than interacting with isolated channels (Gao *et al.*, 2021; Sands *et al.*, 2016; Zheng & Li, 2024). This shift led scholars to advise retailers to invest in omnichannel integration strategies to deliver seamless customer experiences, expecting improved experiential interactions and downstream relational outcomes (Rahman *et al.*, 2025). Nevertheless, empirical and theoretical knowledge on how consumers enact channel configurations and when such configurations translate into meaningful experiential and behavioral outcomes remains scarce and fragmented (Muthaffar *et al.*, 2024). Retailing literature emphasizes that value creation in omnichannel is deeply heterogeneous, as it differs across consumers, contexts, and journey

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configurations (Hajdas *et al.*, 2022; Van Nguyen *et al.*, 2024). Moreover, research on customer journey management calls for a configurational and segment-sensitive approach (Zheng & Li, 2024), as evidence indicates that consumers follow distinct journey patterns rather than a single dominant path.

Despite this growing consensus, most empirical models continue to assume homogeneous effects of omnichannel strategies across consumers. In theoretical and practical terms, this assumption is problematic because it ignores how consumers configure and navigate their journeys and presumes that similar integration efforts trigger equivalent experiential and behavioral responses. By bundling different journey configurations into average effects, prior research neglects journey-specific mechanisms through which omnichannel strategies generate or fail to generate value. Specifically, these models may systematically misrepresent the role of customer experience by treating it as a universal value engine in omnichannel environments rather than recognizing that its translation into downstream outcomes is structurally shaped by the architecture of consumer journeys.

This misrepresentation becomes especially salient when examining post-experience outcomes such as advocacy, which is unlikely to emerge uniformly across heterogeneous journey configurations as it entails social signaling, reputational exposure, and perceived risk (Bourdeau *et al.*, 2024). As a result, existing omnichannel research offers limited theoretical insight into how experiential outcomes stemming from omnichannel integration become advocacy, leaving a critical gap in understanding the structural mechanisms through which omnichannel strategies produce relational returns across diverse journey configurations. Guided by these ideas, this study asks:

RQ: How is the experiential pathway from omnichannel integration to advocacy embedded within distinct omnichannel journey configurations?

To address this question, we adopt a journey-centric perspective rooted in the stimulus-organism-response (S-O-R) framework to identify empirically grounded omnichannel journey profiles and examine how structural relationships differ across them. In this way, this study makes three contributions. First, it advances omnichannel and customer journey research by demonstrating that the effects of omnichannel integration are embedded in distinct journey-based experience-formation processes, rather than producing uniform experiential outcomes. In doing so, the study highlights the role of behavioral channel enactment in shaping the meaningfulness of channel integration in creating experiences. Second, it refines customer experience theory by clarifying its role within omnichannel settings. While prior research often treats customer experience as a universal mechanism, our findings indicate that its behavioral consequences remain stable, although its formation varies across journeys. This shifts attention from how experience drives outcomes to how it is differentially developed and created within complex, multi-channel environments. Finally, it advances our understanding of advocacy as a relational outcome of omnichannel strategies by positioning it as a consistent response derived once customer experience is delivered/formed, rather than a structurally differentiated outcome across journeys. Together, our contributions indicate that the variability in omnichannel effectiveness lies not in the conversion of experience into advocacy, but in the extent to which integration is translated into experience in the first place.

Theory background and hypotheses development

Omnichannel integration as an environmental stimulus

The Stimulus-Organism-Response (SOR) framework is widely used to explain how external environmental cues (stimuli) influence internal psychological states (organism), which, in turn, drive behavioral responses (responses) (Mehrabian & Russell, 1974). In retailing literature, this framework enlightens how structural features of the consumption environment shape consumer evaluations and actions. In omnichannel retailing, perceived channel integration is a salient stimulus that affects individuals' internal states (Gao *et al.*,

2021). Integration creates a coherent shopping environment by ensuring seamless flow of information, uniformity in promotions, product and price consistency, unified service policies, and smooth transitions across channels (Gao *et al.*, 2021; Zhang *et al.*, 2018). By reducing fragmentation between touchpoints, integration reshapes the structural properties of the retail environment and enhances perceived continuity across interactions (Prassida & Hsu, 2022).

Customer experience as an organismic state

The “organism” estate refers to the internal state encompassing emotions, thoughts, and perceptions, triggered by brand “stimuli” (Prassida & Hsu, 2022). The literature shows that customers engage in a continuous evaluation of their interactions with shopping environments, evaluations and responses that are key components of the customer experience in omnichannel settings (Gao *et al.*, 2021; Klaus & Maklan, 2013). Thus, customer experience, defined as the customer’s cognitive and affective assessment of all direct and indirect encounters with a firm in a purchasing context (Klaus & Maklan, 2013; Lemon & Verhoef, 2016; Siqueira *et al.*, 2020), emerges as the organismic state within the SOR sequence. For example, integration between online and offline channels removes consumer constraints on shopping integration and makes the retail environment more consistent and predictable. When channels are coordinated, and transitions between them are seamless, consumers form perceptions of coherence and control over the shopping process, develop cognitive assessments of convenience and reliability, and experience affective reactions such as reassurance or reduced frustration. As channel boundaries become less salient, fluidity across touchpoints increases, thereby strengthening experiential evaluations (Zhang *et al.*, 2018). Accordingly, we hypothesize:

H1: Perceived omnichannel integration positively affects customer experience.

Advocacy as a behavioral response to customer experience

In the SOR model, the “response” component refers to the observable behavioral outcome stemming from the organismic state. Evidence from marketing research demonstrates that consumer advocacy, understood as self-initiated, spontaneous behaviors in which individuals actively promote, recommend, defend, or support a brand, product, or organization, operates as a key behavioral response in the SOR framework (Sweeney *et al.*, 2020; Ul Ain *et al.*, 2024). Advocacy reflects the externalization of internal evaluations shaped during the consumption experience (Yu *et al.*, 2021). When consumers develop favorable cognitive and affective evaluations of their interactions with a retailer, they are more likely to externalize these evaluations into supportive behaviors such as recommending the retailer, sharing positive word of mouth, or endorsing the brand in social contexts. Empirical research in omnichannel retailing similarly shows that positive customer experiences increase consumers’ willingness to recommend retailers and share favorable evaluations with others (Ibrahim *et al.*, 2025; Yang *et al.*, 2025). In this sense, advocacy represents the behavioral manifestation of positive experiential states formed during interactions with integrated retail environments. Accordingly, we hypothesize:

H2: Customer experience positively influences consumer advocacy.

The mediating effect of perceived omnichannel integration

Research grounded on the SOR framework shows that environmental cues shape usage and purchase behaviors by eliciting customers’ internal cognitive and affective states. Consistent with this research stream, multiple studies connect perceived integration across touchpoints to customer experience, which serves as a mechanism that connects external stimuli to customer outcomes, such as advocacy behaviors (Gao *et al.*, 2021). For instance, integrated efforts in promotion, product, price, transaction, and customer service influence cognitive and affective experiences, which, in turn, increase advocacy behaviors such as positive WoM and repurchase intention (Chang & Li, 2022; Khalid, 2024).

From the SOR perspective, customer experience operates as the intervening organism that channels the effect of perceived omnichannel integration on advocacy. By embodying the favorable internal evaluations stemming from the integrated channel, customer experience fosters supportive behaviors toward retailers. Evidence shows that this channeling effect is robust across various dimensions of integration and types of customer experiences, highlighting the central role of customer experience in achieving advocacy outcomes in omnichannel environments (Gao *et al.*, 2021; Prassida & Hsu, 2022). Accordingly, we hypothesize:

H3: Customer experience mediates the effect of perceived omnichannel integration on advocacy.

The moderating role of customer journey

Research in omnichannel retailing suggests that the effect of perceived channel integration on customer experience may vary across journey types. Additional evidence shows that interactions among different dimensions of omnichannel integration (e.g., consistency and connectivity) create distinct journey patterns, each triggering distinct customer experiences (Gasparin *et al.*, 2022). Similarly, empirical studies show that the effects of channel integration systematically vary across the journey's stages. For instance,) found that retailer quality perceptions mediate the effect of channel integration on repurchase intention during prepurchase and purchase phases, following different patterns. During the purchase stage, integration yields stronger indirect effects on intentions, as it provides more immediate and diagnostically relevant cues for evaluating the retailer, whereas pre-purchase integration operates more indirectly by facilitating information processing and shaping subsequent interactions.

These effects are moderated by journey characteristics, particularly consumers' prior online shopping experience, which reduces the diagnostic value of integration cues as experience accumulates. This evidence aligns with other studies (e.g.,) that show that identical stimuli produce different experiential outcomes depending on how customers navigate channels (e.g., type of journey), and studies that found distinct consumer segments with different sensitivities to omnichannel integration features (e.g., Sinha *et al.*, 2025). Together, the above findings indicate that perceived channel integration does not exert a uniform effect on consumers' intentions or behaviors through CX, but rather these effects depend on the structure and nature of the customer's omnichannel journey. Accordingly, we hypothesize:

H4: The mediator effect of customer experience mediates the relationship between perceived omnichannel integration and advocacy, differing across omnichannel journey types.

Figure 1 summarizes the conceptual model.

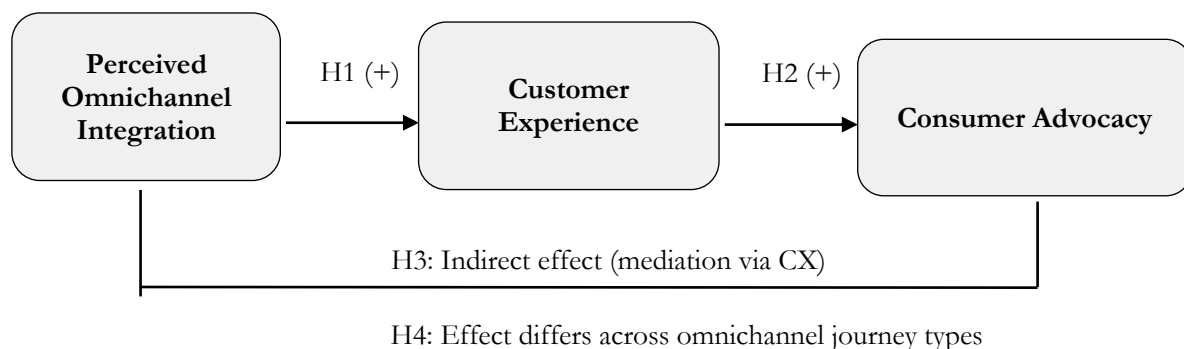


FIGURE 1 - Conceptual model

TABLE 1 – Description of the sample ($N = 480$)

Variable	Value	%
Bought category	Apparel	24,2
	Beauty	22,6
	Footwear	11
	Jewelry	7
	Leather_goods	29,8
	Tech	1,9
	Watches	3,5
Age	18 - 25	26,1
	26–35	41,9
	36–45	3,2
	46–55	9,3
	> 55	19,5
Gender	Male	70,6
	Female	29,4
Household income (COP\$)	<–2.999.999	9,5
	\$3.000.000–4.499.999	13,3
	\$6.000.000–7.499.999	16,3
	\$7.500.000–\$4.499.999	14,6
	\$4.500.000–5.999.999	46,2
Occupation	Student	14,2
	Employee	43,2
	Independent worker	36,2
	Housewife	4,2
	Retired	2,1

Methodology

Sampling and data collection

The population of this study comprised individuals aged 18 or older who had purchased “personal lifestyle goods”, defined as consumption domains characterized by identity expression, symbolic meaning, and frequent interaction across multiple touchpoints (Büyükdag & Kitapci, 2021; Mahajan *et al.*, 2025). Accordingly, we included seven product categories: apparel and fashion, leather goods, footwear, jewelry and accessories, watches, consumer electronics, and perfume/beauty. This categorization was established *ex ante* to delimit a consumption context in which experiential and symbolic value creation processes are salient, thereby providing an appropriate setting for examining omnichannel behavior (Kaman & Deshmukh, 2025).

Data were collected by intercepting individuals at the entrance/exit of one of the major malls in the capital of Colombia, enabling a sample size of 480. Emerging countries are well-suited to our research due to the growing omnichannel retail activity and the coexistence of physical and digital touchpoints, which enable us to capture contemporary shopping behaviors (Sharma *et al.*, 2025). A convenience sampling strategy was employed, consistent with prior research into customer journey and retail contexts (Rosenbaum *et al.*, 2017). To ensure recency and reduce recall bias (Li & Rong, 2023), only individuals who reported a purchase in the last two months were included. Eligible respondents were first asked whether they had purchased at least one product in any of the seven categories, which served as the reference point for answering the

questions (Sharma & Fatima, 2024). Those who met this criterion were then screened for omnichannel engagement by reporting whether they had used one or more channels during their decision-making process (Rosenbaum *et al.*, 2017). Only individuals who bought across at least two channels were included

Instrument design and analysis

This research follows a survey-based structure, and we designed the instrument to capture the key constructs of the proposed model along with behavioral data required to reconstruct omnichannel journeys. All perceptual constructs were measured using multi-item Likert-type scales anchored from 1 = strongly disagree to 7 = strongly agree, following established practices in customer experience research.

Measurement of focal constructs

Perceived omnichannel integration was operationalized following) using nine items that capture the consistency, channel selection freedom, and cross-channel continuity (e.g., synchronization) of the firm's offering. Customer experience was measured using five items that capture consumers' responses to brand interactions across channels, as per Siqueira *et al.* (2020). Finally, we operationalize consumer advocacy as a set of voluntary, brand-supportive behaviors, including recommendations, positive word of mouth, and brand defense, as defined by Bettencourt (1997) and Fullerton (2005).

Behavioral measurement

To create the consumers' self-reported channel–action usage, we included in the instrument a behavioral module that asked respondents (Yes = 1; 0, otherwise) the actions performed (e.g., search, comparison, purchase, service contact, feedback, promotion tracking) across multiple channels, including physical stores, brand websites, mobile applications, social media, e-commerce platforms, and email. These data provide a channel–action matrix at the individual level, indicating whether each channel was used for a specific action.

Results

Sample profiling

Respondents are largely concentrated in early adulthood, with ages 26–35 (41.9%) and 25 or younger (26.1%) being the most prevalent. Males comprised the majority of the sample (70.6%), and most respondents reported a monthly income from \$4.5–6.0 million COP (46.2%). The largest occupational groups were employees (43.2%) and independent workers (36.2%). Finally, in terms of purchased categories, the sample mainly consists of consumers in fashion-related categories, with the highest representation in leather goods (29.8%), apparel (24.2%), and beauty (22.6%), while categories such as technology and watches are less represented. Table 1 describes the sample of relevant variables.

Identification of omnichannel journey configurations

To identify different omnichannel journey configurations, we applied Latent Class Analysis (LCA) to consumers' self-reported channel–action usage data (see behavioral measurement) using the poLCA package in R (Linzer & Lewis, 2026). These behavioral indicators capture enacted journey structures rather than attitudinal preferences, allowing us to map each respondent's observable touchpoint engagement within the omnichannel environment. Importantly, in this analysis, we retained only respondents who reported interactions with at least two channels. Thus, the resulting journeys from poLCA reflect genuine omnichannel behavior through channels and activities rather than single-channel interactions. To identify the optimal number of latent classes, we estimated models ranging from 2 to 5 classes and compared them using the Bayesian Information Criterion (BIC). Results show that BIC values decreased from the two-class solution (BIC = 11,358.32.10) to the five-class solution (BIC = 10,793.31). However, the largest improvement occurred in the transition from two to three classes (Δ BIC = 302.8), after which successive gains became lower.

TABLE 2 – Journeys profiling

Journey name	(%)	Top 3 activities (% use)	Top 3 channels (activity; % use)
Store-dominant low-integration journey	46%	Buy (69.9%); Search (41.6%); Compare (35.2%)	Physical store (Buy: 69.9%; Search: 37.0%; Compare: 35.2%); Social media (Search: 41.6%); Brand website (Search: 41.1%)
Planned omnichannel optimization journey	37%	Search (97.2%); Buy (78.7%); Follow promotions (46.1%)	Brand website (Search: 97.2%; Compare: 26.4%; Promotions: 46.1%); Physical store (Buy: 78.7%); E-commerce (Buy: 39.9%; Compare: 25.8%)
Digitally integrated exploratory journey	17%	Compare (89.2%); Search (77.1%); Compare (69.9%)	Social media (Search: 77.1%; Compare: 89.2%; Promotions: 63.9%); Brand website (Search: 68.7%; Compare: 63.9%); E-commerce (Search: 42.2%; Compare: 69.9%)

TABLE 3 – Study measures and item loadings

Item	Construct
	Consistency (Sharma <i>et al.</i> , 2024); Alpha = 0,78; rhoA = 0.78; rhoC = 0,85; AVE = 0,53
OMN1	The company provided consistent promotional information across online and offline stores.
OMN2	The company provided consistent customer service across online and offline stores.
OMN3	The company provided consistent product information across online and offline stores.
	Channel selection freedom
FREE1	The company allowed me to choose where to shop for merchandise.
FREE2	If there is any service problem (e.g., delivery, return, or refund problem), the company allowed me to choose any channel to report service failure.
FREEENI	The company allowed me to choose any channel to arrange service.
	Synchronization
SYNC1	The company allowed me to choose any channel to arrange service.
SYNC2	The company allowed me to choose the most convenient way to interact with them (e.g., product search, purchase, pick-up, return, post-purchase) across all channels.
	Customer experience (Siqueira <i>et al.</i> , 2020); Alpha = 0,78; rhoA = 0.82; rhoC = 0,85; AVE = 0,54
CX1	I believe that we get superior experience at the recalled store.
CX2	When I leave the recalled store, I usually feel that I had a good experience
CX3	I would say that the experience at/with the recalled store is excellent.
CX4	I believe the recalled store knows the type of experience its customers want
CX5	I think that the total experience procedure at the recalled store is excellent.
	Customer advocacy (Fullerton, 2005; Sweeney <i>et al.</i> , 2020); Alpha = 0,75; rhoA = 0.78; rhoC = 0,84; AVE = 0,56
CAD1	I will encourage friends and relatives to do business with this brand.
CAD2	I would defend this brand if people were to give negative comments about it.
CAD3	I will recommend this brand to someone who seeks my advice.
CAD4	I will say positive things about this brand to other people.

NA = Deleted items in the purification scale process

TABLE 4 – Discriminant validity

	Omnichannel	Customer experience	Advocacy
Omnichannel integration	0,7298		
Customer experience	0,5094	0,7384	
Advocacy	0,4822	0,6791	0,7499

TABLE 5 -Testing H1 – H3

Path	β	SE	t-value	p-value	95% CI	Hypothesis	Decision
Omnichannel → Customer Experience	0.509	0.035	14.44	< .001	[0.442, 0.580]	H1	Supported
Customer Experience → Advocacy	0.585	0.040	14.69	< .001	[0.508, 0.666]	H2	Supported
Omnichannel → Advocacy (direct effect)	0.184	0.041	4.51	< .001	[0.103, 0.263]	H3 (direct path)	Supported
Omnichannel → CX → Advocacy	0.298	—	—	< .001	[≈0.224, ≈0.386]	H3 (mediation)	Supported
Omnichannel → Advocacy (total effect)	0.482	0.032	—	< .001	[0.420, 0.546]	—	

We complemented the statistical criteria with an analysis of interpretability and parsimony (Vermunt & Magidson, 2003). The four-class solution produced one class in which virtually all channel–activity combinations reached endorsement rates near to 100%, making journey types indistinguishable and theoretically uninterpretable. The three-class solution, by contrast, yielded clearly differentiated and narratively coherent behavioral profiles, with meaningful variation across channels and activities. Taken together, these analyses support retention of the three-cluster solution, which provides a parsimonious and interpretable representation of distinct omnichannel journey configurations while preserving meaningful behavioral differentiation. These empirically derived configurations serve as the structural journey architecture within which we examine the experiential pathway from omnichannel integration to advocacy.

DESCRIPTIVE RESULTS: OMNICHANNEL JOURNEY PROFILES

The cluster solution reveals three distinct configurations of omnichannel journey enactment that differ in consumers' exposure to and reliance on environmental stimuli across touchpoints. The first configuration (46%) reflects a low-integration, store-anchored journey in which value is mainly created offline despite partial digital exposure. We call this journey “*Store-dominant low-integration journey*” as integration is low because channels (e.g., stimulus) are approached sequentially (e.g., search → buy) rather than synergistically, and decision-making is performed at offline channels despite some preliminary (e.g., prepurchase) digital exploration. Consumers on this journey rely heavily on physical stores for purchase (69.9%) and in-store evaluation (35.2% comparison; 37.0% information search), while digital channels are used in a fragmented and instrumental manner, for instance, for preliminary information acquisition through social media (41.6%) and brand websites (41.1%) rather than for transactional completion. Although multiple touchpoints are present, they apparently do not operate as an integrated system but rather as weakly connected stages of the journey, limiting the potential for cross-channel reinforcement. From an SOR perspective, it is plausible that in this journey, the stimulus (perceived integration) is weakly enacted at the behavioral level, as consumers do not experience a smooth transition across channels. As a result, customer experience is likely rooted in the physical environment, limiting digital touchpoints to supporting cognitive processes rather than enhancing the overall experience.

The second journey (37%) involves integrating a mix of physical and digital touchpoints and navigating them fluidly to optimize search, evaluation, and purchase processes. We label this journey “*Planned omnichannel optimization journey*” because it reflects a functionally and goal-oriented integration in which consumers combine channels to optimize the purchasing process and outcomes. The brand website serves as the primary informational source (97.2% in search), complemented by structured comparisons across both brand-owned (26.4%) and marketplace environments (25.8%) The purchases occur mainly in physical stores (78.7%) and to a substantial extent through e-commerce (39.9%) In this journey, the channels are not isolated instruments in the purchase process; they are complementary components of a coordinated decision-making process. Such complementarity occurs, for instance, across engagement with promotional stimuli in different touchpoints (brand website: 46.1%; e-commerce: 35.4%; social media: 32.6%; email:

23.6%) This configuration suggests a planned integration logic, in which consumers reduce uncertainty and search costs by combining channels according to their functional advantages rather than their experiential richness. From an SOR perspective, the stimulus (integration) is enacted more coherently at the behavioral level, as consumers experience greater continuity across touchpoints. However, this integration remains primarily instrumental rather than experiential, indicating that customer experience is constructed through efficiency and control rather than immersion or affective engagement.

The third configuration (17%) reflects a high level of integration across multiple channels to explore, evaluate, and finalize purchase decisions. We label this journey a *digitally integrated exploratory journey* because consumers engage in intensive cross-channel interaction, with digital environments dominating early- and mid-stage decision-making while remaining connected to transactional outcomes. Unlike previous journeys, channels are simultaneously mobilized to enrich exploration and comparison, rather than sequentially or functionally compartmentalized. Consumers in this journey rely heavily on digital touchpoints for information search and evaluation, particularly through social media (77.1% search; 89.2% comparison), brand websites (68.7% search; 63.9% comparison), and e-commerce platforms (42.2% search; 69.9% comparison). Engagement with promotional stimuli is also consistently high across channels (social media: 63.9%; brand website: 51.8%; email: 34.9%), indicating active and sustained interaction with brand communications throughout the journey. While physical stores remain relevant for purchase execution (54.2%), they no longer anchor the process but rather operate as one touchpoint within a broader, digitally driven system. This configuration suggests that consumers leverage the complementary affordances of multiple channels to expand information breadth, deepen evaluation, and maintain continuous engagement. From an SOR perspective, this journey illustrates a context where the stimulus (integration) is actively performed at the behavioral level, not just perceived, as consumers experience seamless transitions and high continuity across channels. This allows for a more detailed construct of customer experience, where digital touchpoints go beyond cognitive support to become central in shaping both evaluative and interactive aspects of the journey. Table 2 summarizes the journey characteristics.

Hypotheses testing

MEASUREMENT MODEL

The measurement model was estimated using SEMinR (Hair *et al.*, 2021). In the first step, the omnichannel integration scale was refined during sequential estimations. Two items related to channel selection freedom (flexibility) and another related to synchronization were deleted as they did not meet the minimum loading threshold of 0.40. The final specification preserved the conceptual domain of integration by retaining indicators capturing consistency, channel flexibility, and synchronization, while improving psychometric performance. All indicators loaded onto their respective constructs, with values ranging from 0.5551 to 0.8720 (see Table 3). Although some indicators had loadings below the 0.70 threshold, they were retained due to their theoretical importance and the satisfactory reliability. Internal consistency was demonstrated across all constructs, as all values exceeded the recommended threshold of 0.70. Convergent validity was evaluated using the average variance extracted (AVE), and all constructs achieved AVE values above the recommended 0.50. Lastly, discriminant validity was assessed with the Fornell–Larcker criterion. As Table 4 shows, the square root of each construct's AVE exceeds its correlations with other constructs, indicating that each construct measures a unique conceptual domain (Fornell & Larcker, 1981).

DIRECT EFFECTS AND MEDIATION (Pooled Sample – H1 – H3). Consistent with the SOR framework, the structural model shows a link between perceived omnichannel integration (Stimulus), customer experience (Organism), and customer advocacy (Response) (see Table 5). Perceived omnichannel integration positively influences customer experience, supporting H1 and indicating that integration across channels enhances experiential evaluations. Consistent with H2, customer experience positively predicts customer advocacy, confirming that perceived experience is a critical driver of downstream behavioral responses in the

omnichannel context. Finally, the results are also consistent with H3, as both the direct and indirect effects of omnichannel integration on advocacy are statistically significant, indicating a partial mediation. Regarding explanatory power, the values of R^2 and Adj. R^2 indicates a moderate explanatory capacity of omnichannel integration for variance in customer experience ($R^2 = 0.260$; Adj. $R^2 = 0.258$), suggesting a meaningful role of integration in shaping experiential evaluations in omnichannel retailing. In turn, the combined effects of omnichannel integration and customer experience explain 48.6% of the variance in customer advocacy ($R^2 = 0.486$; Adj. $R^2 = 0.484$), suggesting that advocacy behaviors are substantially driven by experiential processes within the model.

MEASUREMENT INVARIANCE. Before conducting multigroup structural comparisons, we evaluated the measurement invariance of omnichannel experience, customer experience, and advocacy across the three journey configurations. Following recent recommendations for reflective PLS-SEM models (Liengaard, 2024), we tested metric invariance by examining indicator loading equality across groups using a Wald-based multigroup procedure. For each construct, we evaluated whether outer loadings differed significantly between groups, using bootstrap resampling (2,000 resamples per group). Across all constructs, we failed to reject the null hypothesis of equal loadings (all $p > .05$), indicating full metric invariance.

Multigroup comparisons across journey configurations

For testing H4, we ran a multigroup analysis using 5,000 bootstrap resamples per group. Table 6 reveals a systematic pattern of heterogeneity in the direct effects across journey types. The effect of perceived omnichannel integration on customer experience differs significantly across all journey configurations; however, this effect is strongest in the digitally integrated exploratory journey, substantial in the store-dominant journey, and weaker in the planned omnichannel optimization journey. These differences indicate that experiential outcomes across journeys differ even at the same level of integration, and that their impact depends on how consumers engage with and process cross-channel interactions within each journey. In contrast, the relationship between customer experience and advocacy is remarkably stable, with consistently strong effects across the journeys. Similarly, the direct path from integration to advocacy does not differ significantly across journeys.

Table 6 shows that a different story emerges for the mediated pathway. The indirect effect of integration on advocacy through customer experience varies significantly across all comparisons. It is strongest in the digitally integrated exploratory journey, substantial in the store-dominant journey, and attenuated in the planned omnichannel journey. Total effects follow the same ordering, with significantly higher values for the digitally integrated configuration. Taken together, the findings provide partial support for H4. Differences across journey configurations emerge from whether and to what extent integration is translated into experience, rather than from how experience translates into advocacy. These asymmetric effects reveal the need for a structural distinction in managing omnichannel as a SOR process: while journey configurations appear to shape the conditions under which integration becomes experientially meaningful, these configurations leave the downstream behavioral responses to that experience largely unchanged.

Discussion

Our findings reveal a systematic asymmetry in the process of translating omnichannel integration into customer experience and advocacy across distinct journey configurations. These differences emerge in how integration becomes experience rather than in how experience drives advocacy. Regarding the journey-level differences in experience formation, our results show that these differences extend beyond stages to the journey's structure itself, which extends prior research that emphasizes that channel integration effects vary across stages of the journey (e.g., Swoboda & Fränzel, 2022).

TABLE 6 - Differences in the mediation mechanism across types of journeys

Path	Store-dominant journey (C1)	Planned omnichannel journey (C2)	Digital exploratory journey (C3)	C1 vs C2 (<i>p</i>)	C1 vs C3 (<i>p</i>)	C2 vs C3 (<i>p</i>)
Test for structural paths						
Omnichannel → CX	0.607	0.171	0.804	0.001	0.001	0.001
CX → Advocacy	0.614	0.611	0.779	0.960	0.208	0.224
Omnichannel → Advocacy	0.142	0.318	0.083	0.070	0.708	0.122
Test for multigroup comparison of indirect and total effects						
Indirect: Omnichannel → CX → Advocacy	0.373	0.102	0.628	0.001	0.012	0.001
Total effect: Omnichannel → Advocacy	0.515	0.420	0.711	0.242	0.010	0.001

When channels are used in isolation or in loosely connected sequences (e.g., store-dominant journey), integration remains only partially activated as an experiential stimulus. When consumers engage with multiple channels in a structured, goal-oriented manner, the integration effect on experience is tenue. This idea aligns with research indicating that different customer segments interact with channels based on distinct needs and motivations (Van Nguyen *et al.*, 2024). In this case, integration seems to operate primarily at a functional level for supporting task completion rather than intensifying experience.

In contrast, the effect of integration on experience appears strong in a digitally integrated exploratory journey. Here, consumers actively combine channels across stages, engaging in exploration and interaction that amplify both cognitive and affective responses. This supports the view that customer experience emerges from the integration of multiple interactions across touchpoints) and highlights the importance of how those interactions occur within the journey.

Regarding the relationship between experience and advocacy, our findings show that it remains stable and consistently strong across all journeys. Once experience is formed, its effect on behavioral outcomes appears independent of the journey structure. Journeys differ in whether integration triggers experience, rather than in how experience drives advocacy. This finding refines prior work showing that omnichannel integration primarily affects behavior through indirect pathways by identifying where variation occurs within that pathway. The key source of variation lies upstream, in the formation of experience, rather than downstream in behavioral response. Taken together, our findings point to behavioral integration as a critical mechanism shaping omnichannel outcomes. While prior research emphasizes the design and coordination of touchpoints (Zheng & Li, 2024), our results show that their effectiveness depends on how consumers engage with them. Sequential or compartmentalized channel use limits the emergence of integration effects, whereas exploratory and cross-channel engagement amplifies the experiential impact of integration. Omnichannel value is embedded in how consumers use those channels during their journeys, rather than in the availability of integrated channels.

Theory contributions

This study adds three insights to omnichannel and customer journey research. First, it refines our understanding of the role of omnichannel integration in business management by highlighting that its effects are embedded in how consumers organize their channel usage during their journeys rather than in the system

itself. While previous research approaches integration as a firm capability that improves outcomes through seamless coordination (e.g., Swoboda & Fränzel, 2022), our findings demonstrate that its impact varies with the enactment of cross-channel behaviors. This positions journey structure as a key mechanism through which integration becomes experience, expanding the research on diverse channel interactions (Van Nguyen *et al.*, 2024).

Second, the study clarifies the role of customer experience within omnichannel models by shifting the source of variability to the S–O–R process. While prior work emphasizes variability in downstream behavioral responses, our findings show that the experience–advocacy relationship remains stable across journeys. Differences arise in the stimulus–organism link, meaning how integration is turned into experience. This distinction explains that variability in omnichannel results comes from how experiences are formed, not from the behavioral effects of those experiences, thus expanding existing conceptualizations of customer experience as a complete response to interactions across multiple touchpoints (Lemon & Verhoef, 2016). Third, the study introduces behavioral integration as a mechanism of experiential amplification. Existing research focuses on the design and orchestration of touchpoints as drivers of customer value (Zheng & Li, 2024), but pays less attention to how consumers engage with these configurations. Our findings show that not all multichannel behavior yield equivalent outcomes, shifting the focus from the availability of integrated channels to the structure of their use, offering a behaviorally grounded explanation of how omnichannel strategies generate value. Together, these contributions reposition omnichannel effectiveness as a function of how integration is enacted within journeys, rather than as a direct consequence of integration itself.

Managerial implications

We envision at least three managerial implications for our findings. First, firms should move beyond thinking about channel integration as a firm capability and focus on structuring journeys that trigger cross-channel enactment. It means that managers must recognize that omni-channel integration alone does not generate value; rather, integration needs to be activated by customers through cross-channel behaviors. Investments in consistency and connectivity, for instance, are unlikely to generate experiential payoffs if customers approach channels sequentially or in isolation. Managers should therefore complement integration efforts with mechanisms such as persistent information flows, synchronized interactions, and features that facilitate movement between channels, thereby inducing cross-channel integration and fluidity. Without this activation, integration may remain experientially underutilized, although functionally available for customers.

Second, the results highlight the need for a clear differentiation between functional and experiential roles of integration. In more structured journeys, for instance, integration has a limited impact on experience as it primarily supports task completion and decision efficiency. In exploratory journeys, by contrast, integration enhances interaction richness and engagement. This suggests that omnichannel design should align integration features with the dominant mode of journey enactment with the dominant mode of journey enactment, for instance, emphasizing efficiency in some contexts and interaction depth in others. Third, managerial attention should be directed toward specific moments in the journey where integration can be transformed into experience. Because the relationship between experience and advocacy is stable, improving behavioral outcomes depends on strengthening the conditions under which integration is converted into experience. This requires identifying transition points across channels for enhancing their coherence, visibility, and interactivity.

Taken together, these implications suggest that the mere availability of integrated channels may not be enough to realize returns on omnichannel investments. Rather, it is the firm's ability to shape how customers engage with and combine those channels within their journeys the main trigger of benefits from an omnichannel strategy.

Limitations and future research

The results and scope of this study should be considered in light of its limitations, which open opportunities for future research. First, the cross-sectional and self-reported nature of the data restricts causal conclusions. Although the model is theoretically based on the Stimulus–Organism–Response Model, future research could use longitudinal or experimental designs to better understand how omnichannel integration translates into experience over time and across different consumer decision stages. Second, the sampling strategy and sample composition, in demographic terms, may limit the generalizability of the findings. While the context is suitable for observing active omnichannel behavior, future studies could replicate the model across different geographic locations, various populations, retail formats, and levels of market digitalization to test the stability of the identified mechanisms and model results. Third, although the study focuses on “personal lifestyle goods” to ensure the relevance of experiential processes, the inclusion of multiple product categories may introduce unobserved heterogeneity related to involvement, price, or decision complexity. Future research could isolate specific categories or explicitly model category-level effects to disentangle their role in shaping omnichannel journeys and experiential outcomes. Fourth, the identification of journey configurations relies on self-reported channel–action usage, which captures enacted behavior but does not fully reflect its temporal order or intensity. Future research could incorporate behavioral tracking data (e.g., clickstream or transaction logs) to improve journey reconstruction and examine how temporal patterns of channel use affect the formation of customer experience.

Finally, while this study conceptualizes journey configurations as boundary conditions of the S–O–R process, it does not explicitly examine the underlying drivers of these configurations. Future research could investigate antecedents of journey enactment, for instance, consumer traits, motivations, or situational factors, for a better understanding of why certain consumers engage in more integrated or exploratory omnichannel behaviors and how these patterns evolve over time.

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Examining the potential of hidden costs for sustainable consumption

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Abstract. Hidden social and environmental costs are typically excluded from retail prices, making conventional low-price products appear more attractive than more expensive but sustainable alternatives. This research examines how disclosing such hidden costs influences consumers' product perception and purchase intention. Across three experimental studies, participants evaluated typical conventional low-price and organic high-price combinations. Study 1 demonstrates that organic high-price products simultaneously evoke positive sustainability perceptions and negative monetary-sacrifice perceptions, with the latter dominating purchase intentions and thereby contributing to the emergence of the green gap (i.e., consumers' lower purchase intention for sustainable products despite positive attitudes towards sustainability). Studies 2a and 2b explore whether labels indicating the level of hidden costs may help reduce this green gap. They show that reductive hidden-cost labels attenuate it primarily by reducing consumers' preference for conventional low-price products (Study 2a) and graded hidden-cost labels fully reverse it by strengthening sustainability- and quality-related inferences (Study 2b). The findings contribute to research on sustainable consumption by showing that the effectiveness of hidden-cost disclosure depends not only on the availability of the information itself, but also on how easily it can be evaluated by consumers. The results highlight the potential of hidden-cost information in promoting sustainable consumer choices.

Keywords: Hidden costs; green gap; sustainable consumption; labeling; dual role of price

Introduction

Retail prices and true prices of products can differ significantly. In some cases, production generates so-called externalities, i.e. hidden environmental and/or social costs that consumers neither directly see nor have to pay for, but which ultimately have to be passed on to the public. These can occur, for example, in the form of environmental (e.g. pollution) and social costs (e.g. child labor) which are ultimately borne by society (Nature, 2019; Poore & Nemecek, 2018; Chouinard, 2011). Consequently, conventionally produced products may appear artificially inexpensive relative to their actual societal costs (e.g. Wilken *et al.*, 2024).

Sustainable products can entail substantially lower hidden costs than conventional products (Pieper *et al.*, 2020). However, they are often associated with higher retail prices and consumer trade-offs, which can place them at a competitive disadvantage compared to lower-priced conventional alternatives (Olson, 2013; Gleim *et al.*, 2013). While taxing externalities (e.g. through a carbon tax) to internalize hidden costs (Pigou, 1920)

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may be a first step to make hidden costs visible and transferring them to manufacturers/consumers, in many sectors, hidden costs persist without regulatory intervention (e.g. Poore & Nemecek, 2018). Nevertheless, an international change in (tax) laws, as well as appropriate enforcement, would be essential to implement this taxation effectively, entailing considerable effort. Beyond taxes, firms and consumers may voluntarily choose sustainable products to reduce hidden costs. Yet, despite consumers' generally positive attitudes toward sustainability, their actual purchase intention for sustainable products often falls short - a phenomenon known as the "green gap" (White *et al.*, 2019).

One of the central challenges for sellers of sustainable products lies in justifying the higher price premiums often associated with sustainability attributes (Olson, 2013; Gleim, 2013). Product sustainability represents a credence attribute as such characteristics are inherently difficult for consumers to evaluate and remain largely unverifiable even after consumption (Atkinson & Rosenthal, 2014; Darby & Karni, 1973). Research provides first ideas for using pricing strategies to mitigate the green gap. An approach that has already been studied is price partitioning, whereby a retail price is split into several mandatory price components (Abraham & Hamilton, 2018). A similar, context-specific pricing strategy is to communicate externalities in the form of "hidden costs" (e.g. Wilken *et al.*, 2024). The research of the second strategy in realistic shopping contexts, remains scarce. Although the positive impact of this pricing strategy has been demonstrated, these results have only been achieved only in limited contexts (e.g. supermarket/food sectors) and primarily through direct comparisons of two products (Wilken *et al.*, 2024; Peschel *et al.*, 2026) - a presentation unlikely to be practical in a realistic shopping context. Consequently, the logical research question is: How can the disclosure of hidden-cost information in realistic shopping contexts encourage more positive product perceptions and purchase intentions for sustainable products?

To answer this research question, we conduct three experiments in stages, comparing product perceptions and purchase intentions of two typical price-product combinations (conventional low-price T-shirt and organic high-price T-shirt). First, in the initial experiment, the existence of the green gap is demonstrated. In the second experiment, additional information regarding hidden costs is included in the form of a reductive label that discloses the product's sustainability. In the third experiment, in addition to the information, the evaluability of the information is enabled through a graded hidden cost label.

Theory, hypothesis & conceptual model

The central challenge addressed in this research is the so-called green gap, referring to the discrepancy between consumers' positive product perception and their purchase intention (White *et al.*, 2019), which captures the motivational factors that influence purchasing behavior and reflects how willing consumers are to engage in a purchase (Ajzen, 1991). One major explanation for this discrepancy is the higher price commonly associated with sustainable products (Olson, 2013; Gleim, *et al.*, 2013), which is also expected by consumers (Kumbarger & Tripathi, 2025).

Price is of particular theoretical interest in this context because sustainable product attributes are largely credence characteristics – qualities that consumers cannot easily verify, even after consumption (Atkinson & Rosenthal, 2014; Darby & Karni, 1973). Under such conditions of uncertainty, prices can become a surrogate cue. According to Dual Role of Price theory (DRoP), prices fulfil two opposing functions in consumer evaluations (Bornemann & Homburg, 2011). The first function is perceived monetary sacrifice, which refers to the consumer's subjective perception of the financial loss or economic cost incurred when purchasing a product or service. Consequently, higher prices can increase perceived monetary sacrifice, as consumers must give up greater financial resources to obtain a product (Völckner, 2008). The second function is perceived quality, which refers to the consumer's subjective inference about a product's overall excellence or superiority, derived from prices as extrinsic informational cues. Thus, higher prices may positively influence perceived product quality, as consumers often infer that more expensive products

possess superior characteristics (Völckner, 2008). Crucially, when consumers cannot directly assess sustainability-related attributes, this signaling mechanism may extend to sustainability inferences: The price could therefore be used parallel to the estimation of perceived quality or monetary sacrifice to estimate perceived sustainability of a product as well, which refers to a consumer's subjective overall evaluation of the environmental friendliness of a product (Gershoff & Frels, 2015). Consequently, consumers evaluating an organic, high-price product may simultaneously perceive it as more sustainable and of higher quality but also as a significant financial burden. According to the green gap, the conventional product is significantly more likely to be purchased despite being perceived as beneficial, which suggests that monetary sacrifice is the determining factor (Olson, 2013; White *et al.*, 2019).

H1: Consumers report a significantly lower purchase intention for the organic high-price combination compared to the conventional low-price combination.

H2: The effect of the product-price combination on purchase intention is mediated by perceived sustainability, perceived quality, and perceived monetary sacrifice of the product.

One promising approach for reducing the green gap involves pricing strategies that disclose information about hidden costs of products, thereby influencing how consumers perceive prices of sustainable products (e.g., Wilken *et al.*, 2024; Peschel *et al.*, 2026). Rather than changing the objective product price itself, hidden-cost disclosure changes the informational context in which prices are evaluated. Consequently, consumers may no longer interpret higher prices of sustainable products primarily as indicators of monetary sacrifice, but increasingly as justified reflections of product quality. Because sustainability constitutes a credence attribute that is difficult to evaluate directly, the effectiveness of hidden-cost disclosure depends on how this information is communicated. Labels represent a widely established mechanism for presenting sustainability-related information to consumers (e.g. Thøgersen *et al.*, 2010; Atkinson & Rosenthal, 2014). Reductive labels, which are commonly used in contexts such as nutrition labeling, transport information through isolated absolute numerical values without additional interpretation (Dubois *et al.*, 2021; Ikonen *et al.*, 2020).

Through mandatory disclosure of hidden sustainability costs directly at the point of purchase, reductive hidden-cost labels increase the availability of sustainability-related product information. This additional information enables consumers to complement price-based inferences with sustainability-related information. First, this can lead to the product being perceived as significantly more sustainable, and second, it can reduce the uncertainty involved in assessing the perceived product quality primarily via the product price and thereby can help closing the green gap. The mandatory disclosure through legal obligation is particularly relevant because voluntary disclosure would realistically occur primarily for products with comparatively low hidden costs.

H3: When reductive hidden-cost labels are present, consumers report higher purchase intentions for the organic high-price combination than for the conventional low-price combination.

H4: When reductive hidden-cost labels are present, the impact of organic high-price compared to conventional low-price combinations on purchase intention is mediated through perceived sustainability and perceived quality.

While reductive hidden-cost labels increase the availability of sustainability-related price information, they do not provide the evaluability of the information (Ikonen *et al.*, 2020). Consumers may therefore still experience difficulties evaluating whether displayed hidden-cost values reflect relatively high or low sustainability performance.

Graded labels address this limitation by transforming hidden costs into an interpretable and comparable pricing signal. These labels are also particularly well-known and widely studied in the context of nutrition

(e.g. Dubois *et al.*, 2021; Ikonen *et al.*, 2020). Examples in the sustainability context include the system used in the EU and the UK to label the energy consumption of household appliances, consisting of letters (e.g. from A to G) combined with corresponding color-coded categories and actual consumption values (Department for Energy Security and Net Zero & Office for Product Safety and Standards 2026).

The effectiveness of (mandatory) sustainability information (hidden costs) depends not only on information availability, but also on its evaluability. By adding this evaluability of sustainability information, graded hidden-cost labels enable consumers to integrate sustainability-related information more easily into their perception of the product-price combination. The use of the graded hidden-cost label provides an additional, evaluable source of information, reducing the need to assess a product's perceived sustainability and quality primarily based on its price. As a result, consumers are expected to generate stronger sustainability-related and quality-related inferences for sustainable products. In parallel to the reductive hidden-cost label, a hypothetical legally mandated disclosure is assumed.

H5: When graded hidden-cost labels are present, consumers report higher purchase intentions for the organic high-price combination than for the conventional low-price combination.

H6: When graded hidden-cost labels are present, the impact of organic high-price compared to conventional low-price combinations on purchase intention is mediated through perceived sustainability and perceived quality.

The following conceptual model (fig. 1) synthesizes the hypotheses and demonstrates, based on the theoretical foundations, the assumed influence of product-price combinations on purchase intention, mediated by perceived quality, monetary sacrifice, and sustainability, and moderated by different types of hidden-cost disclosure.

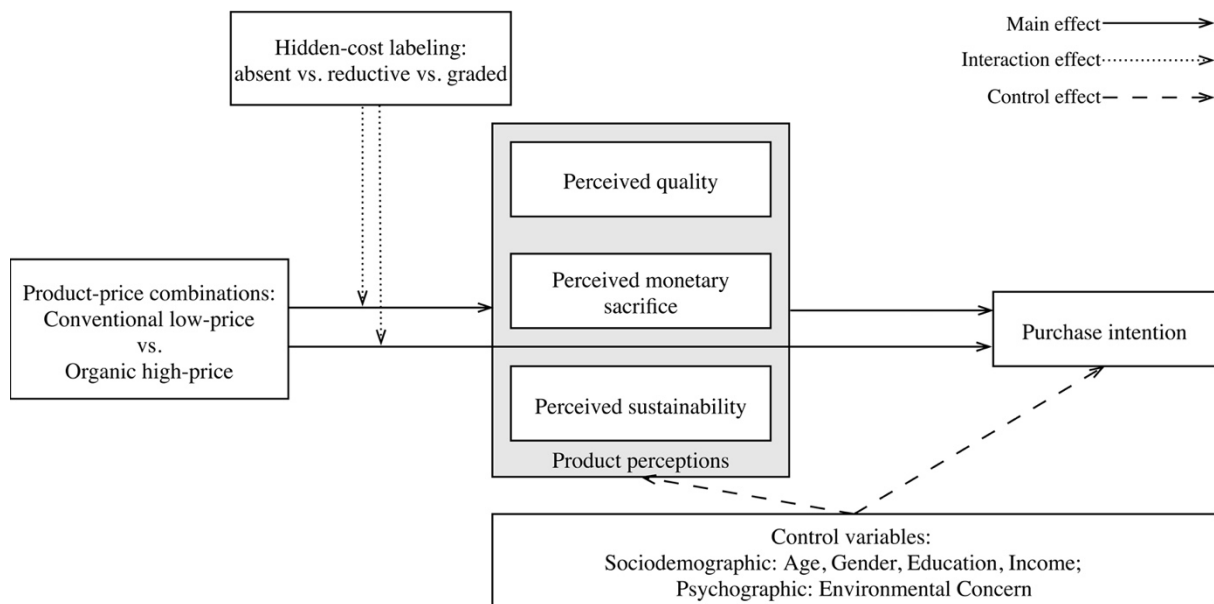


FIGURE 4 - Conceptual model

Methodology: experimental design

OVERVIEW OF STUDIES

To investigate the proposed conceptual model (Fig. 1), this paper employs a pretest and three experimental studies (1, 2a & 2b) using a T-shirt as the focal product category. T-shirts were selected because they

represent a frequently purchased and widely familiar consumer product for which both conventional and sustainable alternatives are commonly available. As apparel products are closely associated with environmental and social sustainability concerns, they provide a particularly suitable context for examining sustainability-related purchase decisions and price perceptions (e.g., McNeill & Moore, 2015).

The pretest was conducted to establish typical low- and high-price levels for the product. These price levels were subsequently embedded into two realistic product-price combinations reflecting prevailing market conditions: a conventional low-price T-shirt and an organic high-price T-shirt. The purpose of the studies was not to isolate the independent effect of sustainability or price, but to investigate how consumers evaluate realistic market constellations in which sustainability and price premiums naturally co-occur. This design mirrors contemporary market structures in which conventional products frequently externalize hidden costs, resulting in comparatively low retail prices, whereas sustainable products tend to internalize a larger share of such costs, leading to substantially higher consumer prices (Pieper, 2020; Gleim *et al.*, 2013).

Building on this setup, Study 1 establishes the existence of the green gap by comparing consumers' evaluations of the conventional low-price combination and the organic high-price combination. In addition, the study examines the psychological mechanisms underlying this effect. Study 2 extends these findings by investigating how different types of hidden-cost disclosure influence consumer responses. Specifically, Study 2a examines the effect of disclosing hidden costs through a reductive label that presents hidden costs as an absolute monetary value without additional interpretation. Study 2b builds on this approach by introducing a graded label that complements the hidden-cost information with an evaluability, thereby enabling consumers to compare the sustainability of the product.

MEASURES

All constructs were measured using established multi-item scales adapted from prior research. Unless stated otherwise, participants responded using seven-point Likert scales ranging from 1 ("strongly disagree") to 7 ("strongly agree"). Table 1 presents means (M), standard deviations (SD), average variance extracted (AVE), composite reliability (CR), and inter-construct correlations for all multi-item constructs. The results are all meeting or exceeding the accepted thresholds (Bagozzi, 1988).

In line with previous research on DRoP, we measured perceived quality (DRoP Quality) and perceived monetary sacrifice (DRoP Monetary Sacrifice) based on Suri and Monroe (2003) and Bornemann & Homburg (2011). Perceived sustainability was measured using items adapted from Gershoff & Frels (2015), while purchase intention was assessed using a multi-item scale adapted from Wang *et al.* (2021) and Dodds *et al.* (1991). In addition, environmental concern was measured as individual-difference variable using items adapted from Kilbourne & Pickett (2008) and Tanner & Wölfling Kast (2003).

TABLE 1 - Means, standard deviations, reliabilities, and correlations of the main model

Variable	M	SD	AVE	CR	1	2	3	4	5	6
(1) DRoP Quality	5.02	1.35	.84	.94	1					
(2) DRoP Mon. Sac	3.26	2.01	.95	.98	.15*	1				
(3) Perc. Sust.	4.21	1.97	.90	.96	.55**	.44**	1			
(4) Purchase Int.	4.32	1.90	.89	.97	.50**	-.29**	.26**	1		
(5) Env. Concern	5.14	1.28	.68	.93	.14*	-.02	.23**	.14*	1	
(6) Age	39.24	12.30	-	-	-.04	-.05	-.09	-.17	.00	
Gender	-	-	-	-	-	-	-	-	-	-
Education	-	-	-	-	-	-	-	-	-	-
Income	-	-	-	-	-	-	-	-	-	-

Note. M = Means; SD = Standard deviations; AVE = Average Variance Extracted; CR = Composite Reliability. N = 247. Pearson correlations are reported. * $p < .05$, ** $p < .01$.

TABLE 2 - Confirmatory factor analysis results

Construct	Item	FL (λ)	IR(λ^2)
DRoP Quality	The product appears to be of good quality.	.90	.81
	The product appears to be reliable.	.95	.91
	I am certain that this product will perform satisfactorily.	.89	.79
DRoP Monetary Sacrifice	The advertised price is very high.	.96	.92
	The product is very expensive.	.99	.98
	I feel that the seller's advertised price for the product is very high.	.98	.96
Perceived Sustainability	The shown T-shirt deserves to be labelled as environmentally friendly.	.94	.88
	Selecting this T-shirt is a good choice for the environment.	.96	.93
	A person who cares about the environment would be likely to choose this T-shirt.	.94	.88
Purchase Intention	It is likely that I would purchase the T-shirt.	.94	.89
	I would consider buying the T-shirt.	.94	.89
	My willingness to buy the T-shirt is high.	.96	.92
	I am interested in purchasing the T-shirt.	.94	.88
Environmental Concern	I am very concerned about the environment.	.85	.72
	I would be willing to reduce my consumption to help protect the environment.	.87	.76
	Major political change is necessary to protect the natural environment.	.64	.41
	Anti-pollution laws should be enforced more strongly.	.64	.41
	It is important to me whether products are environmentally sustainable.	.95	.90
	Environmental protection is important to me when making purchases.	.94	.88

Note. All standardized factor loadings were statistically significant at $p < .01$; FL = Factor Loading; IR = Item reliability.

Table 2 reports the measurement items, their associated constructs, and the standardized factor loadings, providing evidence for the adequacy of the measurement model (Hair *et al.*, 2010). Discriminant validity was further assessed using the Fornell-Larcker (1981) criterion. In all cases, the square root of the AVE exceeded the corresponding inter-construct correlations, supporting discriminant validity.

PRETEST

A pretest was conducted using a UK-based Prolific sample ($N = 180$) to establish realistic low- and high-price levels for the experimental product-price combinations. Participants were shown a standard white T-shirt and asked to indicate the lowest and highest prices they would still consider realistic for the product. The pretest yielded median price perceptions of £5.50 for the low-price condition and £25.00 for the high-price condition. Because the price distributions were slightly skewed, median values were used as robust indicators of central tendency. For the subsequent experiments, the prices were rounded to nearest market-typical price points, resulting in final experimental price levels of £5 and £25.

Study 1: Method

Study 1 serves as the baseline experiment and aims to establish the existence of the green gap within the context of sustainable apparel consumption. Participants from the UK were recruited via Prolific and randomly assigned to evaluate a product detail page showing either a conventional low-price T-shirt (£5) or an organic high-price T-shirt (£25). The study therefore employed a one-factor between-subjects design comparing two realistic product-price combinations (conventional low-price (Fig. 2) vs. organic high-price

(Fig. 3)) reflecting prevailing market conditions. After excluding 2 participants who failed the attention checks, the final sample consisted of 89 participants (Mage = 38.3 years, female = 49, male = 40).

After viewing the stimulus material (product detail pages – see Figs. 2 & 3), participants completed the study questionnaire containing the focal constructs described above. Study 1 pursued two objectives. First, it aimed to establish the existence of the green gap by examining whether consumers would report lower purchase intentions for the organic high-price product despite perceiving it as more sustainable. Second, the study investigated the psychological mechanisms underlying this effect by examining the competing roles of perceived quality, perceived monetary sacrifice and perceived sustainability, in shaping purchase intention.

Study 1: Results and discussion

Independent-samples t-tests were conducted comparing evaluations of the conventional low-price T-shirt and the organic high-price T-shirt. Results showed that the organic T-shirt was perceived as significantly more sustainable ($M = 4.76$, $SD = 1.24$, $N = 44$) than the conventional alternative ($M = 3.75$, $SD = 1.44$, $N = 45$), $t(87) = -3.54$, $p < .001$, $d = 0.75$. However, despite these more favorable sustainability perceptions, participants reported significantly lower purchase intentions for the organic T-shirt ($M = 4.03$, $SD = 1.74$, $N = 44$) compared to the conventional low-price alternative ($M = 5.42$, $SD = 1.61$, $N = 45$), $t(87) = 3.90$, $p < .001$, $d = 0.83$.

Additional analyses controlling for environmental concern and sociodemographic variables yielded substantively identical results, with the green gap remaining highly significant. Together, these findings provide clear evidence for the green gap. Although consumers perceived the organic product as significantly more sustainable, they nevertheless expressed substantially stronger purchase intentions for the conventional low-price alternative, thereby supporting H1.

To further investigate the psychological mechanisms underlying the green gap, a parallel mediation analysis was conducted using PROCESS Model 4 with 5,000 bootstrap samples (Hayes 2017). The product-price combination (0 = conventional low-price, 1 = organic high-price) served as the independent variable, purchase intention as the dependent variable, and perceived sustainability, perceived quality (DRoP Quality), and perceived monetary sacrifice (DRoP Monetary Sacrifice) as parallel mediators.

The total effect of the product-price combination on purchase intention was significant, $b = -1.39$, $SE = 0.36$, $t = -3.90$, $p < .001$, 95% $CI [-2.10, -0.68]$, indicating lower purchase intentions for the organic high-price product. However, once the mediators were included, the direct effect was reduced and no longer statistically significant, $b = -0.82$, $SE = 0.47$, $t = -1.75$, $p = .085$, 95% $CI [-1.76, 0.11]$, suggesting that the relationship between the product-price combination and purchase intention was largely explained by the proposed psychological mechanisms.

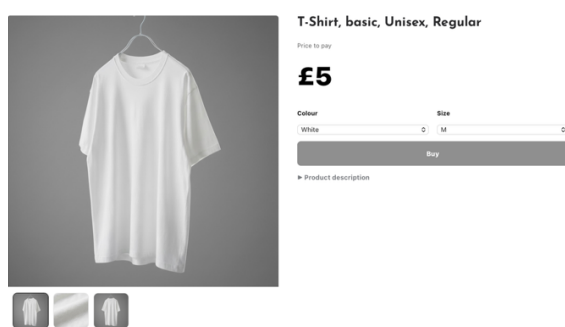


FIGURE 2 - Conventional low-price T-Shirt

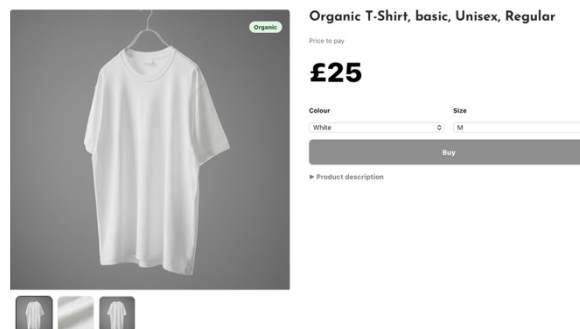


FIGURE 3 - Organic high-price T-Shirt

In the final regression model predicting purchase intention, perceived sustainability and perceived quality significantly positive influenced purchase intention, whereas perceived monetary sacrifice exerted a significant negative effect (perceived quality: $b = 0.36, p = .013$; perceived monetary sacrifice: $b = -0.35, p = .003$; perceived sustainability: $b = 0.37, p = .006$).

The analysis further revealed competing indirect effects. Specifically, the organic high-price combination increased purchase intention indirectly through higher perceived sustainability, indirect effect = 0.37, BootSE = 0.19, 95% CI [0.10, 0.87]. At the same time, it reduced purchase intention through increased perceptions of monetary sacrifice, indirect effect = -1.06, BootSE = 0.36, 95% CI [-1.81, -0.40]. In contrast, the indirect effect through perceived quality was positive but not statistically significant, indirect effect = 0.12, BootSE = 0.11, 95% CI [-0.03, 0.46]. Additional robustness analyses including sociodemographic variables and environmental concern as covariates yielded substantively comparable results. In particular, the indirect effects through perceived sustainability and perceived monetary sacrifice remained significant. However, in contrast to the baseline model, the direct effect of the product-price combination on purchase intention remained significant, indicating partial rather than full mediation. Together, these findings suggest that the proposed mediators explain a substantial share of the green gap, while the results remain robust to the inclusion of relevant consumer characteristics.

Overall, the results indicate that the organic high-price product simultaneously activated competing psychological mechanisms. While perceived sustainability increased purchase intention, perceived monetary sacrifice exerted a substantially stronger negative influence, thereby contributing to the emergence of the green gap. Consistent with this pattern, significant indirect effects emerged through perceived sustainability and perceived monetary sacrifice, whereas the indirect effect through perceived quality was not statistically significant. Thus, H2 received partial support.

Study 2a: Method

Building on the findings of the pretest and Study 1, Study 2a examined whether disclosing hidden costs through reductive labels influences consumers' evaluations of conventional and sustainable product alternatives. The study employed a 2 (product-price combination: conventional low-price vs. organic high-price) $\times$ 2 (hidden-cost labeling: absent vs. reductive label) between-subjects design. Participants from the UK were recruited via Prolific. Since the two control conditions without hidden-cost labels had already been collected in Study 1, only the two additional hidden-cost label conditions were newly collected for Study 2a. Across Study 1 and Study 2a, the combined sample consisted of 167 participants ($M_{age} = 39.05$ years; female = 89, male = 77, diverse = 1). Participants who failed the attention checks were excluded prior to analysis ($N = 6$).

The study builds on the assumption that future regulation may require firms to disclose the hidden costs associated with products. Such mandatory disclosure is particularly relevant because voluntary disclosure would realistically occur primarily for products with comparatively low hidden costs. By disclosing additional information about the hidden costs associated with the product-price combinations, Study 2a investigates whether hidden-cost labels can influence consumers' product perceptions and reduce the green gap. Prior to the experimental manipulation, participants in the reductive hidden-cost label conditions received a short introduction explaining the concept of hidden costs. The explanation clarified the distinction between a product's retail price and hidden costs borne by society, such as environmental emissions or social underpayment. In addition, participants were informed that sustainable products may involve higher retail prices because they are assumed to reduce or internalize a larger share of such hidden costs through more responsible production practices (e.g. responsible materials or fair wages). This introduction was included to establish a common understanding of the hidden-cost concept across participants before exposure to the experimental stimuli.

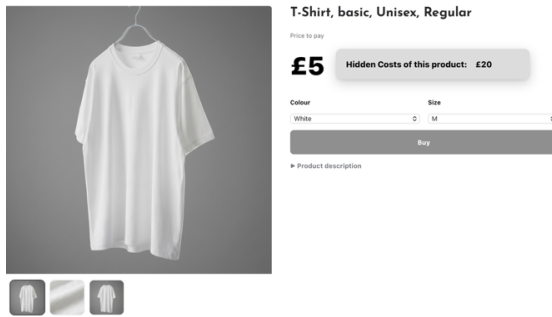


FIGURE 5 - Conventional low-price T-Shirt with reductive hidden-cost label



FIGURE 6 - Organic high-price T-Shirt with reductive hidden-cost label

To ensure comparability across studies, the product detail pages and retail prices from Study 1 were retained unchanged. In the hidden-cost label conditions, additional hidden-cost information was displayed next to the retail price in the form of a reductive label. For the conventional low-price product, the hidden costs corresponded to the difference between the two observed retail prices (£20), reflecting hidden costs (Fig. 5). In contrast, the organic high-price product (Fig. 6) was assumed to internalize these costs, resulting in hidden costs of £0 (Fig. 6).

To assess participants' understanding of the hidden-cost information, two manipulation checks were conducted for participants in the reductive hidden-cost label conditions ($n = 78$). First, participants were asked to identify the hidden costs associated with the displayed T-shirt; 85% provided the correct answer, indicating that the information was noticed. Second, participants completed a comprehension task assessing their understanding of the hidden-cost concept and the distinction between retail prices and hidden costs. Overall, 77% of participants answered all statements correctly, suggesting that most participants correctly understood the meaning and functioning of hidden costs within the experimental context.

Study 2a: Results and discussion

Study 2a examined whether reductive hidden-cost labeling closes the green gap. A 2 x 2 between-subjects ANOVA was conducted with product-price combination (conventional low price vs. organic high price) and reductive hidden-cost labeling (absent vs. present) as between-subjects factors and purchase intention as the dependent variable.

The analysis revealed a significant main effect of product-price combination, $F(1,163) = 6.09, p = .015, \eta^2p = .036$, indicating overall differences in purchase intention between the conventional and organic product conditions. In addition, a significant main effect of reductive hidden-cost labeling emerged, $F(1,163) = 4.39, p = .038, \eta^2p = .026$, suggesting that the presence of hidden-cost information generally influenced purchase intention. More importantly, the analysis revealed a significant interaction effect between product-price combination and reductive hidden-cost labeling, $F(1,163) = 6.92, p = .009, \eta^2p = .041$. As shown in Study 1, participants in the control condition reported substantially higher purchase intentions for the conventional low-price product ($M = 5.42, SD = 1.61, N = 45$) than for the organic high-price alternative ($M = 4.03, SD = 1.74, N = 44$), reflecting the presence of the green gap. However, under reductive hidden-cost labeling, the difference in purchase intentions disappeared between the conventional product ($M = 4.14, SD = 1.88, N = 35$) and the organic product ($M = 4.18, SD = 1.79, N = 43$).

Additional ANCOVA analyses including environmental concern and sociodemographic variables as covariates yielded substantively identical results. In particular, the interaction between product-price combination and reductive hidden-cost labeling remained significant, indicating that the attenuation of the

green gap was robust to the inclusion of relevant consumer characteristics. To further examine this effect, an independent-samples *t*-test was conducted within the reductive labeling conditions. Results indicated that purchase intentions no longer differed significantly between the conventional and organic product conditions, $t(76) = -0.11, p = .915, d = 0.02$. Importantly, this attenuation of the green gap was primarily driven by a substantial decline in purchase intention for the conventional low-price product following the introduction of hidden-cost information, whereas evaluations of the organic high-price product remained comparatively stable.

Therefore, H3 was not supported. Although the significant interaction effect indicated that reductive hidden-cost labels substantially altered the preference pattern between the conventional and organic product-price combinations, purchase intentions did not differ significantly between the organic high-price and conventional low-price products when reductive hidden-cost labels were present. Instead, reductive labeling eliminated the significant difference observed in Study 1, thereby attenuating rather than reversing the green gap.

Building on the mediation model tested in Study 1, a moderated mediation analysis was conducted using PROCESS Model 7 with 5,000 bootstrap samples, introducing reductive hidden-cost labeling as a moderator of the indirect effects (Hayes, 2017). Consistent with Study 1, perceived quality positively influenced purchase intention ($b = 0.56, p < .001$), whereas perceived monetary sacrifice exerted a negative effect on the dependent variable ($b = -0.48, p < .001$). In contrast to Study 1, however, perceived sustainability no longer significantly predicted purchase intention ($b = 0.12, p = .153$). The analysis further indicated that reductive hidden-cost labeling did not significantly moderate the indirect effects of the product-price combination on purchase intention, as all indices of moderated mediation included zero. Nevertheless, the conditional indirect effects pointed in the theoretically expected direction. In particular, the negative indirect effect via perceived monetary sacrifice remained significant both in the control condition (indirect effect = -1.45 , BootSE = 0.26 , 95% CI $[-2.00, -1.01]$) and under reductive labeling (indirect effect = -1.13 , BootSE = 0.25 , 95% CI $[-1.65, -0.69]$). At the same time, the positive indirect effects through perceived sustainability and perceived quality were numerically stronger under reductive labeling, although these differences did not reach statistical significance.

Additional robustness analyses including sociodemographic variables and environmental concern as covariates yielded substantively comparable results. In particular, the pattern of indirect effects remained largely unchanged. Although reductive hidden-cost labeling was associated with a weaker monetary-sacrifice differential and stronger sustainability perceptions for the organic alternative, the indices of moderated mediation remained non-significant across all mediators. These findings suggest that the attenuation effect observed in Study 2a is robust to the inclusion of relevant consumer characteristics.

H4 was not supported. While the conditional indirect effects through perceived sustainability and perceived quality pointed in the theoretically expected direction, the indices of moderated mediation remained non-significant. Thus, reductive hidden-cost labels attenuated the green gap without significantly changing the underlying psychological mechanisms.

Study 2b: Method

Building on Study 2a, Study 2b examined whether the effectiveness of hidden-cost disclosure depends not only on the presence of hidden-cost information, but also on how easily such information can be interpreted and evaluated. Whereas reductive hidden-cost labels attenuated the green gap primarily at the level of overall purchase intentions, the underlying psychological mechanisms remained largely unchanged. This suggests that merely disclosing hidden costs may be insufficient to fundamentally reshape consumers' evaluations of sustainable alternatives.

To address this limitation, Study 2b investigated whether graded hidden-cost labels can increase the evaluability and comparability of sustainability information by providing consumers with an explicit evaluative reference system. In contrast to reductive labels that merely disclose absolute hidden-cost values, graded labels may facilitate more intuitive product evaluations and strengthen positive sustainability- and quality-related inferences associated with sustainable products. The study therefore examined whether graded hidden-cost labels can not only attenuate but fully reverse the green gap and whether these effects emerge through changes in the underlying psychological mechanisms. A 2 (product-price combination: conventional low-price vs. organic high-price) x 2 (hidden-cost information: absent vs. graded label) between-subjects design was employed.

Participants from the UK were recruited via Prolific. Since the two control conditions without hidden-cost labels had already been collected in Study 1, only the two additional graded hidden-cost label conditions were newly collected for Study 2b. Across Study 1 and Study 2b, the combined sample consisted of 169 participants (*M*_{age} = 38.94 years; female = 83, male = 86). Participants who failed the attention checks were excluded prior to analysis (*N* = 2).

Similar to Study 2a, participants in the graded hidden-cost label conditions first received a short introduction explaining the concept of hidden costs and the distinction between retail prices and hidden costs borne by society. In addition, participants received a second introduction explaining the functionality of the graded hidden-cost label. The explanation introduced the label as a hypothetical mandatory disclosure system in which products receive a sustainability grade ranging from “A” (very low hidden costs) to “G” (very high hidden costs). This introduction was included to ensure a common understanding of the graded-label system prior to exposure to the experimental stimuli. To ensure comparability across studies, product detail pages, and retail prices from Studies 1 and 2a were retained unchanged. In the graded-label conditions, the hidden-cost label was displayed within the product description. To maximize realism and external validity, the label design was based on the UK Energy Label, a grading format widely established, legally required, and highly familiar to consumers in the UK. Analogous to this system, the organic high-price T-shirt received an “A” rating (fig. 6), whereas the conventional low-price T-shirt received a “G” rating (Fig. 7). Consistent with Study 2a, the corresponding absolute hidden costs (£0 vs. £20) were additionally displayed within the graded label.

To assess participants’ understanding of the graded hidden-cost label, four manipulation checks were conducted for participants in the graded-label conditions (*N* = 80). First, 74% correctly identified the hidden costs associated with the displayed T-shirt, indicating that the information was noticed. Second, 85% correctly answered a comprehension task assessing their understanding of the hidden-cost concept. Third, 86% correctly recalled the respective rating. Finally, 81% correctly answered all statements assessing their understanding of the graded-label system itself, indicating that the label format was largely understood as intended.

Study 2b: Results and discussion

Study 2b examined whether graded hidden-cost labeling can reverse the green gap by increasing the evaluability of hidden-cost information. A 2 x 2 between-subjects ANOVA was conducted with product-price combination (conventional low-price vs. organic high-price) and graded hidden-cost labeling (absent vs. present) as between-subjects factors and purchase intention as the dependent variable. The analysis revealed no significant main effect of product-price combination, $F(1,165) = 0.001, p = .982, \eta^2 p < .001$. In contrast, a significant main effect of graded labeling emerged, $F(1,165) = 7.26, p = .008, \eta^2 p = .042$, indicating that graded labels generally influenced purchase intention. More importantly, the analysis revealed a substantial interaction effect between product-price combination and graded labeling, $F(1,165) = 25.37, p < .001, \eta^2 p = .133$.

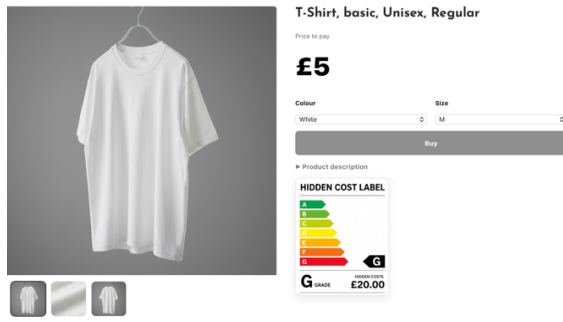


FIGURE 6 - Conventional low-price T-Shirt with graded hidden-cost label



FIGURE 7 - Organic high-price T-Shirt with graded hidden-cost label

As reported in Study 1, participants reported substantially higher purchase intentions for the conventional low-price product ($M = 5.42$, $SD = 1.61$, $N = 45$) than for the organic high-price alternative ($M = 4.03$, $SD = 1.74$, $N = 44$), reflecting the presence of the green gap if no label is displayed. However, under graded hidden-cost labeling, this pattern fully reversed. Participants reported significantly higher purchase intentions for the organic high-price product ($M = 4.68$, $SD = 1.87$, $N = 41$) than for the conventional low-price product ($M = 3.30$, $SD = 1.91$, $N = 39$). Additional ANCOVA analyses controlling for environmental concern and sociodemographic variables yielded substantively identical results, with the interaction between product-price combination and graded hidden-cost labeling remaining highly significant.

To further examine this reversal effect, an independent-samples t-test was conducted within the graded-labeling condition. Results indicated that purchase intentions were significantly higher for the organic product than for the conventional alternative, $t(78) = -3.26$, $p = .002$, $d = 0.73$. Importantly, this reversal was driven both by a substantial decline in purchase intention for the conventional low-price product and by a simultaneous increase in evaluations of the organic high-price alternative, suggesting that the graded label was associated both with reduced evaluations of the conventional product and enhanced evaluations of the sustainable alternative. Consistent with H5, participants reported significantly higher purchase intentions for the organic high-price product than for the conventional low-price product under graded hidden-cost labeling. These findings indicate that graded hidden-cost labels successfully reversed the green gap observed in Study 1.

To examine the psychological mechanisms underlying the reversal effect observed under graded hidden-cost labeling, a moderated mediation analysis was conducted using PROCESS Model 7 with 5,000 bootstrap samples (Hayes, 2017). In the final regression model predicting purchase intention, perceived quality and perceived sustainability positively influenced purchase intention, whereas perceived monetary sacrifice exerted a significant negative effect (perceived quality: $b = 0.62$, $p < .001$; perceived monetary sacrifice: $b = -0.38$, $p < .001$; perceived sustainability: $b = 0.33$, $p < .001$).

The analysis revealed significant moderated mediation effects for both perceived sustainability and perceived quality. First, the positive indirect effect of the product-price combination on purchase intention through perceived sustainability was significantly stronger under graded hidden-cost labeling than in the no-label condition. The interaction between product-price combination and graded labeling on perceived sustainability was significant, $b = 3.20$, $p < .001$. Whereas the organic product already generated higher sustainability perceptions in the control condition, this effect became substantially stronger under graded labeling. Correspondingly, the indirect effect via perceived sustainability increased from 0.33 (BootSE = 0.14, 95% CI [0.11, 0.68]) in the control condition to 1.38 (BootSE = 0.42, 95% CI [0.58, 2.24]) under graded labeling. Importantly, the index of moderated mediation was significant (Index = 1.05, BootSE = 0.34, 95% CI [0.44, 1.78]).

Second, graded labeling also strengthened the indirect effect through perceived quality. Consistent with this pattern, the interaction between product-price combination and graded labeling on perceived quality was likewise significant, $b = 0.95$, $p = .015$. Whereas the indirect effect via perceived quality was not significant in the control condition, the organic high-price product generated substantially stronger quality perceptions under graded labeling. Accordingly, the indirect effect via perceived quality was not significant in the control condition (indirect effect = 0.21, BootSE = 0.17, 95% CI [-0.09, 0.56]), but became positive and significant under graded labeling (indirect effect = 0.79, BootSE = 0.21, 95% CI [0.43, 1.26]). Again, the index of moderated mediation was significant (Index = 0.58, BootSE = 0.26, 95% CI [0.14, 1.16]).

In contrast, the indirect effect via perceived monetary sacrifice remained strongly negative both in the control condition (indirect effect = -1.17, BootSE = 0.31, 95% CI [-1.82, -0.58]) and under graded labeling (indirect effect = -1.00, BootSE = 0.27, 95% CI [-1.61, -0.51]). The corresponding index of moderated mediation was not significant (Index = 0.17, BootSE = 0.19, 95% CI [-0.14, 0.61]). Additional robustness analyses including environmental concern and sociodemographic variables as covariates yielded substantively comparable results. Importantly, the moderated mediation effects through perceived sustainability and perceived quality remained significant, whereas the moderated mediation effect through perceived monetary sacrifice remained non-significant. These findings further reinforce the conclusion that graded hidden-cost labels reverse the green gap primarily by increasing the relative importance of sustainability and quality perceptions, rather than by diminishing consumers' product perceptions of monetary sacrifice.

Taken together, the findings provide strong support for H6. By providing evaluability, graded hidden-cost labels significantly strengthened the indirect effects through perceived sustainability and perceived quality, while leaving the negative indirect effect through perceived monetary sacrifice largely unchanged. These findings suggest that graded hidden-cost labels reverse the green gap by increasing the evaluability of sustainability information, thereby enabling sustainability- and quality-related perceptions to exert a stronger influence on purchase intentions.

Conclusions and general discussion

This research examined how disclosing hidden costs influences consumers' evaluations regarding sustainable and conventional product alternatives. Across a pretest and three experimental studies, the findings provide consistent evidence that hidden-cost disclosure can substantially alter consumers' purchase intentions and reduce - or even reverse - the green gap. Study 1 first demonstrated the existence of the green gap within the context of sustainable apparel consumption. Although participants perceived organic high-price products as substantially more sustainable, they nevertheless reported lower purchase intentions compared to the conventional low-price alternative. The mediation analyses further revealed that sustainable products simultaneously activate competing psychological mechanisms. While sustainability perceptions positively influenced purchase intention, these favorable evaluations were outweighed by substantially stronger perceptions of monetary sacrifice. Together, these findings suggest that the green gap does not emerge because consumers disregard sustainability, but rather because the higher prices of sustainable products evoke strong perceptions of financial sacrifice that dominate purchase decisions. Building on these findings, Study 2a investigated whether disclosing hidden costs through reductive labels can close the green gap. The results demonstrated that reductive hidden-cost labels substantially reduced consumers' purchase intention for conventional low-price products, thereby attenuating the green gap. However, the moderated mediation analyses indicated that the underlying psychological mechanisms remained largely stable. In particular, perceptions of monetary sacrifice continued to exert a strong negative influence on purchase intention, while the positive effects of sustainability and quality perceptions were not significantly strengthened. These findings suggest that merely disclosing absolute hidden-cost information may attenuate the green gap but does not reshape how consumers perceive sustainable alternatives.

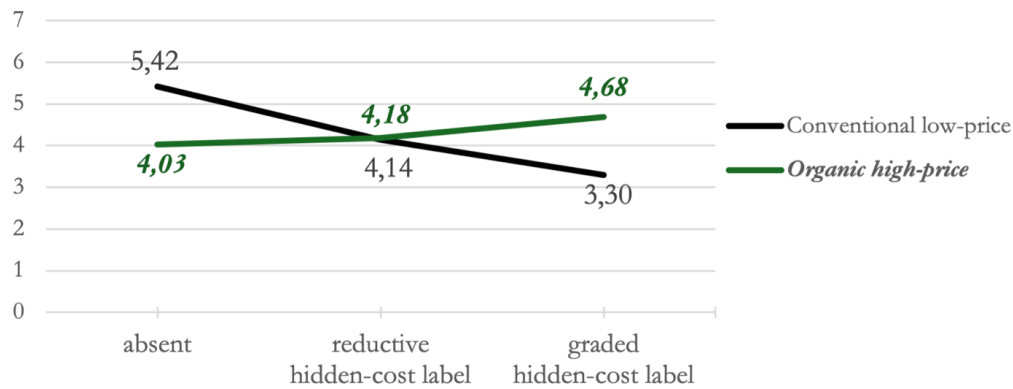


FIGURE 8 - Mean purchase intentions per hidden-cost labeling

Study 2b extended these findings by examining graded hidden-cost labels that contextualize sustainability information through an evaluative reference system. In contrast to reductive hidden-cost labels, graded labels fully reversed the green gap (Fig. 8). Under graded labeling, participants reported significantly higher purchase intentions for the organic high-price combination than for the conventional low-price combination. Importantly, the moderated mediation analyses revealed that graded hidden-cost labels significantly strengthened both sustainability and quality perceptions associated with the organic product. At the same time, perceptions of monetary sacrifice associated with the organic high-price combination remained largely unchanged. These findings indicate that graded hidden-cost labels do not eliminate consumers' price concerns. Rather, they increase the availability and evaluability of hidden costs, thereby enabling positive sustainability and quality perceptions to outweigh the perceived monetary sacrifice associated with the organic product.

Taken together, this research contributes to the literature in several ways. First, the findings extend research on the green gap by demonstrating that sustainable products simultaneously activate competing sustainability- and price-related evaluations. More specifically, the results expand the DRoP by showing that sustainable products cannot only evoke quality and monetary-sacrifice perceptions but also activate sustainability-related inferences that independently shape purchase intention. Second, the findings demonstrate that the effectiveness of hidden-cost labels critically depends on how sustainability information is disclosed. Whereas both types of hidden-cost labels can weaken the attractiveness of conventional products, graded labels have the potential to additionally strengthen positive evaluations of sustainable alternatives. Third, the findings highlight the importance of evaluability in sustainability communication. Because sustainability is largely a credence attribute, consumers often struggle to assess the sustainability of products (Atkinson & Rosenthal, 2014; Darby & Karni, 1973). Hidden-cost labels can help address this challenge by making otherwise unobservable sustainability consequences more visible and comparable. The findings suggest that consumers do not merely respond to the presence of sustainability-related information, but rather to whether such information can be easily interpreted and compared across alternatives. By providing a clear evaluative reference, graded hidden-cost labels appear to transform sustainability information into a more intuitive and decision-relevant cue.

The findings also offer important managerial and policy implications. From a pricing-strategy perspective, the results suggest that consumers do not evaluate sustainable price premiums in isolation, but rather in relation to the information available to justify these premiums. While reductive hidden-cost disclosures can weaken the attractiveness of conventional low-price products, graded labels appear particularly effective because they contextualize sustainability-related price differences through intuitive and comparable evaluation cues. As a result, firms may benefit not only from disclosing sustainability-related information, but from presenting such information in formats that increase the evaluability of sustainable price premiums.

For policymakers, the findings further suggest that standardized hidden-cost labeling systems may represent an effective instrument for influencing sustainable consumption decisions. In particular, graded and comparable disclosure formats appear substantially more effective than isolated numerical disclosures in enabling consumers to integrate sustainability-related costs into their purchase evaluations.

Several limitations should be acknowledged. First, the studies focused exclusively on T-shirts as one apparel product, which may limit generalizability to other product categories. Future research could therefore examine whether similar effects emerge in contexts characterized by different levels of sustainability involvement or price sensitivity. Second, the studies relied on purchase intentions measured in an online experimental setting rather than observing actual purchase behavior. Future research could investigate whether hidden-cost labeling produces similar effects in field experiments or actual retail environments. Third, future research could further explore how different price levels, label designs, reference systems, or framing mechanisms influence consumers' sustainability-related evaluations and trade-offs. Finally, the effectiveness of hidden-cost labeling may depend on widespread adoption. Although firms with comparatively low hidden costs may benefit from voluntarily disclosing such information, the full potential of hidden-cost labels is likely to emerge only when disclosure is standardized across all products, including conventional alternatives with comparatively high hidden costs. Achieving such market-wide adoption would likely require regulatory intervention in the form of mandatory disclosure requirements.

Overall, the present research demonstrates that disclosing hidden costs can substantially alter consumer evaluations of sustainable products. While reductive hidden-cost labels weaken consumers' purchase intention for conventional low-price products, graded labels fundamentally reshape how sustainable alternatives are evaluated by strengthening positive sustainability and quality perceptions. These findings highlight the critical role of availability and evaluability of hidden costs and suggest that well-designed hidden-cost labels can meaningfully reduce - and even reverse - the green gap.

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What women want: experiential retail and the high street

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Abstract. The British high street is undergoing profound structural and cultural transformation driven by economic uncertainty, technological disruption, and evolving consumer behaviors. Despite women accounting for approximately 70% of global consumer spending and shaping most household purchasing decisions, their experiences remain under explored in retail research. Such research often assumes a gender-neutral consumer and overlooks critical gendered aspects such as safety, accessibility, and representation. To address this gap, our study investigates how women engage with experiential retail across four UK high streets of Birmingham city center, Harborne, Lichfield, and Mere Green, using a qualitative comparative case study grounded in constructivist ontology and interpretivist epistemology. Data were collected through semi-structured interviews with 24 female consumers and five retail workers/business owners, analyzed via reflexive thematic analysis combining deductive and inductive coding. The findings reveal four key dimensions shaping female engagement: emotional and social atmosphere; functional needs and hybrid use; representation and visibility; and identity, locality, and place attachment. These informed the development of the Experiential Third Place Model, which integrates immersive design with social inclusion and routine-based engagement, extending existing experiential retail and third place frameworks by foregrounding gendered, context-specific experiences in everyday retail settings. The study contributes to theoretical advancement by reframing experiential retail through a gender-sensitive, routine-centered lens and offers practical recommendations for retailers, planners, and policymakers to create inclusive, resilient high streets that better reflect women's lived experiences and sustain their central role in retail vitality.

Keywords: women consumers; high streets, third places, experiential retail

Introduction

The British high street, once the hub of everyday retail, services, and social life, is undergoing profound transformation. Economic pressures, accelerated digital adoption, and shifting consumer expectations have reshaped its purpose and composition (Campbell-Gosling *et al.*, 2024; Institute of Place Management, 2025). While high streets historically blended functional retail with essential services, the post pandemic period has intensified long-term structural change (House of Lords Built Environment Committee, 2024; Beck, 2025). Furthermore, there is concern around the health and longevity of existing high streets with multiple Government enquires and calls for evidence to secure their future (Montano 2025; 2026; Ward 2025). Today, the high street is reemerging as a multifunctional environment where leisure, community connection, and experiential engagement sit alongside, and often supersede, traditional retail formats (White *et al.*, 2023; McGregor, 2024; Shahab & Webb, 2024). Within this transition, women play a central yet underexamined role. As primary decisionmakers in household consumption and the drivers of most global spending, women's routines, social practices, and care responsibilities position them as key users of high street

environments (Roshitsh, 2019; Pereira & Rebelo, 2024; Graham, 2024). However, retail research has frequently treated consumers as gender-neutral, masking the ways in which high streets are shaped by implicit male norms (Schauer *et al.*, 2023; Montano & Toral, 2023). Feminist spatial critiques, including Massey (1994), have long argued that space is socially produced and embedded in power relations. Yet these insights remain insufficiently incorporated into mainstream retail thinking, resulting in high streets that inadequately reflect women's lived experiences in relation to safety, accessibility, representation, and emotional comfort.

The evolving nature of high street value reinforces the importance of this oversight. While physical retail continues to account for around 70% of global sales (Euromonitor, 2024), the UK experienced the loss of approximately 250,000 retail jobs between 2020 and 2024, with an estimated 37 store closures per day in 2024 (British Retail Consortium, 2025a; Goodley, 2025). These patterns, particularly prominent in suburban locations, highlight the declining role of physical stores as transactional spaces (Hanlon, 2019). Consumers increasingly seek meaning, sociability, and experiential depth in their interactions with retail environments (Graham, 2024). As a result, many high streets have shifted toward cafés, personal services, hospitality, and other experience rich formats (Easton and BBC Data Journalism Team, 2022). This represents the broader "experiential turn" in retail where emotional resonance, sensory engagement, and social atmosphere become core value drivers (Pine & Gilmore, 1999; Hagtvedt & Chandukala, 2023; Alexander & Cano, 2020; Alexander & Varley, 2025).

Despite their central role in shaping demand, women remain a neglected group within this experiential reconfiguration (Graham, 2024). Women's engagement with the high street extends across multiple dimensions (shopping, socializing, routine mobility, and selfcare) (Miller, 1998; Brunelli *et al.*, 2024). Yet retail design often assumes an abstract, "neutral" consumer whose needs ostensibly apply to all, but in practice reflect a default male orientation. This manifests in oversight of issues such as inadequate lighting, poor wayfinding, limited seating, inaccessible layouts, and the absence of authentic female representation. Such factors significantly shape willingness to visit, linger, and return, and thus influence both experiential value and commercial performance (Pereira & Rebelo, 2024). To revitalize the high street, women's perspectives must be placed at the forefront of both theoretical development and retail practice.

Two frameworks are particularly valuable in understanding this shift. Pine & Gilmore's (1999) Experience Economy proposes four dimensions of experience such as entertainment, education, escapism and aesthetics emphasizing the design of memorable encounters. Oldenburg's (1989) concept of the Third Place highlights informal, accessible environments that foster sociability and belonging between home and work. Together, these frameworks capture the dual significance of aesthetic experience and social relationality. Their complementary strengths are well suited to analyzing contemporary high streets, where consumers seek immersive engagement as well as community orientated spaces (Alexander, 2019).

Therefore, our principal research question was: *How do women experience and engage with contemporary British high streets, and to what extent do these spaces reflect and respond to their role as primary drivers of consumer spending?* Drawing on qualitative comparative case studies across four contrasting high street environments, the research examined how atmosphere, functionality, representation, and emotional attachment intersect to shape women's experiences and addresses two key research gaps:

- (i) The absence of gendered analysis within both experiential and spatial retail frameworks;
- (ii) The lack of comparative research on experiential retail beyond major urban centers.

In answering this question, the study contributes to debates in experiential consumption, gendered spatiality, and placemaking, offering evidence-based insights for retailers, designers, and policymakers seeking to build inclusive, resilient, and socially meaningful high streets.

Literature Review

Gender and Consumption

Gender fundamentally shapes contemporary retail engagement (Francis-Devine *et al.*, 2025). Women drive approximately 70% of global consumer spending and make most household purchasing decisions, positioning them as the most financially influential consumer group (Roshitsh, 2019). Their economic power, estimated at \$32 trillion globally in 2024, is amplified by the multiplier effect, as many purchases are made not only for themselves but also for dependents (Graham, 2024). Furthermore, their purchasing power is amplified by the multiplier effect, as women frequently buy on behalf of dependents and households (Graham, 2024). Despite this, retail design often reflects male centric norms that overlook the values, expectations, and emotional labor underpinning women's shopping practices (Montano & Toral, 2023). Nevertheless, gender stereotypes persist. From BrewDog's "Beer for Girls" campaign to cultural narratives like "girl math," female consumption is often trivialized (Caviness, 2024). Retail environments continue to reflect male defaults through minimalist layouts, inaccessible store design, and gender segregated spaces (Schauer *et al.*, 2023). Redevelopment projects often privilege visual spectacle or technological novelty over relational use (Lim *et al.*, 2018). Design decisions such as placing maternity wear on upper floors (Bates, 2022) or adopting inaccessible high-tech features (Kotzé *et al.*, 2016) reflect a persistent male default. These patterns highlight the need for gender aware experiential strategies that recognize the diversity of women's everyday retail lives.

This gender blindness is also echoed in academic literature. While experiential retail is promoted as a strategy for revitalizing the high street (White *et al.*, 2023), many studies still treat consumers as neutral subjects (Borges *et al.*, 2013), obscuring the gendered dynamics of consumption (Kim *et al.*, 2024). Retail environments are culturally embedded spaces, reflecting social norms and power relations (Schauer *et al.*, 2023). For women, engagement is closely tied to routines, care work, and emotional labor (Miller, 1998). Tuan's (1974) concept of topophilia captures this emotional bond, while de Certeau's (1984) notion of tactics explains how women creatively appropriate retail space meeting in cafés, exploring second-hand fashion, or engaging with community popups. Experiential retail seeks to foster immersive, emotionally resonant environments (Hagtvedt & Chandukala, 2023), qualities strongly aligned with female consumer preferences. Experiential retail aligns closely with many female consumer preferences, such as emotional resonance, aesthetic richness, and social interaction (Bäckström & Johansson, 2006; Kim *et al.*, 2024). Identity driven experiences such as Huda Beauty's Covent Garden immersive popup (Cuff, 2020) illustrate how women engage with expressive, participatory retail environments. Recognizing women's central role in sustaining and reshaping high streets is essential. Incorporating their lived experiences into experiential design enhances inclusion and supports more vibrant, emotionally meaningful retail environments. However, before we do so, it is important to recognize the impact that the historical evolution of the British high street has had on consumers and how its role has changed.

The changing retail landscape and the British High Street

Understanding the transformation of the British high street, particularly the shift from transactional retailing to experiential and community-oriented environment, is critical for explaining contemporary consumer behavior (White *et al.*, 2023). The British high street has long served as both a commercial and social anchor, evolving in response to technological, cultural, and economic change (Vaughan, 2015). Women have historically shaped these retail landscapes through everyday practices, emotional labor, and community-based routines (Hamlett *et al.*, 2008; Criado Perez, 2019).

Modern British retailing emerged in the mid 19th century with the rise of structured trading, fixed pricing, and early forms of visual merchandising (Jefferys, 2011; Howard, 2021). Yet for many working class and lower middleclass consumers, early 20th century shopping remained resolutely local, grounded in trust, routine, and relationships with familiar shopkeepers (Hamlett *et al.*, 2008). Women played a central role in

these networks, undertaking daily provisioning and sustaining the social ties that underpinned local commerce (Boris & Swinth, 2023). Wartime rationing (1940–1954) intensified reliance on local retailers, whose trust-based systems helped communities navigate scarcity. Thus, even amid structural change, the high street retained its emotional and social significance.

The postwar decades marked a fundamental reorientation toward convenience, branded goods, and self-service. Sainsbury's first self-service store in 1950 symbolized this shift, as shopping transitioned from personalized interaction to more individualized browsing (Barford, 2014; Hughes, 2023). As more women entered paid employment, demand for timesaving solutions increased (Bose *et al.*, 2022), reinforced by innovations such as sliced bread and consolidated supermarket formats. Self-service also reshaped the sensory and emotional character of shopping. Store layouts emphasized speed and efficiency, while the emerging discipline of servicescape design demonstrated the role of atmospherics in influencing behavior (Bitner, 1992). Advertising increasingly targeted women, framing consumption as central to modern domesticity. Credit cards, first introduced in 1967, further abstracted consumption from social relationships, enabling new forms of individualized, debt driven retailing (Önder, 2018).

The 1970s consolidated retail modernity through suburbanization and the rise of large format, car dependent stores and retail parks (Newby & Shepherd, 2024). While these formats improved efficiency, they weakened community-based retail interactions and displaced local high streets (London Assembly, 2025). For women, still positioned as primary household shoppers, this shift altered both the geography and emotional experience of retailing (Hughes, 2023). Simultaneously, barcoding and early data analytics laid the foundations for targeted marketing and loyalty schemes (Wohlsen, 2014; Harford, 2017). The consumer increasingly became a source of data reshaping gendered retail behaviors.

The decline of traditional high streets prompted supermarkets and shopping centers to expand their social functions. By incorporating cafés, pharmacies, and other services, they became informal third places that offered comfort, sociability, and familiarity (Oldenburg, 1989; Pettersen *et al.*, 2024). Such environments often held particular value for women, older adults, immigrants, and lower income communities—groups whose social routines often centered on accessible, everyday spaces (Hughes, 2023). These developments demonstrate how retail environments acquired emotional and communal significance long before “experiential retail” became a strategic concept.

The rapid rise of ecommerce fundamentally disrupted high street dynamics (Isharyani *et al.*, 2024). Online retailing reduced footfall, accelerated homogenization through the dominance of national chains and undermined the high street's role as a sociable third place. For many women, whose retail engagement had long intertwined social interaction, care work, and routine, this shift represented both economic and emotional loss. The proliferation of mobile technologies created continuous, personalized consumption (Wilson *et al.*, 2024), shifting retail encounters from physical spaces to algorithmic, data driven environments (Gavilan & Martinez-Navarro, 2022). These developments transformed not only retail structures but also everyday social life.

Recent years have seen a renewed attempt to reinvigorate physical spaces through phygital' hybrid experiences that integrate digital convenience with instore engagement. Retailers such as Marks & Spencer have incorporated in changing room self-checkout to streamline journeys (Hill, 2024), while AI, AR, and data analytics allow increasingly personalized interactions (Hill & Cheshire, 2022; Euromonitor, 2024). Accelerated by COVID19, these innovations have reshaped retail into hybrid models that maintain physical presence while leveraging digital capabilities. The coffeeshop sector exemplifies this transformation. With over 25,000 UK outlets by 2019 (Ferreira *et al.*, 2021), cafés now function as hybrid workspaces, community hubs, and wellness-oriented environments. Yet their distribution remains uneven, raising questions about whose high streets benefit from experiential investment (Saey & Foss, 2016). Women's everyday routines—

often involving loops of childcare, work, and social interaction—make these divides particularly significant (Criado Perez, 2019; Noaime *et al.*, 2024).

DRIVERS OF EXPERIENTIAL RETAIL

Experiential retail has emerged as a strategic response to digital disruption, market saturation, and shifting consumer expectations (Alexander & Cano, 2020; Imschloss & Schwemmler, 2024). Despite increases in online shopping, consumers continue to value the sensory, symbolic, and relational aspects of instore retailing (Robertson *et al.*, 2020). For retailers, experiential strategies help reduce returns, differentiate in competitive markets, and build emotional engagement (Ferne & Sparks, 2014). Experiential sites from flagship stores to immersive popups draw on sensory branding, interactive technologies, and theatrical design (Quartier *et al.*, 2014). Kotler's (1973) atmospherics and the later Experience Economy (Pine & Gilmore, 1999) highlight how atmosphere and participation underpin consumer meaning making. Yet the focus on immersive spectacle often obscures everyday sociability and community practices, which remain central to high street vitality (Brunelli *et al.*, 2024). The post pandemic rise of the Feeling Economy (Rust & Huang, 2021) has amplified the importance of emotional resonance, authenticity, and rituals, encouraging brands to design for everyday moments as much as for theatrical experiences (Shaw, 2022; John Lewis, 2022).

Pine & Gilmore's (1999) Experience Economy remains a foundational framework, categorizing experiences into four realms—entertainment, education, escapism, and esthetics—based on participation and immersion. Its strength lies in conceptualizing experience as a value proposition rather than an embellishment. By contrast, Oldenburg's (1989) third place foregrounds informality, accessibility, and routine sociability. Rosenbaum's (2006) concept of place attachment further explains how repeated interactions build belonging, trust, and emotional connection—particularly relevant for women, whose loyalty often centers on interpersonal relationships rather than brands (Melnik *et al.*, 2009). Taken together, these frameworks illustrate the dual nature of contemporary retail: both staged and performative, and routine and relational.

Designing mechanisms and modes of engagement

Experiential retail is intentionally crafted through design, atmospherics, and performance and retail theatre positions the store as a stage, coproduced by staff, consumers, and environment (Grove & Fisk, 1992; Kozinets *et al.*, 2002). Iconic examples from American Girl's instore doll experiences (Mitchell, 2019) to Selfridges' museum style installations (Visit Birmingham, 2019) demonstrate how narrative and participation create memorable encounters (Ritzer, 1999; Feenstra *et al.*, 2015). However, such theatrical formats remain rare on everyday high streets, where women undertake the majority of everyday, community-based shopping (Beebejaun, 2016). Popups, microevents, and service led interactions dominate, yet these smaller scale experiences still contribute significantly to community engagement (McGregor, 2024). Digital inequality complicates this landscape. While flagship stores deploy advanced AI, AR and VR (Alexander & Varley, 2025), high streets often rely on routine interaction rather than technological spectacle. Concerns over privacy, accessibility and exclusion are particularly salient for women, who frequently face usability barriers and trust issues in data driven personalisation (Kolar *et al.*, 2024). This reinforces the need for inclusive, community rooted experiential design.

Place profoundly shapes experiential retail. Urban centers attract trend driven, theatrical formats (e.g., Sephora in Birmingham's Bullring; Morgan, 2024), while smaller towns rely on familiar cafés, salons, and everyday services that act as third places for women juggling work, care, and community roles (Graham, 2024). Spatial analysis reveals strong gendered dimensions to access, safety, and emotional resonance (Massey, 1994). Designing for emotion is central. Servicescape elements influence affective responses (Sharma *et al.*, 2023), while hybrid work patterns have intensified demand for hyperlocal, welcoming retail

spaces (Gauri *et al.*, 2021). While Pine and Gilmore emphasize staged spectacle and Oldenburg (1989) focusses on routine sociability, neither adequately accounts for gendered retail experiences or the hybrid digital physical environments shaping contemporary high streets. Oldenburg's (1999) model reflects masculine, Western defaults (Fullagar *et al.*, 2019), while experiential retail often prioritizes spectacle over relational practices (Bäckström & Johansson, 2006).

In conclusion, women despite being the primary drivers of global consumer spending, they remain underrepresented in both retail strategy and in academic discourse. To compound matters the British high street is undergoing profound structural and cultural change, opening up opportunities for change and women centered places. Historical and contemporary evidence illustrates that women's engagement with retail is relational, emotional, and embedded in routines of care, sociability, and identity. However, high streets continue to reflect male centric design norms that overlook issues of safety, accessibility, and authentic representation. This gap highlights the need for inclusive, context specific experiential models that prioritize women's lived experiences. Experiential retail and Third Places have therefore emerged as key solutions to create rerail spaces that better support women's expectations, wellbeing, and meaningful engagement.

Methodology

This research is grounded in a constructivist ontology and interpretivist epistemology, an approach well suited to examining how women make meaning within contemporary high street environments. Constructivism positions retail experience as socially produced through interaction, while interpretivism foregrounds the situated, emotional and spatial contexts in which those experiences unfold. Given the centrality of gendered behaviors, embodied routines, and socio-spatial practices, a qualitative methodology was essential for capturing the nuance and complexity of these lived experiences.

Research design: comparative qualitative case study

A comparative qualitative case study design was adopted to investigate how women engage with four contrasting high street environments: Birmingham city center, Harborne, Lichfield, and Mere Green. Case study methodology is well established in retail and services research, allowing for rich understanding of place-based dynamics and, social interactions. The selection of sites followed a maximum variation sampling logic, ensuring contrast across scale (urban vs suburban), retail composition (chain dominated vs independent led), demographic profile, and experiential character. This design acknowledges that "the high street" is not a homogenous entity but a socio-commercial ecosystem shaped by spatial, cultural and economic differences. Comparative analysis enabled identification of both shared experiential dimensions and location specific dynamics, enhancing theoretical transferability while preserving contextual integrity.

Sampling strategy

Using purposive sampling, 24 women aged 18–64 were recruited based on their frequent engagement with the designated high streets. This demographic reflects the segment with the strongest economic and emotional relationship with retail environments and aligns with research positioning women as key drivers of consumer spending and social retail participation. To complement consumer perspectives, five retail workers and business owners were also interviewed. This provided an operational lens on atmospherics, experiential design, and everyday retail practice. A limited degree of snowball sampling supported recruitment but was carefully managed to avoid homogeneity.

Data collection

Primary data were collected through semi structured interviews, a method well suited to eliciting reflective accounts of retail engagement, emotional experience, and perceptions of safety, inclusion, and representation. The interview guide was informed by Pine and Gilmore's Experience Economy and

Oldenburg's Third Place theory, while remaining sufficiently open to allow novel themes to emerge. Interviews initially commenced in person; however, to prioritize participant comfort—particularly when discussing experiences of gendered space—a researcher administered digital format (Google Forms) was adopted for many interviews. Participants provided responses verbally or through reflective conversation, which the researcher transcribed in real time. This method enhanced accessibility and disclosure, especially in busy or public high street environments, while maintaining the rigor and depth expected of qualitative inquiry. Secondary data provided essential macro context for interpreting local experiences. Sources included British Retail Consortium datasets, House of Lords Built Environment Committee reports, Ordnance Survey-based BBC Postcode Checker, and national retail employment and vacancy data. Although these datasets vary in granularity and periodicity, together they offered a robust evidence base outlining structural trends such as store closures, service reconfiguration, and the experiential shift across UK high streets.

Data analysis

Data analysis followed Braun & Clarke's (2006; 2019) reflexive thematic analysis framework. NVivo supported systematic organization and interrogation of the dataset. A hybrid coding approach was used: Deductive codes drew on Experience Economy and Third Place constructs (e.g., atmosphere, sociability, immersion, participation); Inductive codes emerged directly from participants' narratives (e.g., emotional safety, identity alignment, hybrid shopping routines). The coding process produced 61 initial codes, reduced to 34 refined codes, synthesized into four overarching themes that underpin the *Experiential Third Place Model*: Emotional and Social Atmosphere, Functional Needs and Hybrid Use, Representation and Visibility, Identity, Locality and Attachment. Cross case comparisons were used to identify patterns that transcended location while also clarifying distinctions between urban and suburban contexts.

Results

The thematic analysis generated four interconnected dimensions: Emotional and Social Atmosphere, Functional Needs and Hybrid Use, Representation and Visibility, and Identity, Locality and Place Attachment. Together, these dimensions form the basis of the *Experiential Third Place Model*, which extends Pine & Gilmore's (1999) Experience Economy and Oldenburg's (1989) Third Place by embedding gender, routine, emotional security and spatial specificity into experiential retail theory.

Emotional and social atmosphere

Across all high streets, emotional and social atmosphere emerged as a primary determinant of female engagement. Participants emphasized calmness, familiarity, and sensory comfort as fundamental components of a positive retail experience. These findings strongly align with Kotler's (1973) concept of atmospherics and Bitner's (1992) servicescape, both of which conceptualize environmental cues lighting, music, layout, and scent as central to shaping consumer emotions. However, the present study extends these models by demonstrating the gendered nuances of emotional comfort, particularly the importance of relational interactions and safety. Women repeatedly identified cafés, salons, and well-designed boutiques as emotionally resonant "pause points" within their everyday routines, reflecting Oldenburg's (1989) claim that informal social venues can operate as "third places." Yet, this research reveals that Oldenburg's assumptions of neutrality fail to capture the gendered realities of contemporary high streets (Fullagar *et al.*, 2019). For example, the significance of recognition by staff feeling known, welcomed or remembered echoes Mittal & Lassar's (1996) work on personalization and Rosenbaum's (2006) research on social support in commercial settings. Such interactions fostered deeper emotional attachment and belonging, particularly in Harborne and Lichfield, where independent retailers create personalized, relationally rich environments.

These findings align with Graham's (2024) argument that women's purchasing behaviors are strongly influenced by emotional resonance and everyday relationality. They also reinforce Pine and Gilmore's (1999)

experiential realms, particularly esthetic and escapist dimensions, though often enacted subtly through comfort and routine rather than spectacular design. The emotional quality of place, therefore, is not an adjunct to retail performance but a fundamental element of how women value, navigate, and return to high street environments.

Functional needs and hybrid use

While atmosphere was central, functionality emerged as a necessary precondition for experiential value. Participants emphasized the practical importance of accessibility wide pavements, ramps, clear signage, logical layouts, and adequate seating. These findings resonate with feminist critiques of urban space (Criado Perez, 2019; Beebejaun, 2016), which argue that planning and design often reflect the priorities of a “default male” user (Schauer *et al.*, 2023), leading to environments that fail to accommodate caregiving responsibilities, mobility devices, or embodied safety concerns.

Participants described high streets as sites of hybrid use, where shopping coexisted with sociality, errands, childcare, personal wellbeing and micro-work practices. This aligns with Mehta’s (2008) argument that streets function as layered social environments and with Gauri *et al.*’s (2021) identification of hybrid consumption patterns. The blending of online and offline behaviors trying items in store, later purchasing them online supports research by Verhoef *et al.* (2009) and Alexander & Cano (2020), who emphasize the integration of physical and digital touchpoints within omnichannel journeys. Notably, participants described physical stores as essential for sensory exploration and confidence building, echoing Robertson *et al.*’s (2020) work on reduced return rates in tactile environments and the enduring value of physical presence in an increasingly digital retail landscape (Hanlon, 2019; Wilson, *et al.*, 2024). While technological innovations such as AR and AI (Enyejo *et al.*, 2024; Hill, 2024) are often positioned as the future of the high street, participants placed greater emphasis on basic practical affordances ease of movement, well-designed changing rooms, and frictionless, predictable layouts. This illustrates a critical gap in contemporary design discourse: experiential retail cannot succeed if foundational functional needs are unmet. Functionality is not separate from experience; it is the scaffolding through which emotional, social, and identity-based engagement becomes possible.

Representation and visibility

Representation played a central role in how women interpreted retail spaces. Participants assessed whether environments reflected their identities in relation to age, body type, lifestyle, aesthetics, and cultural belonging. These findings align with the work of Arnould & Thompson (2005) on consumer identity and with Bäckström & Johansson’s (2006) argument that women engage strongly with aesthetic and emotional dimensions of retail. Several women, particularly in Mere Green, felt that retail offerings catered narrowly to older demographics, leaving them feeling invisible or unsupported. Conversely, some found large beauty retailers in Birmingham intimidating due to their high-pressure atmospheres echoing Borges *et al.*’s (2013) findings on gendered value perception in retail atmospheres. Visibility was thus both symbolic and embodied: it depended on signage, product ranges, staffing diversity, and sociocultural cues that signal who belongs (Zukin, 1995; Figueiredo *et al.* 2021). Participants also highlighted the emotional significance of staff behavior. Supportive, attentive, or empathetic service generated loyalty, aligning with Melnyk *et al.*’s (2009) finding that women demonstrate strong loyalty to individual service providers. In contrast, dismissive or exclusive interactions undermined belonging, reinforcing Arora & Aggarwal’s (2018) work on the relational components of female shopping attitudes. This dimension demonstrates how representation extends beyond marketing into the lived, spatial experience of inclusion. Retailers must therefore consider the symbolic, emotional and demographic signals encoded within their environments and practices.

Identity, locality and place attachment

Women expressed strong affective bonds with local and independent retailers, underpinned by values of authenticity, familiarity and community embeddedness. These attachments reflect Tuan’s (1974) concept of

topophilia and Rosenbaum *et al.*'s (2007) research on third place attachment. Participants described how familiar shops, cafés and market stalls contributed to a sense of home, routine, and personal grounding. Locality also shaped patterns of attachment. Suburban and smaller high streets, such as Lichfield & Mere Green, fostered feelings of safety and predictability, factors repeatedly identified as essential for women's comfort in public space (Pereira & Rebelo, 2024). In contrast, Birmingham city center elicited concerns about harassment and overcrowding, echoing research demonstrating how safety inequalities shape female mobility (Criado Perez, 2019; Brunelli *et al.* 2024). Participants' sense of belonging was deeply intertwined with identity alignment. Shops selling stationery, artisan goods or distinctive food items were described as "spaces that get me", reinforcing insights from Ntounis *et al.* (2023) on the role of place-based distinctiveness in consumer meaning making. These findings reveal that high streets operate as symbolic landscapes where women negotiate identity, comfort and community connection through routine consumption.

Towards an experiential third place

Collectively, these themes demonstrate that women experience high streets as socially and emotionally layered environments rather than transactional retail zones. The *Experiential Third Place Model* integrates the immersive, design led focus of Pine & Gilmore (1999) with the relational, routine based insights of Oldenburg (1989), and extends these by embedding emotional safety (Jacobs, 1961), gender sensitive design (Schauer *et al.*, 2023), hybrid usage (Gauri *et al.*, 2021) and everyday place attachment (Tuan, 1974). Women's engagement is therefore shaped by the intersection of atmosphere, functionality, representation, and attachment a configuration not captured fully by existing models. The findings illustrate that high streets function as emotional and cultural infrastructures, where identity, safety, and everyday life converge. Such insights highlight the urgent need for gender attuned community sensitive strategies capable of supporting high street resilience.

Conclusions and discussion

By foregrounding the lived experiences of women across four UK high streets, the study challenges the limitations of dominant experiential retail framework particularly Pine and Gilmore's (1999) Experience Economy and Oldenburg's (1989) Third Place and proposes the *Experiential Third Place Model* as a gender sensitive, routine centered alternative. Our research confirms the continued relevance of Pine and Gilmore's (1999) four experiential realms—esthetic, escapist, entertainment, and educational—as heuristics for understanding the design and delivery of retail encounters. Participants responded positively to esthetic cues such as lighting, music, and visual design; and escapist qualities, for instance, in boutique interiors or curated coffee shop environments. However, as has been argued in recent literature (Imschloss & Schwemmler, 2024), the escalation of digital disruption, hybrid working, and post pandemic behavior has repositioned experiential value away from spectacular immersion and toward emotional connection, routine familiarity, and psychological safety. The findings clearly support this shift.

The study demonstrates that sensory richness alone is insufficient to produce meaningful engagement. Women grounded their evaluations in the intersection of atmosphere with relational qualities, spatial comfort, identity resonance, and habitual use. This challenges the assumption that experience is primarily about immersion or theatricality, as seen in flagship environments (Kozinets *et al.*, 2002), and highlights the value of micro experiences embedded in everyday life. Experiential retail is not an isolated interaction, but a cumulative process shaped by repeated visits, emotional ease, and place familiarity. To address these contemporary dynamics, the study employs the *Everyday Experience Economy Model* (2026). This model reconceptualizes Pine & Gilmore's framework through the lenses of routine, emotional safety, and identity attachment, reframing the absorption-immersion axis to distinguish between designed spectacle and lived everyday practice. When applied to the high street, the four realms remain relevant, but must be understood as mediated by atmosphere, functionality, representation, and place attachment.

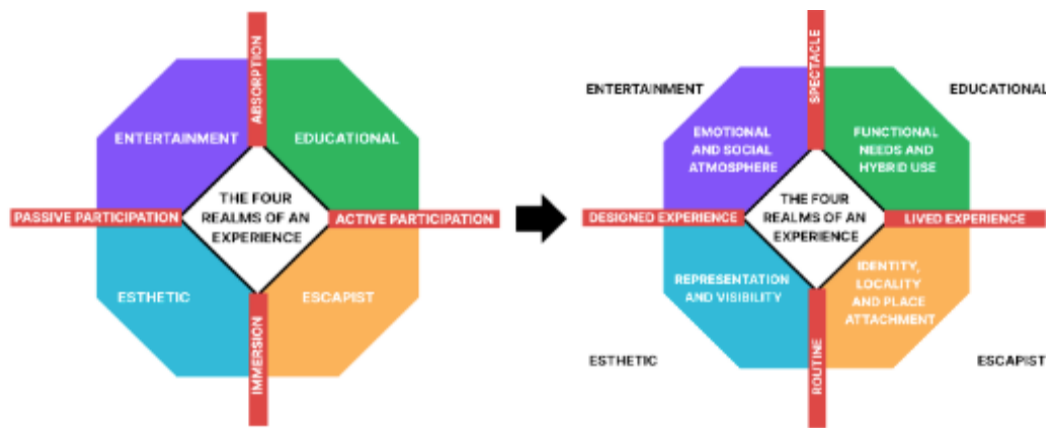


FIGURE 1 - Everyday experience economy model (2026) adapted from Pine and Gilmore's original 1999 model

Oldenburg's (1989) Third Place theory is similarly illuminating yet incomplete when applied to contemporary high streets. While the premise that individuals seek informal, welcoming environments for sociability remains valid, the findings highlight several oversights. First, Oldenburg's treatment of third places as universally accessible, egalitarian, and socially neutral is contradicted by the participants' accounts. Women emphasized the centrality of safety, recognition, and emotional comfort—dimensions that Oldenburg underplays but which Jacobs (1961) and Zukin (1995) identify as fundamental to everyday urban experience. Fullagar *et al.*'s (2019) critique that third places often privilege white, masculine, middleclass norms is strongly supported by this study. Participants described discomfort in pubs or certain largescale retail environments that signaled exclusivity through gendered aesthetics, clientele, or behavioral expectations. Thus, third places are not neutral social containers but socio-spatial structures shaped by gender, age, class, and cultural representation. Furthermore, the findings reveal that the boundaries of the third place are far more fluid than Oldenburg (1989) proposed. Coffee shops operated simultaneously as homelike environments, workspaces, and social hubs. Beauty salons functioned as combined service, social, and emotional support settings (Rosenbaum *et al.*, 2007). Hybrid uses extended across the high street: women engaged in shopping, rest, childcare coordination, and wellbeing within a single trip. These findings suggest that the high street itself can be conceptualized as a *collective third place* a social infrastructure of belonging where daily life is organized and negotiated.

The *Experiential Third Place Model* captures these nuances by integrating atmosphere, functionality, representation, and attachment. This more inclusive conception acknowledges that meaningful engagement is situated in emotional security, cultural visibility, and routine familiarity, thereby expanding the interpretive power of Oldenburg's framework. Integrating the study's empirical insights with experiential and spatial theory, the *Experiential Third Place Model* provides a gender sensitive, multilayered framework for analyzing inclusive high streets. Its four layers—emotion and atmosphere, functionality, representation and identity, and place attachment—reflect the priorities expressed by women across diverse contexts. Atmosphere emerged as a foundational condition, shaped by sensory cues, design quality, and staff interactions. Calm, clean, and aesthetically coherent environments generated emotional ease, while chaotic, poorly maintained spaces created alienation. Functionality was equally critical. Accessibility through ramps, seating, open layouts, and intuitive signage allowed women to move comfortably and without stress. Hybrid practices such as click and collect, browsing offline and purchasing online, or using cafés as informal work hubs were essential features of contemporary high street use. Representation shaped whether women felt they belonged in a space. Décor, staff behavior, product range, and the presence of diverse clientele all operated as symbolic cues. Inclusive design and emotionally attuned service fostered trust and comfort, while exclusive or stereotyped environments discouraged repeat visits. Place attachment developed from repeated positive interactions and alignment with women's values, histories, and identities. High streets became spaces of memory and emotional investment, resonating with Tuan's (1974) topophilia and Melnyk *et al.*'s (2009) findings on relational loyalty.

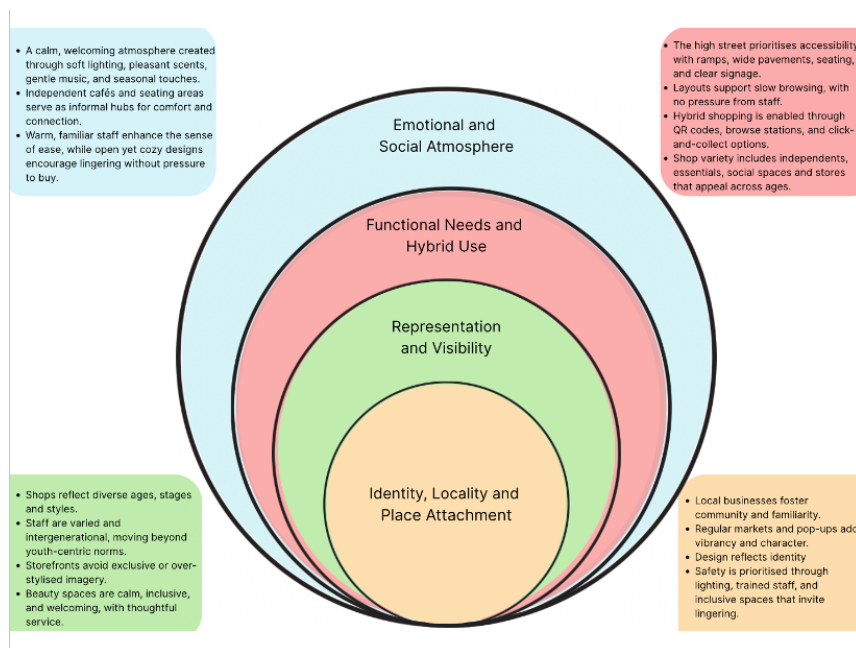


FIGURE 2 - THE EXPERIENTIAL THIRD PLACE MODEL

Taken together, these layers demonstrate that female engagement on the high street is sustained not through consumption alone but through the interdependence of emotional, functional, representational, and identity-based dimensions. The model thus extends Pine & Gilmore (1999) by embedding experience within routine and care, and challenges Oldenburg (1989) by foregrounding gendered safety and inclusion. The findings reinforce earlier work demonstrating that women value aesthetically rich and emotionally resonant environments (Bäckström & Johansson, 2006; Kim *et al.*, 2024) but extend these insights by illustrating how such preferences intersect with habit, familiarity, and spatial identity. The emotional ties that participants described to particular stores and routines align strongly with Tuan's (1974) topophilia and the broader literature on place attachment.

Unlike studies focused on flagship or city center spectacle (Sherry, 1998; Kozinets *et al.*, 2002), the present research highlights how suburban and secondary high streets foster equally meaningful engagement often more so, due to their proximity to daily routines and community life. Women's journeys, which combine care labor, errands, and social interaction (Criado Perez, 2019), position the high street as a multifunctional environment rather than a single purpose retail destination. This supports findings on post pandemic localism (House of Lords Built Environment Committee, 2024) and the centrality of cafés and community-oriented spaces (Ferreira *et al.* 2021). Hybrid shopping behaviors observed in the study align with Gauri *et al.* (2021) and Verhoef *et al.* (2009), indicating that digital channels have not supplanted the tactile and social dimensions of physical stores. Instead, women draw on sensory exploration and relational cues to inform purchasing decisions, even when transactions occur online.

Overall, the findings offer a more comprehensive interpretation of female high street engagement by foregrounding the intertwining of emotional, functional and identity-based factors. They highlight the necessity of accommodating female needs for safety, visibility, and belonging—needs not fully addressed in current retail strategy.

A model for future high streets and a call to action

Our research does not end with a summary of the findings but rather we seek to make a call to action to ensure that high streets meet the needs to women and by proxy we offer a way to secure the future of the high street.

Inclusive, Sensory Design. Retailers, planners, and designers must treat sensory design and accessibility as interdependent components of the retail experience. Sensory cues such as lighting, scent, and sound can enhance atmosphere, but only when integrated with functional accessibility. Participants repeatedly emphasised the importance of spacious layouts, wide aisles, large changing rooms, and plentiful seating echoing research on inclusive design (Lim *et al.* 2018). Poor design choices such as placing baby sections on upper floors or constructing narrow aisles create barriers that exclude caregivers, disabled consumers, and those managing pushchairs. Inclusive design is therefore not an aesthetic choice but a strategic imperative.

REPRESENTATION AND COMMUNITY ENGAGEMENT. Representation was a vital determinant of long-term loyalty. Retail environments that reflected participants' identities through diverse staffing, culturally resonant décor, and inclusive product ranges fostered comfort and attachment. Staff training should emphasise emotional intelligence and inclusive customer interaction, supporting Rust & Huang's (2021) concept of the Feeling Economy. Independent and women owned retailers contributed significantly to perceptions of diversity and community alignment. Collaboration between retailers and local authorities—through popup markets, cultural events, or spotlight initiatives supporting underrepresented entrepreneurs—can strengthen identity alignment and collective belonging.

RETHINKING METRICS. Traditional retail KPIs such as sales, dwell time, and conversion rates fail to capture experiential value and given the emotional and relational nature of women's high street engagement, alternative metrics are required. These might include measures of emotional resonance, perceived safety, quality of staff customer interaction, repeat visitation and social engagement and participation in local events

Such indicators align directly with the four layers of the Experiential Third Place Model and allow stakeholders to evaluate high streets as meaningful everyday places, not merely commercial transactions.

Stakeholder recommendations

LOCAL COUNCILS AND URBAN PLANNERS. Local councils hold significant power in shaping inclusive high streets. Participants valued environments that felt safe, familiar, and community rooted- qualities strongly associated with independent businesses and smaller scale- high streets. Councils should therefore consider targeted interventions such as rent relief, flexible leases, and small business rate reductions to support these retailers. Evidence from Lockwood *et al.* (2024) that targeted relief can reduce vacancies by up to 80% underscores the impact of such measures. Urban planning should prioritise walkability, lighting, safety infrastructure, and accessible public seating. These features support emotional comfort and reflect women's day-to-day- patterns of use.

Funding for inclusive retail Targeted funding for female owned businesses is crucial. Research by the European Investment Fund (2023) highlights persistent gender gaps in access to finance. Microgrants, shared retail units, and subsidised startup support could diversify high street offerings and improve representation. Prioritising businesses that deliver community value such as salons, cafés, craft stores, or wellness services aligns strongly with women's identified preferences.

COMMUNITY LED DESIGN. Community led planning ensures that regeneration aligns with lived experience rather than top-down assumptions. Participatory methods, including mapping workshops and consultation panels, enable residents to articulate emotional, cultural, and practical priorities. Douglas *et al.* (2020) demonstrate the effectiveness of participatory mapping in surfacing place-based values that may be overlooked by traditional approaches. Cocreated interventions—public art, community run kiosks, shared seating can enhance visibility, sociability, and belonging with relatively low cost and high community impact.

DATA SHARING AND CROSS SECTOR COLLABORATION. Effective regeneration requires robust collaboration between councils, property owners, and retailers. Strategic data sharing on footfall, vacancy

rates, consumer demographics, and behavioural trends supports evidence-based decision-making. Initiatives such as the High Streets Task Force (Parker *et al.*, 2024) demonstrate the value of coordinated, researched approaches. Partnerships with universities, cultural organizations, and social enterprises can further enrich high streets through innovation and creative programming. The Meanwhile Foundation's activation of vacant units as cultural and entrepreneurial spaces illustrates the potential for transforming underused assets into community building opportunities (Meanwhile Foundation, n.d.)

Conclusions

Our research demonstrates that women are not only the most influential consumer group on the British high street but also the primary drivers of its social, emotional, and economic vitality. Across historical and contemporary contexts, women's everyday routines, caregiving responsibilities, and emotional labor have shaped how retail spaces are used, valued, and experienced. Yet despite their centrality, high street design and strategy continue to reflect male centric defaults, overlooking the spatial, sensory, and relational needs that underpin women's engagement with retail environments. As digital disruption accelerates and experiential retail becomes increasingly dominant, the high street faces a critical moment of adaptation. Current experiential models often centered on flagship spectacle or technologically driven interventions fail to address the realities of women's everyday high street use, including the need for safety, accessibility, emotional connection, and community-oriented spaces. The proposed Experiential Third Place Model responds to this gap by integrating immersive design with the relational, inclusive dynamics that shape women's daily interactions with place. To ensure resilience and relevance, the high street must evolve into a gender responsive environment that supports belonging, routine sociability, and meaningful experience. Attending to women's lived practices offers not only a pathway to commercial renewal but also a foundation for revitalizing the high street as a shared social and cultural space.

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Perceived data ownership and consumers' use of personalized services

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Abstract. This study investigates the role of perceived data ownership (PDO) in consumers' decisions related to personalized digital services, specifically examining how PDO moderates the effects of perceived benefits and risks on two distinct behavioral outcomes: continuous usage intention and willingness to disclose personal information. Drawing on data from the 2023 Intelligent Information Society User Panel Survey in South Korea ($N = 4,581$), hierarchical regression analyses reveal that while perceived benefits and risks significantly predict continuous usage intention, PDO does not meaningfully alter these relationships at the service adoption stage. However, PDO emerges as a salient factor in personal information disclosure decisions: consumers who perceive data as personally owned display lower baseline willingness to disclose, yet respond more strongly to service benefits and are less deterred by data breach concerns when deciding whether to share their information. These moderating effects are more pronounced for non-sensitive information types such as name and age, and largely diminish for sensitive categories such as health information, suggesting that PDO's influence is contingent on the nature of the data involved. Together, these findings advance understanding of how consumers' sense of ownership over their personal data shapes their engagement with personalized services, offering practical implications for service providers and policymakers seeking to foster a balanced approach between data privacy and consumers' benefits from personalized services.

Keywords: perceived data ownership; personal information disclosure; personalized services; data privacy

Introduction

Personalized digital services have become prevalent across a wide range of domains, from search engines and news feeds to entertainment and e-commerce. Delivered through recommended offerings, targeted ads, and customized pricing, personalized services have changed in both how consumers interact with digital services and how they perceive data privacy. While personalization provides convenient and efficient ways to achieve consumer goals in using digital services, it simultaneously raises concerns about privacy protection and data misuse, as greater benefits from personalization typically require more customer data (Chellappa & Sin, 2005). In response, regulatory initiatives have gradually moved from a protection-centered stance toward a more balanced approach that also recognizes the value of personal data (OECD, 2015, 2023). Most digital services now require consumers, at the point of sign-up, to indicate which categories of personal information they consent to share. The decision regarding what to disclose thus becomes a necessary step that precedes actual service use. Consumer decision-making in personalized service contexts now involves at least two different parts: consumers decide whether to adopt and continue using a personalized service (the service adoption) and what and how much personal information to disclose to

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that service (the data provision) (Zeng *et al.*, 2020). However, these two decisions might not necessarily align. For example, consumers could actively use a service while withholding sensitive information, or disclose without strong engagement with the service itself.

Because personalized services inherently require the use of personal data, the question of who owns the data generated through consumer activity has become important in both decisions. Consumers who perceive themselves as the rightful owners of their data may evaluate the benefits and risks of personalized services differently from those who view data as belonging to firms or as ownerless (Hummel *et al.*, 2021; Li *et al.*, 2023; Xi *et al.*, 2025). In this regard, perceived data ownership can serve as an important psychological factor that explains both service adoption and data provision decisions. However, existing studies have largely examined consumers' decisions to use personalized services and to provide personal data as separate phenomena, and the role of perceived data ownership remains underexplored. In particular, little is known about whether and how ownership perceptions moderate the effects of perceived benefits and risks on these two distinct behavioral outcomes.

To address this gap, the present study investigates two research questions: (1) how perceived benefits and risks influence consumers' intention to adopt personalized services, and (2) how they influence consumers' willingness to provide personal data. In both cases, we further examine whether and how perceived data ownership moderates these relationships. For the second research question, we estimate separate models for four types of personal information: name (identifiable information), age (non-identifiable information), health information (sensitive information), and current location (behavioral data). We examined these research questions using data from the 2023 Intelligent Information Society User Panel Survey in South Korea, employing regression analyses with interaction terms between the perceived benefits and the perceived risks and the data ownership. By investigating consumers' perceptions of data ownership in the use of personalized services, this study offers insights into how personalized services can be enhanced by taking into account consumer rights and engagement in data privacy.

Methodology

Sample

This study draws on data from the 2023 Intelligent Information Society User Panel Survey conducted by the Korea Communications Commission. The survey sample consists of 4,581 individuals residing in Korea between the ages of 15 and 69, providing nationally representative data to examine the factors influencing consumers' usage intention of personalized search services and their willingness to provide personal data.

Data analysis

To address the relationship of continuous usage intention of personalized search services (RQ1), hierarchical regression analysis was conducted. In Model 1, perceived benefits and risks of personalized service were entered as predictors. Perceived benefits included three dimensions: usefulness (i.e., how useful the service is perceived to be), relevance (i.e., how well the service is suited to one's intended use), and taste (i.e., how closely the service is tailored to one's personal preferences). Perceived risks included two dimensions: concerns about personal data breach and exposure to illegal content. Demographic variables and digital literacy were included as control variables. In Model 2, perceived data ownership was added to test its main effect. Perceived data ownership was operationalized as a binary variable indicating whether respondents believed that ownership of personal activity data belongs to the individual. Finally, interaction terms of perceived benefits and risks with perceived data ownership were entered in Model 3. All variables were measured using a 5-point Likert scale.

TABLE 1 - Descriptive statistics

	<i>M</i>	<i>SD</i>
Perceived Benefit of Personalized Search Services		
Usefulness	0.703	0.457
Relevance	0.668	0.471
Taste	0.681	0.466
Perceived Risk of Personalized Search Services		
Personal data breach	0.488	0.500
Exposure to illegal content	0.466	0.500
Continuous usage intention	3.780	0.758
Willingness to Disclose Personal Information		
Name	3.176	1.028
Age	3.334	1.037
Health Information	2.899	1.028
Current Location	2.650	1.024
	<i>N</i>	%
Perceived Data Ownership		
Belongs to individual	1,370	29.91
Non-individual	3,211	70.09

TABLE 2 - Regression results for continuous usage intention of personalized search services

	Model 1	Model 2	Model 3
	<i>β</i> (SE)	<i>β</i> (SE)	<i>β</i> (SE)
Usefulness	0.268*** (0.023)	0.267*** (0.023)	0.277*** (0.028)
Relevance	0.341*** (0.022)	0.340*** (0.022)	0.318*** (0.027)
Taste	0.380*** (0.023)	0.381*** (0.023)	0.370*** (0.027)
Personal data breach	- 0.055* (0.023)	- 0.055* (0.023)	- 0.072** (0.027)
Exposure to illegal content	0.038 (0.023)	0.038 (0.023)	0.034 (0.027)
PDO		0.005 (0.022)	- 0.073 (0.055)
Usefulness × PDO			- 0.025 (0.051)
Relevance × PDO			0.074 (0.048)
Taste × PDO			0.026 (0.049)
Personal data breach × PDO			0.055 (0.050)
Exposure to illegal content × PDO			0.011 (0.051)
R ²	0.192	0.192	0.193
Adjusted R ²	0.188	0.188	0.188
F	56.896***	54.042***	43.435***
N	4,581		

Note. PDO = perceived data ownership; Gender, age, education, household income, and digital literacy are controlled. * $p < .05$, ** $p < .01$, *** $p < .001$

TABLE 3 - Regression results for willingness to disclose personal information

	Name			Age			Health Information			Current Location		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)
Usefulness	0.121*** (0.035)	0.122*** (0.035)	0.05 (0.041)	0.015 (0.035)	0.015 (0.035)	– 0.014 (0.041)	0.01 (0.035)	0.013 (0.035)	– 0.025 (0.042)	– 0.036 (0.035)	– 0.034 (0.035)	– 0.082 (0.042)
Relevance	0.100** (0.033)	0.100** (0.033)	0.077 (0.039)	0.140*** (0.033)	0.140*** (0.033)	0.097* (0.040)	– 0.022 (0.034)	– 0.022 (0.034)	– 0.018 (0.040)	0.044 (0.034)	0.044 (0.034)	0.07 (0.040)
Taste	0.135*** (0.034)	0.132*** (0.034)	0.065 (0.040)	0.166*** (0.034)	0.166*** (0.034)	0.105** (0.041)	0.094** (0.035)	0.089* (0.034)	0.05 (0.041)	0.118*** (0.034)	0.114*** (0.035)	0.101* (0.041)
Personal data breach	– (0.033)	– (0.033)	– (0.039)	– (0.033)	– (0.033)	– (0.039)	– (0.034)	– (0.034)	– (0.040)	– (0.034)	– (0.034)	– (0.040)
Exposure to illegal content	– (0.033)	– (0.033)	– (0.039)	– (0.033)	– (0.033)	– (0.039)	– 0.077* (0.034)	– 0.081* (0.034)	– 0.101* (0.040)	– 0.081* (0.034)	– 0.084* (0.034)	– (0.040)
PDO		– 0.048 (0.033)	– (0.080)		– 0.006 (0.033)	– (0.080)		– (0.033)	– (0.081)		– (0.033)	– (0.081)
Usefulness × PDO			0.261*** (0.074)			0.123 (0.074)			0.129 (0.076)			0.163* (0.076)
Relevance × PDO			0.106 (0.070)			0.161* (0.070)			0.000 (0.071)			– 0.065 (0.071)
Taste × PDO			0.181* (0.071)			0.165* (0.071)			0.112 (0.072)			0.025 (0.072)
Personal data breach × PDO			0.304*** (0.073)			0.271*** (0.074)			0.116 (0.075)			0.205** (0.075)
Exposure to illegal content × PDO			0.132 (0.074)			0.115 (0.074)			0.055 (0.076)			0.059 (0.076)
R ²	0.057	0.058	0.074	0.065	0.065	0.076	0.027	0.030	0.033	0.021	0.023	0.027
Adjusted R ²	0.053	0.054	0.069	0.061	0.061	0.071	0.023	0.025	0.027	0.017	0.018	0.022
F	13.888***	13.333***	13.967***	15.898***	15.139***	14.453***	6.414***	6.689***	5.971***	4.932***	5.048***	4.903***
N	4,581											

Note. PDO = perceived data ownership; Gender, age, education, household income, digital literacy, and satisfaction with search services are controlled.

* $p < .05$, ** $p < .01$, *** $p < 0.001$

Conclusions and discussion

Regarding RQ1, regression analyses demonstrated that perceived benefits (usefulness, relevance, and taste) and perceived risks (concern about personal data breaches and concern about exposure to illegal content) of using personalized services play significant roles in continuous usage intention, whereas PDO did not emerge as a significant predictor. This suggests that continuous usage intention is closely tied to the perceived characteristics of the service itself; however, consumers' belief about who owns personal data may not affect their decisions of using services. The analyses conducted to examine RQ2 focused on the information disclosure stage, investigating how perceived benefits, perceived risks and PDO are related to the willingness to disclose personal information (WTD) across four types of personal information: name, age, health information, and current location. Regarding PDO, its main effect on WTD was consistently negative across all four information types, while its moderating effects were generally positive. Consumers who perceive their data as personally owned showed a stronger positive relationship between perceived benefit and WTD, and a weaker negative relationship between perceived risk and WTD, compared to those who do not hold such beliefs. This pattern is particularly pronounced for concern about personal data breach. Examining the results by information type, PDO's moderating effect was prominent for age, where significant interactions were observed for usefulness, relevancy, and concern about personal data breach, but was largely absent for more sensitive personal information such as health information and current location, where few interaction terms reached significance.

These patterns suggest that individuals who perceive data ownership as belonging to individuals tend to show lower overall WTD. At the same time, however, they appear more sensitive to the benefits of providing personal data. In addition, among these consumers, concerns about personal data breaches no longer have a significant negative influence on their willingness to disclose personal information (i.e., age, name, and current location). This asymmetric effect of PDO implies two things. First, consumers who have a PDO consider personal data disclosure a reciprocal exchange in which they provide their information in return for better services. Second, those with a PDO show less sensitivity to data breach risk, as they may regard the probability of a data breach as beyond their control, and therefore discount it when evaluating disclosure decisions. Notably, however, this tendency diminishes for highly sensitive information in our study, that is, health information. This indicates that PDO's moderating role may vary depending on the type of personal information involved.

This study contributes to the understanding of PDO by suggesting where in the consumer decision-making PDO matters and how it interacts with the perceptions of using personalized services. By examining the continuous usage intention and willingness to disclose personal information separately, the study shows that PDO is more pronounced in disclosure decision. Furthermore, this study demonstrates that PDO's moderating roles with perceived benefits and perceived risks in disclosure decision can differ depending on the informational context. As personal data has become an indispensable component of service provision, consumers' own beliefs about their data play a critical roles in addressing their decision. In this light, these insights into PDO's significant role underscore the need for environments in which consumers can actively engage in decisions about their personal data disclosure, carrying meaningful practical implications for both service providers and policymakers.

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The rational black market: lessons from France's wartime food supply chains

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Abstract. The paper examines the resilience of supply chains in times of crisis through an extreme historical case: the black market for foodstuffs in France between 1940 and 1944. The investigation focuses on the paradox of clandestine circuits which, although illegal and fraught with risks, managed to develop genuine forms of logistical and distributive efficiency. The central aim is to demonstrate how, under the rationing imposed by the Vichy regime and reinforced by German requisitions, underground supply chains emerged to guarantee the continuity of urban provisioning. The study area is France under Nazi Occupation, a context characterized by structural shortages, profound logistical disorganization, and constant police surveillance. The methodology draws on academic literature that identifies and analyzes the economic and organizational logics at work, highlighting five structuring dimensions: economic adaptation, strategic decision-making, organizational rationality, risk management, and micro-entrepreneurial innovation. These dimensions materialized in flexible routing, decentralized storage, territorial segmentation, and the mobilization of trust-based networks, all of which provide insights directly applicable to contemporary retail logistics when confronted with health, geopolitical, or climate-driven disruptions. The main contribution of the paper lies in establishing that logistical performance does not originate exclusively from institutional legality, but from the ability of actors to coordinate effectively and reconfigure resources within highly constrained environments. Historical analysis of the French black market therefore enriches the international debate by offering a novel conceptual framework to test and expand contemporary theories of resilience and dynamic capabilities as applied to retail logistics.

Keywords: Black market, France, resilience, retail logistics, supply chain, Vichy regime.

Introduction

During the harsh winter of 1941, Parisian families queuing for hours at ration distribution centers often returned home to empty cupboards, highlighting the severe limitations of formal supply channels. A few streets away, clandestine trade flourished: farmers concealed butter beneath sacks of potatoes, middlemen transported eggs in secret compartments of bicycles and carts, and networks of local traders adapted constantly to shifting demand. Far from random acts of survival, these operations followed rational distribution patterns, with careful planning of routes, schedules, and stock management. Historical research on wartime supply in Marseille, south of France, illustrates this dynamic. Beauquier (1979) underlines how the general decrease in goods progressively suffocated official distribution networks, necessitating parallel markets, while retention, speculative stocking, and localized logistics shaped the flow of scarce products. Analysis of the French black food market during WWII thus reveals that severely constrained environments

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stimulate organizational ingenuity, requiring rapid problem-solving, territorial knowledge, and coordination across multiple actors. Contrary to conventional portrayals of illegal markets as chaotic or morally deviant, supply chains operating under Nazi Occupation reveal principles of optimization, flexibility, and demand-side adaptation analogous to strategies observed in contemporary economic systems. Studying these networks encourages scholars to broaden theoretical frameworks, incorporating lessons from informal economies regarding resilience, responsiveness, and human creativity.

Beyond mere survival, wartime black markets exemplify sophisticated decision-making under extreme uncertainty. Participants navigated constant risks of control, sanctions, and detection, while simultaneously addressing resource scarcity, fluctuating demand, and logistical bottlenecks. Multi-level distribution systems, including local hubs, regional intermediaries, and mobile couriers, enabled continuous flows of goods across the city and surrounding countryside. Detailed territorial knowledge allowed actors to anticipate potential interruptions, reroute deliveries, and maintain decentralized storage, creating a highly adaptive network. Conceptually, supply chains supporting black markets demonstrate principles that parallel modern retail logistics under crisis conditions, including flexibility, rapid response, and demand-driven allocation. Situating the French WWII black market within a framework of economic rationality and logistical sophistication highlights its analytical relevance, showing that responsiveness and knowledge-based resource allocation extend beyond formal channels. Examining these clandestine networks invites critical reflection: lessons derived from the efficiency of informal operations can inform the design of resilient, agile, and adaptive distribution systems in contemporary contexts. Historical insights thus provide valuable guidance for managing supply chains under severe constraints, uncertainty, or disruption.

Theoretical foundations

The black market for foodstuffs represents primarily an economic and logistical adaptation to constraints imposed by the State or circumstances causing widespread shortages, including geopolitical or humanitarian crises. Rationing creates a structural gap between legal supply and actual demand, providing fertile ground for informal circuits and black-market activity (Castells & Portes, 1989). As early as the late 1940s, Chelmicki (1949–1950) conceptualized the black market as a clandestine economic model in which transactions occur in defiance of rationing regulations. Contrary to common perceptions of disorder, black markets operate according to clear principles of rationality. Four decades later, De Soto (1989) highlighted the ingenuity of participants who develop methods to circumvent institutional mechanisms, ensuring continuity of supply under rationing conditions. Operations rely on flexibility and speed that often surpass formal distribution channels, a point reinforced by Maloney (2004). Efficiency, however, coexists with substantial risks, including the absence of health controls, uncertainties surrounding product quality, and informational asymmetries between buyers and sellers (Williams, 2004). In this sense, the black market for foodstuffs embodies a paradox: it compensates for deficiencies in the official system while simultaneously generating vulnerabilities inherent to its informal nature.

Contemporary research on black markets enhances understanding of the phenomenon by highlighting dimensions often overlooked in earlier studies. Dell’Anno (2022) proposes a typology of theoretical approaches to the informal economy, distinguishing neoclassical, macro-econometric, and conceptual perspectives, which situates black markets more precisely within the broader spectrum of economic informality. Empirical evidence from Hardy & Norgaard (2016) demonstrates that seller reputation plays a critical role in facilitating transactions within online black markets in the absence of formal regulation. The importance of reputation extends to food black markets, where interpersonal trust substitutes for state regulatory mechanisms. Additionally, Daljord *et al.* (2019) examine the license plate black market in Beijing, showing that, despite high transaction costs, these markets can mitigate the effects of restrictive regulations by reallocating scarce resources to consumers with the highest demand. Finally, Rothenberg *et al.* (2016) underscore the diversity of factors driving informality in Indonesia, illustrating that black food markets can

arise from multiple contexts, including excessive regulation and the pursuit of economic flexibility. Collectively, these studies reveal that black markets operate as adaptive, rational systems, responding to institutional constraints while generating their own forms of governance and coordination.

Very recently, Evans & Pine (2024) emphasized that scholarly attention to black food markets remains limited, despite their critical significance for understanding economic and social dynamics during periods of crisis. Participants in such markets constantly navigate trade-offs between potential sanctions and expected gains, making strategic decisions under conditions of extreme uncertainty. These decisions operate within a framework that departs markedly from neoclassical assumptions, as information is imperfect and market outcomes rely heavily on implicit cooperation among actors, particularly buyers and sellers (Castells & Portes, 1989; De Soto, 1989). Insights from consumer behavior in constrained contexts further illuminate these dynamics. Herzig & Zander (2025) demonstrate that, in short food supply chains analogous to black markets, choices depend both on product availability and the level of trust placed in intermediaries. In black market settings, such considerations generate networks of trust, frequently rooted in interpersonal relationships. Transactions are neither purely opportunistic nor chaotic; rather, they reflect deliberate strategies to secure flows, reduce losses, and maintain continuity of supply. The black food market therefore exhibits a hidden yet coherent organization in which social norms, reputation, and relational enforcement operate alongside price mechanisms to regulate exchanges effectively.

The contemporary perspective on informality encourages moving beyond a purely criminological lens to view the black market as a space for micro-entrepreneurial innovation. Maloney (2004) demonstrates that informality is not solely a consequence of exclusion but can function as an autonomous mode of management, capable of experimenting with adaptive solutions under regulatory constraints. At the same time, the International Labor Organization (2024) highlights that such practices raise significant food safety and public health concerns, underscoring the need to balance operational flexibility with consumer protection. From a logistical standpoint, black markets operate as a “natural laboratory” for performance optimization: parallel networks develop storage, transport, and distribution techniques which, although clandestine, parallel principles found in modern supply chains. Mechanisms for flow optimization, territorial distribution of points of sale, and reliance on interpersonal networks resemble contemporary models of resilience, agility, and decentralized coordination. Studying the French black food market during WWII therefore illuminates historical dynamics while offering insights relevant to current retail logistics strategies. Table 1 summarizes the principal dimensions, mechanisms, and organizational implications of wartime black food markets prior to detailed discussion of the issues.

Case Study

Under the Vichy regime, following France’s military defeat in 1940, rationing imposed on the population—through a complex system of food and non-food coupons designed to regulate distribution (see Figure 1)—and compounded by German requisitions, created near-total dependence on underground supply channels. Official rations, capped at approximately 1,080 calories per adult per day, fell drastically short of average physiological requirements, estimated at 2,200 calories (Mouré, 2010). By comparison, the Belgian population received about 1,800 calories per adult per day. Agricultural output collapsed under labor shortages, military levies, and logistical breakdowns, while nearly 20% of total production was diverted directly to Germany (Margairaz, 1991). Taylor (1997) notes that although black markets emerged across Europe, France faced particularly acute deprivation. Postwar literature captured this vividly: Dutourd’s (1969 [1952]) novel delivers a biting satire of opportunistic traders thriving on systemic scarcity. These constraints extended beyond material shortages, reshaping social behaviors and sustaining a parallel economy where survival and profit overlapped, prices soared (see Table 2), and collective morality confronted harsh dilemmas. The inadequacy of official supply networks forced populations to improvise local solutions, laying the groundwork for organized clandestine logistics during wartime.

TABLE 1 – Key dimensions of the wartime food black market

Dimension	Description	Organizational implications
<i>Economic adaptation</i>	• Emerged in response to rationing and artificially low prices • Compensated for gaps between official supply and actual demand • Demonstrated creative and practical adaptation under severe constraints	• Highlights how societies adjust economically under extreme scarcity • Shows adaptive behaviors that inform understanding of informal economies in crisis contexts
<i>Strategic decision-making</i>	• Participants weighed risk of punishment against potential gain • Developed informal networks of trust and cooperation • Relied on local knowledge and negotiation to sustain supply	• Illustrates decision-making under uncertainty • Emphasizes importance of trust networks and collaboration in sustaining operations
<i>Organizational rationality</i>	• Operated according to social norms, reputation, and reciprocity • Followed structured and purposeful strategies • Challenged the perception of black markets as anarchic	• Demonstrates that clandestine systems can be coherent and rational • Provides lessons on implicit organization under constraints
<i>Risk and vulnerability</i>	• Inherently risky due to lack of oversight and health hazards • Exposed information asymmetries between buyers and sellers • Showed trade-offs and fragility of informal systems	• Underscores the vulnerabilities of informal markets • Informs risk management considerations in constrained or high-pressure environments
<i>Micro-entrepreneurial innovation</i>	• Developed novel methods to bypass regulations • Ensured continuity of supply through inventive solutions • Functioned as experimental spaces for adaptive problem-solving	• Shows how constraint drives innovative practices • Offers insights into the emergence of new organizational strategies under pressure

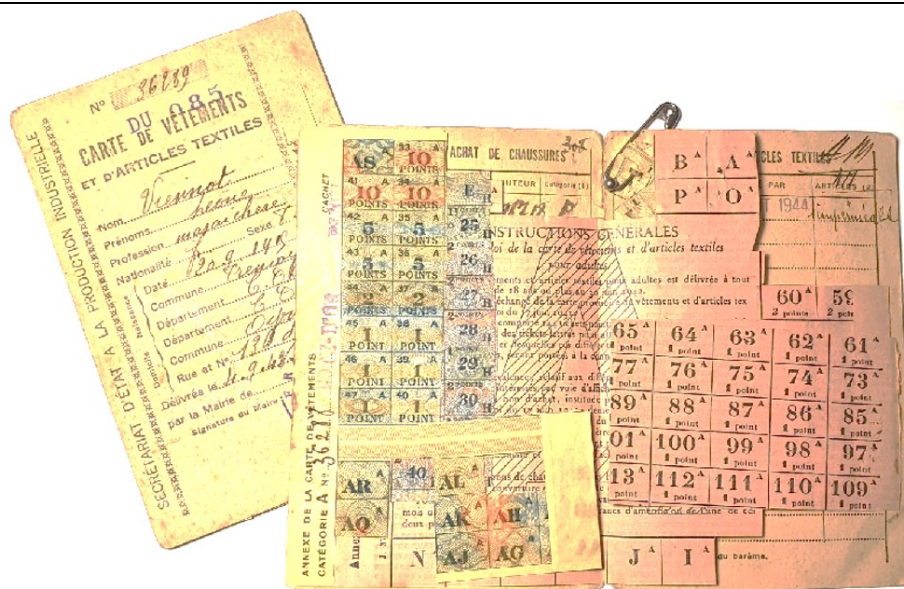


FIGURE 1 – Ration cards issued in France under the Vichy regime
(Source: <https://fortitude-ww2.fr/le-rationnement>, Accessed December 29, 2025)

TABLE 2 – Prices of foodstuffs on the black market in France, early 1944

Product	Official Price (in French francs)	Black Market Price (in French francs)
Roasting beef (1 kilo)	72	150 to 250
Whole milk (1 liter)	4.6	12 to 30
Eggs (dozen)	36	100 to 120
Butter (1 kilo)	77 to 79	450 to 600
Potatoes (1 kilo)	3 to 5.70	22 to 30
Rapeseed oil (1 liter)	50	1,000

Note: Monthly urban wage: 1,100 French francs; Workers on a German construction site: 3,000 French francs.

Source: Adapted from *Les Amis de la Résistance du Morbihan* (2025).

The material shortages and systemic inefficiencies were further shaped by regulatory frameworks and the roles of intermediaries within both formal and informal circuits. Leteux (2010) illustrates how Vichy-imposed transport authorizations for livestock and slaughtered meat structured the black market, which involved wholesalers, brokers at Les Halles and the La Villette abattoirs, and neighborhood butchers diverting products from official channels. Inefficiencies in rationing control by the *Ravitaillement Général* and the *Groupement d'Achat et de Répartition des Viandes* amplified these dynamics, demonstrating that constrained official systems stimulated adaptive, underground distribution networks. Urban populations relied on decentralized storage, secret transport routes, and cooperative arrangements between rural producers, transporters, and city merchants to sustain supply. These mechanisms reveal an early form of organizational intelligence, combining careful planning, territorial knowledge, and flexible coordination to maintain flows despite systemic limitations. In such context, survival and commerce were deeply intertwined, and the ingenuity of these networks highlights how informal economies efficiently compensated for the failures of formal distribution, offering enduring insights for understanding supply chain adaptation under extreme constraints.

Faced with persistent shortages, urban populations developed diverse and adaptive supply strategies to maintain access to essential foodstuffs. Barter systems, exchanges between urban and rural areas, and postal family parcels became critical mechanisms for sustaining daily consumption. Between 1941 and 1943, an estimated 10 to 20% of official agricultural production circulated outside legal channels, a figure that could quadruple when including the semi-official market serving affluent clients (Cobb, 2018 [1990]; Grenard, 2008). Occhino *et al.* (2007) document the rational organization of these networks: rural producers, transporters, and urban merchants assigned precise roles to maximize efficiency while minimizing the risk of seizure. Transport modes—including bicycles, carts, and commuter trains—were adapted to evade controls, with occasional bribery of surveillance agents facilitating certain flows (Sweets, 1986). Weekly shipments from villages, often concealed in suitcases or baskets, enabled continuous supply to urban centers with constant demand (Burrin, 1997; Lyautey, 2025). This parallel logistics relied on an implicit territorial segmentation between discreet rural zones and dense cities, allowing flows to be rationalized while circumventing the repressive apparatus. The survival of urban dwellers thus depended on the coordination, adaptability, and resilience of clandestine circuits, demonstrating early organizational intelligence.

The black market operated through distinct social actors who embodied the inherent ambiguities of clandestine exchange, firmly condemned by official propaganda (see Figure 2). Resellers of butter, eggs, and cheese—derisively labeled “BOF” in French, translated as “UGH” in English—emerged as emblematic figures of Parisian informal supply, tolerated as a necessity yet vilified as immoral (Zdatny, 1986). Their indispensable role stood in stark contrast to the resentment they left in collective memory. At the upper end of the spectrum, luxury restaurateurs, including renowned establishments such as Maxim’s, relied on sophisticated networks to serve a collaborationist clientele (Sweets, 1986). In rural France, local officials, physicians, and notables acted as intermediaries, redistributing agricultural surpluses and blurring the line

between solidarity and profit (Jones, 1982). These rural circuits, integrated into well-structured parallel networks, ensured the steady flow of goods despite constant surveillance and requisitions (Zdatny, 1986). Navigating between survival imperatives and self-interest, these actors illustrate that clandestine trade was not merely a shadow economy but a social stage where class tensions, symbolic hierarchies, and ethical dilemmas unfolded daily. The deliberate planning of routes, decentralized storage, and continuous adjustments to operations demonstrate a genuine logistical intelligence, combining barter, favoritism, and coordination. They provide a striking historical example of organizational resilience under extreme moral and economic pressure (Margairaz, 1991; Burrin, 1997), consistent with Bloch's (1968 [1940]) account of the "strange defeat."

The black market extended beyond a mere survival mechanism to become a strategic component of the French war economy. Sanders (1999) documents that, depending on the phase of Nazi Occupation, 15 to 60% of the occupiers' financial resources flowed through clandestine channels, revealing their systemic significance and considerable influence on both local and national markets, shaping economic behaviors and social practices alike. Seasonal storage practices—concealing potatoes, cereals, or butter in hidden cellars—stabilized urban supplies and mitigated the impact of requisitions. Adaptation to fluctuating urban demand, modular network design, and the interpersonal integration of actors illustrate supply chain intelligence well ahead of its time. Despite its illegal character, the system demonstrates a society's capacity to reinvent exchange rules when formal channels fail. It operated as a historical laboratory of resilience and organizational creativity, where flexibility, territorial segmentation, and precise coordination among actors ensured continuity of food supply under extreme conditions. Lessons from this experience inform contemporary strategies for designing modular, resilient, and adaptive supply chains capable of functioning effectively even within highly constrained, unpredictable, or informal environments.



FIGURE 2 – Vichy regime propaganda image denouncing the black market (1943)
(Source: © Musée de la Libération de Paris)

In short, the black market in foodstuffs in France under the Vichy regime archetypally illustrates the complexity of clandestine circuits in the face of rationing constraints, German requisitions, and the logistical disorganization of the country following the defeat of 1940. The parallel networks established made it possible to maintain urban supplies despite surveillance and risks, while different actors made strategic decisions, organized exchange flows, and tinkered with storage and transport mechanisms adapted to the constraints and dangers of the moment. To better understand how these historical practices fit into the conceptual dimensions theorized above, it is possible to analyze them point by point in the light of Table 1:

- *Economic adaptation*: Faced with insufficient rations and extensive German requisitions, the French population established clandestine channels—barter systems, family parcels, and gray markets—to compensate for the persistent gap between legal supply and actual demand, ensuring survival in urban areas under extreme constraints.
- *Strategic decision-making*: Farmers, traders, and transporters constantly weighed the risks of sanctions against potential profits, organizing flows according to a logic of maximum efficiency, security, and responsiveness, adapting operations to fluctuations in urban demand and availability.
- *Organizational rationality*: Far from chaotic or purely opportunistic, clandestine channels followed implicit operational rules, relying on decentralized storage, modular network structures, and robust interpersonal networks of trust that enabled coordination across multiple actors.
- *Risks and vulnerabilities*: The absence of formal oversight, combined with uncertainties regarding product quality and safety, exposed buyers and sellers to significant health risks, revealing the inherent fragility and moral complexity of clandestine supply systems.
- *Micro-entrepreneurial innovation*: Individuals and local notables experimented with transport, storage, and distribution techniques, adjusting flows to urban needs and demonstrating remarkable logistical intelligence, adaptability, and resilience in an environment defined by extreme constraints and uncertainty.

Implications for retail logistics research

The study of the black market for foodstuffs in France between 1940 and 1944 demonstrates that economic and organizational rationality can emerge under extreme constraints. Clandestine networks operated according to a logic of resilience in the face of scarcity and constant surveillance, echoing debates in supply chain management on robustness and modularity introduced in the early 2000s (Christopher & Peck, 2004). As Mouré (2024) emphasizes, activity on the black market followed two distinct logics: some actors sought profit by circumventing state controls, while others acted strategically to ensure the survival of family or community. Chronic under-rationing imposed constant pressure, forcing households to rely on parallel networks when legal markets failed (Mouré, 2010, 2023). These historical practices underscore the importance of flexibility and rapid supply chain reorganization, principles that proved essential during modern health crises such as the COVID-19 pandemic (Ivanov & Dolgui, 2020). Interpreting the Vichy-era black market thus extends beyond social history, offering a highly relevant case study to test and refine contemporary models of resilience in retail logistics.

Beyond resilience, governance within the black market demonstrates that logistics innovation can emerge directly from constraint. Between 10 and 20% of official agricultural production circulated through parallel networks, reaching up to 50% for certain commodities such as butter or eggs (Grenard, 2008). Such flows required flexible routing, temporary storage, and continuous adaptation to seasonal variations, reflecting principles of agile supply chains as formalized by Lee (2004) through the triple-A framework. Far from mere opportunistic exchanges, logistics practices in the black market for foodstuff reveal organizational inventiveness comparable to contemporary supply chain risk management (for a literature review, see Gurtu & Johny [2021]). Conceptual analysis of these clandestine networks allows reinterpretation of the black market as a historical precursor to dynamic capabilities theory (Teece *et al.*, 1997) applied to retail logistics. In France, Nazi Occupation and rationing created a hostile environment that paradoxically

stimulated actors—including farmers, transporters, and urban consumers—to reconfigure internal and external resources, adapting continuously to shifting markets and environmental pressures. This historical perspective highlights the importance for modern retail logistics of designing alternative scenarios and embedding innovation as a natural response to uncertainty.

Finally, the dynamics of the French black market prompt a reevaluation of knowledge in territorial supply systems. Clandestine circuits relied on local intelligence, including weekly trips by city dwellers to the countryside, combined with adaptive offerings tailored to the needs of specific urban neighborhoods (Sanders, 1999, 2008). Such organization represents a form of “*proto-logistics*” grounded in proximity, echoing modern approaches to omnichannel retail (Verhoef *et al.*, 2015). Where official distribution faltered due to centralization and rigidity, clandestine networks optimized flows through flexible inventory management (Mouré, 2015). A critical reinterpretation of the black market encourages moving beyond moralistic assessments to recognize it as an organizational experiment testing the robustness of prevailing models. Observing how an illegal economy implemented rationalization principles comparable to contemporary retail logistics demonstrates that distributive efficiency depends less on legality than on adaptability and contextual intelligence. Table 3 presents a comparative analysis of the French Vichy-era black market and modern crisis supply chains.

Conclusion

The analysis of the black market in France between 1940 and 1944 offers unprecedented insight into logistical and distribution dynamics in extreme situations, revealing lessons that can be directly transposed to the supply chains of the 2020s. Of course, the paper does not seek to glorify or justify an underground system, often associated with abuses, social inequalities, and health risks, but to analyze the economic rationale behind it. Clandestine circuits have implemented alternative routes, decentralized storage methods, and sophisticated coordination mechanisms to ensure continuous supply despite strict food rationing and constant police surveillance. The flexibility and modularity of systems, coupled with a detailed knowledge of the territory and the differentiated needs of populations, constitute essential levers of resilience, very rarely addressed in academic literature. Added to this is the ability to quickly mobilize trusted networks and circumvent bottlenecks with creative solutions. For retail logistics researchers and practitioners, the observations on the French case offer a stimulating framework for thinking about the proactive management of shortage situations, the optimization of flows, and the design of alternative supply chains in times of crisis. Finally, the study highlights that informal governance, although illegal, can produce unexpected forms of efficiency, questioning the usual limits of centralized planning.

Beyond practical lessons, the investigation also enriches theoretical reflection on retail logistics. Analysis demonstrates that a specific form of rationality can emerge even within illegal and highly constrained contexts, challenging conventional assumptions that compliance with institutional legality determines supply chain efficiency and overall organizational effectiveness. Clandestine circuits reveal universal principles of coordination, adaptation, and cooperation, providing a heterodox framework to test resilience models developed over several decades across multiple sectors. This perspective encourages a reconsideration of retail logistics in extreme environments, where actors must continuously balance risk, uncertainty, and economic incentives while responding to rapidly changing circumstances. Moreover, the study emphasizes the significance of reputation, trust, and social norms as structural adjustment variables in flow management. In France under the Vichy regime, sustaining trade depended as much on the perceived reliability of intermediaries as on the actual availability of goods, highlighting social capital as a critical organizational resource. The black market thus exposes intangible dimensions of logistics performance often overlooked in dominant models, offering a powerful conceptual lens to explore robustness, expand understanding of competitive mechanisms, and inspire the design of more responsive and adaptive organizations in uncertain and highly dynamic conditions.

TABLE 3 – Comparative analysis: WWII French black market vs. modern crisis supply chains

Feature	France 1940–44 black market	Contemporary supply chain in crisis	Implications
Scarcity	- Official rations around 1,080 kcal/day - Severe shortages led consumers to seek alternative channels	Demand spikes, limited inventory, and supply shocks during pandemics, natural disasters, or geopolitical events	Scarcity drives the need for alternative sourcing and flexible demand management strategies
Distribution networks	- Multi-tiered clandestine channels - Urban-rural “family parcels” - Dynamic routing to avoid controls	Multi-modal, global logistics networks with backup suppliers and contingency routes	Adaptive routing and decentralized flows increase resilience
Segmentation and local knowledge	- Localized intelligence - Knowledge of social and territorial networks determined efficient distribution	Use of geospatial analytics, micro-segmentation, and IoT tracking for precise demand fulfillment	Localized intelligence—human or digital—optimizes resource allocation under constraints
Flexibility and innovation	- Rapid adaptation to ration adjustments - Ad hoc storage and mobile logistics	Agile supply chains employ real-time monitoring, flexible inventory, and dynamic re-routing to respond to crises	Crisis drives organizational creativity and adaptive capacity
Risk management	- Constant threat of confiscation or punishment - Actors balanced risk vs. benefit in strategic decision-making	Legal supply chains face financial, reputational, and operational risks during disruptions	Understanding risk-reward dynamics enhances decision-making under uncertainty
Resilience and continuity	- Sustained supply of critical food items despite rationing - Networks evolved to maintain flow	Business continuity planning, redundancy, and buffer stocks ensure ongoing supply during systemic shocks	Resilience principles are universal: redundancy, flexibility, and rapid adaptation

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The smooth check-out: customer preferences for cashierless systems

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Abstract. Cashierless systems offer numerous operational benefits for retailers and enhanced convenience for customers. Despite these advantages, many customers remain skeptical and hesitant to adopt such technologies. Prior research has produced mixed and sometimes contradictory findings, limiting clear managerial implications. Addressing this gap, the present study conducts a comparative analysis of different cashierless system types. The empirical approach compares prominent types of cashierless systems (self-checkout, smart trolley, just-walk-out, and facial recognition) and traditional checkouts. For this analysis, the results of an empirical Discrete Choice Experiment are integrated in a structural equation model. The analysis reveals comparative system-specific effects key determinants, such as customer experience, data privacy concerns, and socio-demographic characteristics, on customer preferences. Confirming literature findings, customers perceive different types of cashierless systems in distinct ways. Self-checkout systems and traditional checkouts as well as AI-based systems (just-walk-out and facial recognition) are perceived as similar and distinct from other systems. Smart trolleys occupy an intermediate position between these two groups. Customer experience positively influences preferences for AI-based cashierless systems. At the same time, data privacy concerns represent a significant barrier to the adoption of just-walk-out and facial recognition technologies. Furthermore, the findings indicate that socio-demographic characteristics (age, household income, and household size) shape customer preferences across different cashierless system types. Customer preferences and socio-demographic characteristics support retailers in selecting the appropriate types of cashierless systems for their target customers improving customer satisfaction. Retailers may combine the most appropriate systems reducing the risk of alienating specific customer segments.

Keywords: cashierless systems; discrete choice experiment; customer preferences; retail checkout; retail technology.

Introduction

In 2024, more than 45% of the German customers did at least a fraction of their grocery shopping online. This continuous growth in online grocery shopping exerts pressure on competing stationary retailers and prompt them to innovate their stores and introduce new concepts to keep customers in their stores. An example of such an innovation is the checkout with cashierless systems. Cashierless systems facilitate time-efficient checkouts by avoiding or reducing waiting lines (e.g., Pantano *et al.*, 2023; Schultz & Paetz, 2025). There are several types of cashierless systems, including self-checkout, just-walk-out, facial recognition, and smart trolleys. These systems vary in the degree of customer action required, the level of artificial intelligence (AI) used, and the amount of private customer data needed.

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Self-checkouts are systems where customers scan their products themselves after shopping and pay at a terminal (Andriulo *et al.*, 2015). In Europe, the first self-service checkout was introduced in Switzerland in 1965 as “self-typing checkout”. Self-typing refers to customers having to register their purchases at the cashier on their own by typing in the prices of all items. However, due to limited consumer acceptance, the system was discontinued shortly thereafter (Stiftung Warentest, 1966). In 2004, a pilot implementation of self-service checkouts was launched in Germany at the retail chain “extra” (now Rewe). In 2021 and 2022, the supermarket chains Aldi Süd and Lidl subsequently adopted similar systems (Bernhard, 2022; Rehmann, 2021). Notably, these cashierless systems neither require the collection of customers’ personal data nor rely on AI technologies.

Several smart trolley systems exist (Satheesan *et al.*, 2021), e.g., using RFID tags and readers. The use of *smart trolleys* requires a smart phone app for personal identification on the shopping cart (Schultz & Zacheus, 2024). Customers then select their desired products in the aisles and place them in the shopping cart. The cart can be equipped with cameras, scanners, or sensors recognizing and recording products automatically. At the checkout, customers may also pay via the shopping cart (Divya *et al.*, 2019). Hence, customers do not have to check out with a cashier. Such smart trolleys use AI and private data are required (e.g., payment information).

For the *just-walk-out* system, customers identify, for example, via a smart phone app when entering the store. The check-in is done via an entrance barrier, for example with the help of a QR code. In the store, customers select products that are automatically recorded by cameras, scanners, and sensors. At checkout, customers use their smartphones to automatically complete their purchase at the exit barrier, without having to actively pay at a conventional cashier-operated checkout. After leaving the store, the purchase amount is debited from the customer’s account (Cui *et al.*, 2022; Jordan *et al.*, 2023). Within the just-walk-out system, the use of AI is pervasive, and requires the collection of customers’ personal data, including payment information. To use *facial recognition* (Gao *et al.*, 2023; Lee & Pan, 2023; Pantano *et al.*, 2023; Yu *et al.*, 2024), customers must register an account with a service provider, such as AliPay or Tencent, and link it to their biometric data (Schultz & Paetz, 2025). Facial recognition technology is then used to identify customers during shopping and verify their identity at checkout (Schultz & Paetz, 2025). In this setting, AI is integral to the system’s operation and necessitates the collection of customers’ personal data, including payment and biometric information.

Recent literature suggests that (German) customers exhibit a certain reluctance to adopt cashierless systems: Security, social, and technical concerns act as barriers to their use (Bulmer *et al.*, 2018; Hazée *et al.*, 2025; Pantano & Di Pietro, 2012). By contrast, convenience has consistently been identified as a key driver of adoption (e.g., Schultz & Paetz, 2025), alongside personal compatibility and perceived usefulness (Gouthier *et al.*, 2022). Moreover, the use of cashierless systems appears to depend on situational and product-related factors. Zhang *et al.* (2025), for instance, report increased usage when customers experience time pressure or when purchasing sensitive personal products (e.g., condoms). The existing literature has examined several drivers and barriers to the adoption and use of cashierless systems. However, the focus is often limited to one type of systems or on aggregate level. There is limited research on the different types of cashierless systems, such as self-checkout, smart trolleys, just-walk-out, and facial recognition. These types of cashierless systems differ substantially in their technical implications and are, thus, expected to evoke different concerns and emotions. We tackle this issue by studying preferences for different types of cashierless systems.

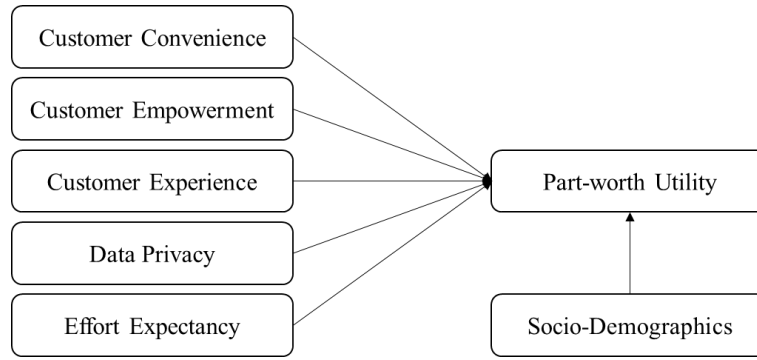


Figure 1: Research model

Methodology

RESEARCH DESIGN

Following previous research, key factors that influence customers' use of cashierless systems (Schultz & Paetz, 2025) are customer convenience, empowerment, and experience as well as data privacy and effort expectancy. However, we decouple the non-type specific model to various types of cashierless systems (traditional checkout, self-checkout, smart trolley, just-walk-out, and facial recognition). For this purpose, a discrete choice model estimates individual preferences, instead of fully relying on self-reported measurements for self-service satisfaction or behavioral intention. Figure 1 displays the general research approach.

Based on the results from recent literature, we try to formulate hypotheses: Previous research outlined the importance of *data privacy* for the acceptance of just-walk-out and facial recognition systems (Pantano *et al.*, 2023; Schultz & Paetz, 2025). Yu *et al.* (2024) as well as Dang *et al.* (2022) further support this regarding *privacy concerns* as a main barrier in using facial recognition checkout. Similarly, the acceptance of the just-walk-out is negatively related to privacy concerns (Gouthier *et al.*, 2022). In contrast, traditional checkouts and self-checkout cashiers are generally less influenced by privacy concerns, as they do not require the collection or processing of highly sensitive personal data. For smart trolleys, the effect of data privacy concerns appears to be more ambiguous. On the one hand, these systems do not require the disclosure of biometric data. On the other hand, their use typically involves a smartphone application that requires the provision of personal information, and the integration of e-billing systems may pose perceived privacy risks (Das *et al.*, 2020). Moreover, Schultz & Zacheus (2024) report a negative effect of perceived privacy risks on customers' attitudes toward smart trolleys, although this effect does not extend to purchase intention.

H1: Data privacy has a ...

H1a: ... positive impact on users' preferences for traditional checkouts.

H1b: ... positive impact on users' preferences for and self-checkouts.

H1c: ... no impact on users' preferences for smart trolleys.

H1d: ... negative impact on users' preferences for just-walk-out concepts.

H1e: negative impact on users' preferences for facial recognition concepts.

Effort expectancy is closely linked to cashierless systems (Lee & Pan, 2023; Zhang & Kang, 2019), particularly with regard to the technological features and usage processes associated with them. Based on Gouthier *et al.*'s (2022) findings, which indicate a higher willingness to use just-walk-out checkout when effort expectancy is high, we posit a positive influence of effort expectancy on preferences for cashierless systems. In contrast, Durdevic *et al.* (2022) analyze the influence of effort expectancy on the acceptance of RFID technology, which conceptually corresponds to smart trolley systems in our study, and find a positive effect. However, other studies (Schultz & Paetz, 2025) report no significant influence of effort expectancy on the

acceptance of facial recognition and self-checkout systems. In summary, we propose a similarly limited or non-significant effect in our investigation of preferences across different types of cashierless systems.

H2: Effort expectancy has ...

H2a: ... no influence on users' preferences for traditional checkouts.

H2b: ... a positive impact on users' preferences for self-checkout.

H2c: ... a positive impact on users' preferences for smart trolleys.

H2d: ... a positive impact on users' preferences for just-walk-out concepts.

H2e: ... no influence on users' preferences for facial recognition concepts.

Customer experience has been shown to positively influence just-walk-out concepts, with a stronger experience contributing to greater acceptance and use of this type of cashierless system (Chuawatcharin & Gerdsri, 2019). Schultz & Zacheus (2024) argue that smart trolleys play only a subordinate role in shaping the overall shopping experience. In the context of fashion retail, self-checkout usage is positively associated with enhanced customer experience (Liang *et al.*, 2022). However, Schultz & Paetz (2025) report that customer experience does not significantly impact the acceptance of facial recognition technology. The same reasoning applies to preferences for traditional checkouts, as the dimensions underlying customer experience are primarily conceptualized in relation to cashierless technologies rather than staffed checkouts.

H3: Customer experience has a...

H3a: ... no influence on users' preferences for traditional checkouts.

H3b: ... a positive impact on users' preferences for self-checkout.

H3c: ... a positive impact on users' preferences for smart trolley.

H3d: ... a positive impact on customers' preferences for the just-walk-out concept.

H3e:no influence on the preferences for facial recognition concept.

Customer convenience was recently found to have a positive influence on self-checkout systems, but not on the facial recognition or just-walk-out concept (Chauhan *et al.*, 2025; Schultz & Paetz, 2025). Customer convenience is closely related to time-saving in cashierless shopping (Duarte *et al.*, 2022). Especially the use of smart trolleys is frequently linked to time-saving aspects and therefore customer convenience (Das *et al.*, 2020; Schultz & Zacheus, 2024). Hence, we assume a positive impact of customer convenience on their preferences for smart trolleys. In contrast, we assume no influence on traditional checkouts, because – once again – the items are preliminary tailored to cashierless systems.

H4: Customer convenience has...

H4a: ... no impact on users' preferences for traditional checkouts.

H4b: ... a positive impact on users' preferences for self-checkout concepts.

H4c: ... a positive impact on users' preferences for smart trolleys.

H4d: ... no influence on the preferences for just-walk-out systems.

H4e: ... no influence on facial recognition concepts.

Customer empowerment showed no direct effect on facial recognition and just-walk-out systems (Schultz & Paetz, 2025). In resemblance with this, we assume that there is no impact of empowerment for traditional checkouts, because customer empowerment is explicitly necessary for cashierless systems. However, based on the need for “knowledge” for self-checkout (Cebeci *et al.*, 2020), we assume a positive impact of customer empowerment on self-checkout systems. To the best of our knowledge, no study scrutinized the influence of *customer empowerment* in the context of smart trolleys. Since smart trolleys are perceived as more similar to self-checkout systems than to AI-based cashierless technologies, we assume that smart trolleys will have a positive impact on customers, just as self-checkouts do.

H5: Customer empowerment has...

- H5a: ... no impact on users' preferences for traditional checkouts.
- H5b: ... shows a positive impact on users' preferences for self-checkout.
- H5c: ... shows no influence on users' preferences for smart trolleys.
- H5d: ... no impact on the preferences for just-walk-out systems.
- H5e: ... no influence on customers' preferences for the facial recognition concept.

In order to test our formulated hypotheses, we conducted an empirical study online to achieve a representative sample. The online survey was administered in the summer of 2025. After providing their consent to participate in the study, the participants were introduced to the different types of cashierless systems and responded to the three sections of the online study. The first section surveyed factors influencing customer preferences for cashierless systems. Participants answered various multi-item scales. Hunter & Garnefeld (2008) provide the scale for *customer empowerment*. This construct refers to “a positive subjective state evoked by customer perceptions of increasing control” (Hunter & Garnefeld, 2008, 1). *Customer convenience* is based on Duarte *et al.* (2022). Customer convenience mirrors customers' perceived convenience, e.g., regarding time savings or ease of use, when engaging with a cashierless system. *Customer experience*, that refers to customers' attention or even passion to use cashierless systems, is measured with the scale by Gong *et al.* (2022). *Effort expectancy* capture customers' perceived effort and necessary skills to use cashierless systems. Measurement is adopted from Venkatesh *et al.* (2003), Im *et al.* (2011), and Zhou (2012). Lastly, we used the scale by Zhang *et al.* (2019) to measure *data privacy*. This factor summarizes questions about customers' concerns regarding the third-party use of personal information.

In the second section, participants provided socio-demographic details (e.g., age and gender). The third and final section included a discrete choice experiment (DCE) (Train, 2009) that considered the cashierless checkout system as the focal service. Four attributes described the cashierless checkout: (1) type of cashierless system (self-checkout / just-walk-out / facial recognition / smart trolley), (2) immediate cost verification (yes / no), (3) availability of staff assistance (yes / no), and (4) frequency of random invoice verification checks performed by staff (every 5th customer / every 20th customer / every 35th customer). These four attributes represent findings and reflect relevant characteristics of cashierless systems that are perceived as relevant by customers (Benoit *et al.*, 2024; Knezevic *et al.*, 2020; Schultz & Paetz, 2025). The DCE included six choice sets, each with three checkout alternatives and a none-option (“I would like to use a traditional cash counter with a cashier”).

SAMPLE

The online study yielded 236 complete responses. We excluded participants who chose the “none” option in at least 75% of the tasks (“none-straightliners”). After the elimination of these respondents, the final sample is 206. 67% of the final sample was female, and the mean age was 30.5 years. 48% have a maximum monthly net household income of €2500 and 74% live in an urban area. In the German grocery retail sector, younger people (i.e., those between 16 and 49 years old) are more open to using cashierless systems than older customers (Statista, 2023). Therefore, the younger mean age of our sample compared to the approximate mean age of 45 years of Germans (Statista, 2024a) is justified for our study. In Germany, 42% have a maximum monthly household income of €2,500 (Statista, 2024b), which corresponds with the distribution of our sample. The higher percentage of women in our sample corresponds with the higher percentage of women in the German population, who are responsible for grocery shopping for their families (54%; Bundeszentrum für Ernährung, 2025). It also reflects the higher number of women living alone (compared to men) (DeStatis, 2024). Furthermore, approximately 78% of Germans live in urban regions (Statista, 2024c), which is consistent with the percentage of people in the sample who live in urban regions.

The DCE reveals that the selection shares within choice sets are almost on par, i.e., 27.75% for the first alternatives, 27.51% for the second alternatives, 28.24% for the third alternatives. The share of the fourth

alternative (none-option) is 16.50%. It is only one-tenth higher than the recommended threshold of 15% (Johnson & Orme, 2003). The percentage of none-option shares, as well as the almost equal shares of the cashierless system alternatives, provide a solid foundation for further analysis and estimation using a DCE-model. Additionally, we examined the relevance of our selected attributes by asking respondents to rate their importance in the final decision to use a certain cashierless system. The majority attached the highest importance to the cashierless system itself (38.83%), followed by immediate cost verification (25.00%), availability of staff assistance (23.81%), and frequency of invoice verification by staff (12.35%). Although, the importance of the “frequency of verification of invoice by staff” attribute is lower than that of the other attributes, it is still higher than one-eighth. In addition, the standard deviations of all attributes’ importance are relatively high: 19.80 for the type of cashierless system, 16.11 for the immediate cost verification, 15.09 for the availability of staff assistance, and 12.33 for the frequency of invoice verification by staff. Hence, a certain number of participants that attach a much higher importance to even the least influential attribute. Therefore, all attributes seem to have some influence on the final cashierless system decision, maintaining the study’s good setup.

The high standard deviations suggest substantial heterogeneity in our sample. Therefore, we decided to use heterogeneous data analysis techniques (rather than homogeneous models) and estimate an individual-level CBC-HB model. Specifically, a HB-Multinomial Logit (MNL) model (Kim *et al.*, 2007; Webb *et al.*, 2021), captured preference heterogeneity at the finest level.

Results

Choice-Based conjoint for Hierarchical Bayes estimates

The CBC-HB model is estimated via the corresponding Sawtooth software (Sawtooth Software, 2009). We considered part-worth models for all attribute levels, because the number of the degrees of freedom for the estimation is sufficient. In contrast to a linear model, a part-worth model is able to capture non-linearities, which is especially relevant for the “frequency of invoice verification by staff” attribute. Thus, eight part-worths (including the none-option) are estimated. For example, if an attribute has three levels, two part-worth parameters must be estimated for the first two levels. However, the part-worth parameter for the third level can be calculated by adding to zero. After a burn-in phase of 10,000 iterations, 10,000 draws are used for each of the 206 respondents. Table 1 displays the mean parameters.

TABLE 1 – Mean parameters from CBC-HB estimation

Attribute level	Mean parameter
<i>Type of cashierless system</i>	
Self-checkout	2.67
Just-walk-out	-0.35
Smart trolley	0.76
Facial recognition	-3.08
<i>availability of staff-assistance</i>	
Yes	1.06
No	-1.06
<i>immediate cost verification</i>	
Yes	0.72
No	-0.72
<i>frequency of verification of invoice through staff</i>	
every 5 th customer	-0.86
every 20 th customer	0.42
every 35 th customer	0.44
None	0.13

TABLE 2 – Descriptive statistics of the latent variables

Latent Variable	Mean	Min	Max	SD	Kurtosis	Skewness
Customer Convenience	5.791	1.305	7.000	1.124	1.693	-1.207
Effort Expectancy	5.764	1.714	7.000	1.021	0.857	-0.838
Customer Empowerment	5.769	1.310	7.000	1.165	2.407	-1.434
Customer Experience	4.744	1.000	7.000	1.515	-0.355	-0.434
Data Privacy	3.482	1.000	7.000	1.834	-1.144	0.304

TABLE 3 – Individual item loadings

Latent Variable	Item	traditional checkout	self- checkout	smart trolley	just-walk- out	facial recognition
Customer Convenience	1	0.956	0.854	0.921	0.873	0.659
	2	0.896	0.918	0.938	0.886	0.840
	3r	0.704	0.856	0.710	0.870	0.955
Data Privacy	1	0.953	0.954	0.955	0.956	0.953
	2	0.939	0.931	0.946	0.932	0.937
	3	0.962	0.967	0.955	0.964	0.963
Effort Expectancy	1	0.924	0.898	0.906	0.901	0.904
	2	0.755	0.808	0.773	0.792	0.789
	3	0.914	0.900	0.921	0.912	0.911
Customer Empowerment	1	0.905	0.906	0.878	0.895	0.891
	2	0.802	0.822	0.831	0.874	0.807
	3	0.876	0.861	0.879	0.819	0.886
Customer Experience	1	0.813	0.813	0.834	0.793	0.830
	2	0.948	0.950	0.938	0.958	0.941
	3	0.917	0.915	0.905	0.924	0.906

Notes: r: reverse coded measurement item.

We observe a percent certainty of 68.30% and a root likelihood (RLH) of 0.645 indicating a good model fit (Paetz *et al.*, 2019). On average, the estimates seem plausible; staff assistance and immediate cost verification are preferred to their corresponding counterparts. Verifying invoices less frequently is favored over verifying them more frequently. Of the cashierless systems, respondents prefer self-checkout systems the most, followed by smart trolley, just-walk-out and facial recognition systems.

Structural equation models' estimates

Next, we entered the individual part-worth utility estimates into five different structural equation models: one model for each type of cashierless system and one for the traditional checkout. This means customer's individual preferences are compared between the five types of checkout systems. The relationships in the system type-specific research models were analyzed using variance-based structural equation models in SmartPLS4. Calculations are based on 5,000 bootstrap samples. Table 2 presents the descriptive overview of the latent constructs in the full sample. As common method bias may be a concern, full collinearity variance inflation factors (FVIF) are calculated for the surveyed multi-item scales. The FVIFs range from 1.267 data privacy, 1.505 effort expectancy, 1.526 customer convenience, 1.573 customer experience to 2.083 customer empowerment. All values are well below the 3.3 threshold. Thus, the sample is not greatly impacted by common method bias. First, we assess the reliability and validity of the measurement models. Individual item reliability is given when all item loadings are greater than 0.7. The measurement across all five models was approached conservatively, so measurement items were dropped to create consistency across all checkout type models: one item from effort expectancy, two items from customer empowerment, and one item from customer experience. One item loading is below 0.7 but can be accepted with 0.659 as construct reliability is established. Table 3 reports the individual item loadings.

TABLE 4 – Measurement results for each latent variable

Latent variable	traditional checkout		self-checkout		smart trolley		just-walk-out		facial recognition	
	Rho	AVE	Rho	AVE	Rho	AVE	Rho	AVE	Rho	AVE
Convenience	0.892	0.737	0.909	0.768	0.896	0.744	0.908	0.768	0.864	0.684
Effort	0.901	0.753	0.903	0.757	0.902	0.756	0.903	0.757	0.903	0.757
Empowerment	0.897	0.743	0.898	0.746	0.898	0.745	0.897	0.745	0.897	0.743
Experience	0.923	0.800	0.923	0.800	0.922	0.798	0.923	0.800	0.922	0.798
Privacy	0.966	0.905	0.966	0.903	0.967	0.906	0.966	0.904	0.966	0.905

Notes: Rho: Dillon-Goldstein rho, AVE: average variance extracted.

TABLE 5 – Results of the Checkout type-specific structural model (Model 1)

Independent Variable	Dependent variable	traditional checkout	self-checkout	smart trolley	just-walk-out	facial recognition
Customer Convenience	Preference	0.024	0.292***	-0.032	-0.245***	-0.277'
Customer empowerment	Preference	0.003	-0.037	0.032	0.022	0.031
Customer experience	Preference	-0.364***	-0.237***	-0.171*	0.182**	0.309***
Effort expectancy	Preference	0.001	-0.058	-0.123	0.106	0.099
Data privacy	Preference	0.271***	0.165***	0.107	-0.140**	-0.194***

Notes: Asterisks indicate a significance level of 0.10, *0.05, **0.01, ***<0.01.

Next, construct reliability is examined with Dillon-Goldstein's rho which should exceed 0.7. The values range from 0.864 to 0.967. Cronbach's alpha further confirmed construct reliability. Convergent validity is achieved when the average variance extracted (AVE) values for all variables are greater than 0.5. The AVE values range satisfactorily from 0.684 to 0.906. Table 4 summarizes the results.

Lastly, discriminant validity is assessed by evaluating the cross-loadings, the Fornell-Larcker criteria, and the heterotrait-monotrait ratios (HTMT). Each item has the highest loading with its corresponding construct. For the Fornell-Larcker criteria, the square root of AVE for each construct is greater than other construct correlations. All HTMT ratios are below the conservative 0.85 threshold. The cross-loadings, Fornell-Larcker criteria, and HTMT ratios support discriminant validity for all measurements. The structural models then seek to explain the part-worth utilities from the DCE by the self-reported measures. In the following, we present the results in two steps. First, empirical results are presented without socio-demographics (Model 1). Second, the results include effects of socio-demographic characteristics (Model 2).

Table 5 displays the results of Model 1. Customers' perceived *effort expectancy* has no significant effect on the part-worth utilities of either cashierless system. The effects on self-checkout systems are entirely opposite to those effects on the just-walk-out system. While *customer convenience* and *data privacy* have a positive effect on customers' preferences for self-checkout and *customer experience* yields a negative effect, *customer convenience* and *data privacy* yield a negative effect on the preferences for just-walk-out and *customer experience* has a positive effect. Customers' preference of *customer experience* positively and *data privacy* negatively affect the part-worth utilities of facial recognition. In contrast, customers' perceive negative *customer experience* toward smart trolleys in comparison to the other cashierless systems. Finally, customers' individual preferences reveal the expected positive effect of *data privacy* and the negative effect of *customer experience*. These effects are similar but less pronounced in the self-checkout. This reveals that customers attribute less customer experience to existing systems and perceive data privacy concerns in the newer ones.

TABLE 6 – Overview of assumed and observed directions of latent variables

Independent Variable	Dependent variable	traditional checkout	self-checkout	smart trolley	just-walk-out	facial recognition
Data privacy	Preference	+/+	+/+	o/o	-/-	-/-
Effort expectancy	Preference	o/o	+/-	+/-	+/-	+/-
Customer experience	Preference	o/o	+/-	+/-	+/-	+/-
Customer Convenience	Preference	o/o	+/+	+/-	o/-	o/o
Customer empowerment	Preference	o/o	+/-	+/-	o/o	o/o

Notes: On the left side is the direction of the hypothesized influence displayed, on the right side is the direction found in the analyses.

TABLE 7 – Results of the Checkout type-specific structural model (Model 2)

Independent Variable	Dependent variable	traditional checkout	self-checkout	smart trolley	just-walk-out	facial recognition
Customer Convenience	Preference	0.034	0.293***	-0.019	-0.246***	-0.283
Customer empowerment	Preference	0.002	-0.019	0.027	0.015	0.009
Customer experience	Preference	-0.358***	-0.231***	-0.163	0.181**	0.305***
Effort expectancy	Preference	0.001	-0.023	-0.159	0.094	0.081
Data privacy	Preference	0.231***	0.169***	0.117	-0.138**	-0.207***
Age	Preference	0.041	0.182*	-0.129'	-0.076	-0.122
Income	Preference	-0.092	-0.147'	0.071	0.014	0.153'
Household size	Preference	-0.114'	-0.061	-0.078	0.033	0.111'

Notes: Asterisks indicate a significance level of 0.10, *0.05, **0.01, ***<0.01.

Based on the results, we are able to accept several of our hypotheses. Table 6 summarizes all hypotheses and results, supporting H1a-H1e, H2b, H2d, H3b, H3d, H4b, H4c, H4d, H5b, H5a, and H5d.

Model 2 adds the direct effects of selected socio-demographic variables (e.g., age, income and household size) to Model 1. The selection of these specific variables resulted from a stepwise incorporation of single socio-demographic variables. Table 7 contains the results for Model 2. The direct effects of the self-reported individual preferences remain stable compared to Model 1. Customer's *age* has a positive influence on the preferences for self-checkout. Meaning older customers show a preference for the self-checkout. In contrast, customer's *age* has a significant negative impact on their preferences for smart trolleys. Whereas an increasing *income* hampers customers' preferences for self-checkout, it increases their preferences for the face-recognition system. An increase in household size tends to deteriorate customers' preferences for traditional checkouts. This contributes to higher preferences for facial recognition.

Conclusions and discussion

Currently, many retailers are installing cashierless systems. While cashierless systems are known to shorten the checkout process for customer, many customers are still reluctant in their acceptance of cashierless systems (Schultz & Paetz, 2025). Several studies analyze the drivers and obstacles for customers' adoption and acceptance of cashierless systems (e.g., Bulmer *et al.*, 2018; Gao *et al.*, 2023; Schultz & Paetz, 2025). However, most studies either focus on a specific type of cashierless system (e.g., self-checkout or facial recognition) or consider cashierless systems as a whole without accounting for the differences between the

various types. Recent studies identified various impact factors impacting the acceptance of cashierless systems. However, the reasons for these differences remain unexplored. Cultural differences in the focal samples (Schlieuwe & Pezoldt, 2010) or in specific product categories (Zhang *et al.*, 2025) may explain the differences in acceptance of cashierless systems. However, no study has focused on a comparative approach reviewing the most prominent cashierless systems in retailing. Therefore, this study focuses on four types of cashierless systems, e.g., self-checkout, smart trolley, just-walk-out, and facial recognition in comparison to traditional checkouts. The present study identified no impact of *customer effort* or *customer empowerment* compared across all five checkout systems. In contrast, *customer experience* shows considerable customer preference differences across all cashier(less) types. Naturally, the directions of the perceived preferences varied across the different types. Similarly, *data privacy* affected the preferences of almost all cashier(less) system types, with the exception of smart trolleys.

The comparative analysis found similar customer preferences for traditional checkouts and self-checkout systems: Customers perceive these forms of cashier(less) systems as very similar. In contrast, we found opposite impacts on self-checkout and traditional checkouts for highly AI-driven technologies like just-walk-out and facial recognition. Once again, this suggests that customers perceive these technologies as more similar to each other than to the aforementioned technologies. Interestingly, based on the impact directions, smart trolleys are perceived as more similar to self-checkout systems than to AI-based systems. For example, an increasing *customer experience* with cashierless systems strengthens the preferences of AI-based cashierless systems like just-walk-out or facial recognition. Previous predominantly links core antecedences to customers' cashierless system acceptance (e.g., Chuawatcharin & Gerdri, 2019; Moriuchi 2021; Shiau *et al.*, 2023). Schultz & Paetz (2025) included customer experience directly but could not verify its impact. *Data privacy* concerns are a main obstacle for the adoption and acceptance of cashierless systems (Dang *et al.*, 2022; Pantano *et al.*, 2023; Yu *et al.*, 2024). The comparative study confirmed these results for customers' preferences for just-walk-out and facial recognition systems. Consistent with the findings of Schultz & Paetz (2025) and Chauhan *et al.* (2025), customer convenience positively influences self-checkout systems. However, this factor negatively influences the just-walk-out concept. While this result may seem counterintuitive at first, we believe customers are deterred by the effort required before shopping, such as registering via a shopping app and entering payment information.

The results of Model 2 also yield insights into relevant socio-demographics. Older aged customers have been scrutinized in the past (e.g., Yin *et al.*, 2013). Here, older customers were more likely to prefer self-checkout systems compared to other checkouts. This finding updates Dean's (2008) finding that older customers are less confident using self-checkout systems. Older age further tends to hinder the use of smart trolleys. A higher household income decreases the likelihood of using self-checkout systems, but increases customers' preferences for facial recognition systems. The latter is supported by the results of Im *et al.* (2003), who found that customers with higher incomes are more likely to use new technologies. However, Lee *et al.* (2010) found that income had no significant impact on preferences for self-checkout systems. Larger households tend to reject traditional checkouts in favor of facial recognition systems. This result seems intuitive because larger households tend to have more items per shopping trip, resulting in time-consuming cashier processes. In contrast, facial recognition is perceived as a time-saving cashierless approach (Jasrotia, 2023) and is, therefore, preferred by larger households with more items in their shopping baskets.

Naturally, customers perceive different types of cashierless systems differently. In addition to the challenge of installing cashierless systems, retailers must understand their customer preferences and socio-demographic characteristics to implement the appropriate type or combination of types of cashierless system. Otherwise, they risk alienating customers. Installing cashierless systems provides both economic benefits and drawbacks that should be weighed: A common argument for cashierless systems is that they satisfy customers' need to save time by reducing waiting times, for example, or by appealing to their desire

for novelty (Pantano *et al.*, 2023; Schultz & Paetz, 2025). Cashierless systems also are sometimes regarded as a solution to reduce staff costs, e.g., cashiers. However, our research showed, customers prefer staff assistance even with cashierless systems in correspondence with Benoit *et al.* (2024). Additionally, specific types of cashierless systems (i.e., self-checkout systems) encourage shoplifting. These systems can result in substantial monetary losses that may exceed the savings from staff reductions.

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A strategic framework for enhancing retail performance through customer experience management

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Abstract. In modern retailing, differentiation based on low prices or premium product features is no longer sufficient to remain competitive. Increasingly, value derives from the customer experience (CX) that retailers provide. This study is motivated by the need for retailers to strategically manage CX to foster positive word-of-mouth, grow share of wallet, build loyalty, and enhance profitability. Building on existing literature, practical observations, and a grounded-theory-inspired qualitative study, we identify “customer time” as a clear lever for retail differentiation and develop a strategic framework for analyzing how CX can be used for differentiation and growth.

Keywords: customer experience, time, experiential retail, strategic framework, qualitative research

Introduction

Traditionally, retailers have sought differentiation by offering customer value through either low prices or premium benefits. However, in today’s retail environment, price and quality products alone are no longer enough to remain competitive. The value more often lies in the customer experience (CX) that retailers provide (Kahn, 2021). The key to success is the strong consumer relationships that successful retailers can cultivate. CX is a multidimensional, holistic, subjective, and dynamic concept (Gustafsson *et al.*, 2024). We propose that customer experience management can be used strategically by retailers to influence customer interactions and to generate value for both the customer and the company (Verhoef *et al.*, 2009; Holmlund *et al.*, 2020). Managing omnichannel experiences effectively results in customer loyalty (Rahman *et al.*, 2025) and greater customer satisfaction, positive WOM, higher share of wallet, increased frequency of visits, and overall profitability (Gahler *et al.*, 2023; Grewal *et al.*, 2009; Puccinelli *et al.*, 2009).

The temporal aspect of the shopping experience is a crucial factor in CX. It reflects both the pace and duration of the experience and influences customers’ overall judgment (De Keyser *et al.*, 2020). Time saving, as a factor that enhances consumers’ positive perception of CX, has been widely studied, particularly regarding the removal of friction points (Boudkouss & Djelassi, 2021; Reinartz *et al.*, 2019; Inman & Nikolova, 2017). However, some shoppers prefer to spend quality time with retailers because they priorities hedonic goals in their interactions. Researchers have found that strategies to build engagement, and hence loyalty, when customers spend more time shopping include providing enjoyment, exploration, and escapism

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(Vadruccio *et al.*, 2024), or offering entertainment through playful elements and themed environments (Roggeveen *et al.*, 2020), or fostering stronger bonds with customers via store-specific experiences that promote a sense of local community and connection (Bruckberger *et al.*, 2023; Augé, 2020). While other researchers have suggested maximizing omnichannel share of time (Rahman *et al.*, 2025), which is defined as the customers' assessment of the proportion of time they allocate across the channels of an omnichannel retailer, our study proposes a strategic time–value framework for understanding how shoppers perceive the CX strategies that retailer use to position themselves, differentiate, and drive growth.

New customer experience framework

We build on Kahn's (2018, 2021) “success matrix” to propose a new framework based on two dimensions. The first dimension (customer time) captures how retailers manage the time they spend with customers to deliver distinctive CX: either by spending more valuable time with the customer or by saving them time through quicker, more efficient service. The second dimension (customer value) reflects how retailers generate value from the customer experience: either through premium pricing or by offering low prices that also foster loyalty. Each of the four resulting CX archetypes represents a distinct differentiation strategy:

- “Frictionless Automatic Retention” (low price – save time) focuses on convenience and efficiency, using tools such as automatic renewals, one-click purchasing, and easy return policies to drive high retention. Amazon exemplifies this approach.
- “Experiential Retail Theatre” (premium price – spend time) emphasizes discovery, customized service, community, and *shoppertainment*, where quality of time becomes the primary source of value.
- “Do-it-Yourself and Treasure Hunt” (low price – spend time) shifts effort to consumers through co-production and co-creation, which lowers costs/price and also builds engagement and loyalty, as seen at Ikea or TJ Maxx.
- “Fast Quality Excellence” (premium price – save time) combines time-saving convenience with traditionally luxury attribute products, delivering exceptional experiences that justify premium pricing by redefining speed as a form of luxury.

Methodology

To contrast the proposed framework with key informants in the retail sector and to gather a comprehensive and nuanced view of the CX strategies that contribute to retailers' success, we conducted an empirical study. The study adopts a qualitative, grounded-theory-inspired approach with a theory-building purpose. We used semi-structured in-depth interviews, which align with the exploratory and qualitative nature of the research (Pantano & Gandini, 2017). Participants were selected through convenience sampling, targeting senior executives with direct retail management experience in Spain and the USA. The sample consists of 12 qualified informants.

All interviews were conducted via Microsoft Teams, a platform that supports video recording and audio transcription. Strict anonymization of informants was performed using codes including metadata on country, sector, and role. Inter-researcher reliability was maintained throughout the interview process and the data analysis phase. AI-based tools were used solely for procedural support (transcription, translation, anonymization, and exploratory lexical visualization). All coding, interpretation, and theory building were conducted exclusively by the authors.

The interview data were analyzed using thematic and content analysis. Verbatim excerpts from participants were identified to emphasize and illustrate the outcomes. Literature triangulation and peer debriefing confirmed the findings.

TABLE 1 - CX strategy archetypes for retail differentiation and growth

Archetypes	Time Logic and Illustrative Excerpts
Experiential Theatre	Voluntary time investment ES01: Customers who are not on rush visits are relaxed, reflecting a slower, deeper shopping experience. US02: Experiential retail thrives when customers want to linger, explore, and enjoy the atmosphere of the store.
	Time as a driver of economic value ES04: In premium stores, more time is expected from customers, increasing opportunities for upselling and emotional buy-in. ES05: Quality time in-store can lead to the discovery of unexpected “wow” products and higher average ticket sizes.
	Immersive and experiential environments ES01: In-store events and immersive experiences (e.g., exclusive events with wine and chocolates) create unique, lifestyle-oriented moments beyond shopping. ES04: Flagship stores incorporate rotating art exhibits, blurring the line between a fashion store and an art gallery. US03: Coffee shops extend brand interaction, creating experiences that encourage longer interactions.
	Customer–associate interaction US01: Customers take the lead, and time is spent on discovery and education, with interactions becoming voluntary and non-salesy. ES04: Personalized service supported by digital tools. Sales associates assess customer interaction style (assisted vs. independent) and use digital tools (e.g., iPads) to suggest personalized looks.
	Immediacy and speed as core value US02: Contrary to popular belief, Amazon doesn’t win solely on product assortment or price. It created a new standard for (1) Immediacy (2) Low-friction Transactions (3) Effortless Shopping
Fast, Frictionless Shopping	Technology-enabled frictionless shopping ES05: Mobile POS allows payment anywhere in the store. ES03: Apps support reorders and fast returns, dynamic pricing, and auto-applied coupons. ES03: Digital-first return processes that require minimal in-store steps save time and improve convenience.
	ES03: Click & collect systems enable hybrid fast transactions
	Optimization of the purchasing process ES05: Optimized product listings reduce search time. Online, fast load times and intuitive navigation to improve engagement and reduce customer effort ES02: Customers expect clear shelving, wide aisles, and low-assistance environments designed for speed.
	Habit formation and cognitive offloading US04: If they have a shopping habit, shoppers do not necessarily check whether something is available elsewhere at a lower price.
	Co-created value ES01: Time and effort legitimize low prices. Customers know they are paying less because they are doing part of the work. ES06: Fair value. Customers accept navigation and effort because the price makes it worthwhile. ES03: Not everyone is willing to make the effort, and that’s precisely the point. Effort filters customers and protects higher-end offerings.
DIY / Treasure Hunt	Competence, identity, and experiential discovery ES03: Customers feel smart and competent; shopping becomes a ritual.
	US02: Retailers like Costco can thrive because they co-create value by giving the customer more responsibility. They build community through ritual and repetition (e.g., samples, Saturday trips), turning the store into a “playground” of surprise and shared savings.
	US02: Using IKEA as an example: They offer high-touch sensory moments with relatively low-cost staging to offload complexity and imagination to the shopper. Consumers feel (1) smart –

Fast Quality Excellence	they got a deal, (2) capable – they built something, (3) inspired – saw it in a real-life context, and (4) understood – the model matches their lifestyle and budget.
	Speed as a premium value
	US04: People will pay a premium simply to save time, or for stylists to help them save time (service excellence via expert curation)
	Technology-enabled personalization and optimization
	ES01: Technology allows companies to use customer data for personalized experiences and to monitor interactions to optimize product placement and engagement.
	ES02: Technology ensures operational efficiency without disrupting premium service: smooth transactions through fast payments, flexibility in how customers shop, and seamless stock management.

Results

The exploratory study initially confirmed the importance of time as a limited resource that plays a key role in shaping the customer experience (CX). Consumers decide how to optimize the time they spend on the purchasing process, and retailers can either minimize or enhance that time. Table 1 displays the four CX strategy archetypes identified through our qualitative analysis. For each quadrant, we outline the core underlying logic supported by illustrative excerpts from the interviews.

Conclusions

This paper introduces a framework that treats customer time as a strategic CX variable. Customer time refers to the way retailers manage the time they spend with shoppers to create a differentiated CX (extending quality interactions or reducing friction to save customers' time). In terms of value, customers will pay a higher price for better experiences. When costs are reduced, customers expect a lower price. The framework outlines four distinct CX strategies: "Frictionless Automatic Retention"; "Experiential Retail Theatre"; "Do-it-Yourself and Treasure Hunt" and "Fast Quality Excellence". By using store design, immersive environment technology, and service interactions, retailers can influence how customers perceive the value of the time they spend with the retailer. The key to successful retailing is to align the time logic of the CX with the customer's value goals in each situation.

This research offers several key contributions. As a work in progress, it provides preliminary insights into the role of time in shaping customer experience. First, it advances the customer experience literature by incorporating a temporal perspective into the analysis of retail strategies. Second, it proposes a novel framework that can serve as a strategic tool for generating differentiation patterns through the management of customer experience. From a managerial standpoint, the study highlights the importance of designing customer journeys guided by coherent CX logic, carefully determining when to minimize friction and when to foster extended interactions, in alignment with the retailer's value proposition and customer expectations. This study has several limitations stemming from its exploratory, theory-building design. The qualitative approach constrains the generalizability of the findings. Future research employing quantitative methods could provide empirical validation and assess the robustness and generalizability of the proposed framework across different retail formats and sectors. In addition, cross-country analyses offers valuable insights into whether the suggested CX strategies are systematically shaped by underlying cultural values.

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From clutter to culture: understanding crowding as a visual atmospheric cue in UK thrifting pop-up markets

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Abstract. This study examines how crowding influences consumer behaviour in UK thrift pop-up markets—temporary retail spaces selling second-hand clothing in urban areas. While crowding has been viewed as a social or physical occurrence, its role as a visual atmospheric element in temporary retail settings remains unexplored. This study investigates how perceived crowding impacts consumers' shopping behaviour in these markets through qualitative mixed methods, using ten semi-structured interviews with participant-generated photographs and AI-created visual vignettes. Thematic analysis was conducted on consumer perceptions of crowding cues, with participants selected through purposive sampling. Results show that familiarity significantly influences reactions to spatial organization. Newcomers experience cognitive overload due to conflicts with retail norms, whereas experienced thrifters view spatial disorder as authentic. Aesthetic crowding provides both functional and emotional value, whereas olfactory cues impact entry and engagement more than visual stimuli. Human crowding triggers avoidance and adaptive behaviours, with some viewing crowds as popularity indicators. Using the stimulus–organism–response (S-O-R) framework, this study reveals that experiential benefits, such as exploration and social interaction, can offset negative crowding perceptions. This study recommends rest areas and phygital interventions to manage sensory overload. This study contributes to retail and atmospherics research by showing that crowding is context-dependent and shaped by familiarity and sensory interaction, while emphasising inclusive environments for thrift markets in the digital age.

Keywords: Thrifting, experiential retail, pop-up markets, pop-up atmospherics

Introduction

Concerns about overconsumption and environmental degradation have highlighted second-hand fashion as a sustainable consumption solution, making the resurgence of thrifting markets significant (Machado *et al.*, 2019). This trend intensified post-pandemic, as behavioural changes drove the reinvention of physical retailing with sensory experiences (Shanthi *et al.*, 2019). This shift represents a cultural transformation, as online brands such as Vinted and Depop expand through temporary spaces (Houghton, 2025; Wong, 2023). While online brands embrace pop-ups, physical thrifting markets remain popular (Ceron, 2025). This relates to the scrutiny of fast-fashion emissions (Arora *et al.*, 2022). Fashion industry carbon emissions increased by 30% in the 21st century, while material usage doubled (Peters *et al.*, 2021). These statistics explain

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environmental attitudes and the appeal of second-hand fashion. Research shows that second-hand trading could reduce fast fashion's carbon footprint by 90% (Li *et al.*, 2024). Scholars view this shift as indicating a movement toward a circular economy (Halicki *et al.*, 2024; Hellström & Olsson, 2023). The evolution of flea markets to community-driven spaces shows this transformation (Bluhm & Krause, 2022; Ha, 2014; Oldenburg & Brissett, 1982). The value of traditional markets is recognised outside the UK, with commercial goods embedded in cities' culture (Boustani & Lemoine, 2021; Pervaiz *et al.*, 2025; Korkmaz, 2024). These circumstances present an opportunity to examine whether these atmospherics apply to thrift pop-up markets and distinguish them from online competitors.

Early research highlighted the impact of shopping experiences on consumer motivation in physical retail environments (Pine & Gilmore, 1998; Verhoef *et al.*, 2007). With declining High Street demand, brick-and-mortar stores have focused on providing experiential experiences through technology and atmospheric elements (Grewal *et al.*, 2020). Atmospherics create effects that online retailers struggle to replicate. Bitner (1992) categorised these into ambient conditions, design, symbols, and artefacts. While foundational, its application across retail environments may be inappropriate given diverse retail formats (Bäckström & Johansson, 2006, 2024; Chen, 2025). These atmospheric cues were explained through the stimulus–organism–response (S-O-R) framework (Mehrabian & Russell, 1974), where a stimulus (S) elicits an emotional state (O), evoking behavioural responses (R). Studies have shown that atmospherics moderate engagement and purchasing intention (Al-Sulaiti, 2022; Schweiger *et al.*, 2019). In pop-up stores, elements such as signage and layout influence purchasing intention (Ye *et al.*, 2023). The layouts of thrifting pop-up markets underscore the need to examine how crowding influences this model, as crowding significantly affects shopping experiences (Boustani & Lemoine, 2021).

The literature views crowding as a social or physical phenomenon defined by density, rather than exploring environmental cues (Bitner, 1992; Evans & Wener, 2021; Machleit *et al.*, 1994). This gap is notable in the UK's growing thrifting pop-up market scene (Ceron, 2025), where crowding could shape patronage intention. The understudied nature of crowding as a visual atmosphere has prompted the examination of analogous settings to understand how perceived crowding influences shopping experiences. This study investigates the impact of crowding on consumer experiences in UK thrifting pop-up markets and how perceived crowding influences shopping behaviour.

This study employs a mixed-methods approach using photo-elicitation and visual vignettes in semi-structured interviews to examine crowding conditions. This qualitative in-method triangulation explores thrifting consumption behaviour using visual cues. Using Mehrabian & Russell's (1974) and Saricam's (2023) S-O-R framework, it evaluates atmospheric influences on retail experiences, examining how crowding (S) triggers internal states (O) and market responses (R) to understand crowding's influence on consumer motivation and experiences. The data were analysed using thematic analysis to identify patterns within the data (Braun & Clarke, 2006). The study aims to expand the understanding of crowding as a visual atmospheric cue by examining human and spatial dimensions, with environmental design as a subset. Second, examining visual atmospheric experiences of thrifting pop-up markets through in-method triangulation offers an alternative method for studying temporary retail spaces. Practically, the study will show how UK thrifting pop-up markets can leverage crowding as a visual atmospheric element to distinguish themselves from competitors and promote positive shopping experiences. The study will contribute to the literature on thrifting, pop-ups, experiential retail, and atmospheric marketing. The introduction is followed by a review of the literature on second-hand fashion, experiential retail, pop-ups, atmospherics, and crowding as a visual atmospheric cue. The methodology, research design, and analytical approach are covered in the subsequent section, with findings introduced after. Section 5 discusses the study's relevance, and Section 6 concludes with contributions, limitations, and future research recommendations.

Literature Review

Second-hand fashion consumption

Second-hand fashion, known as thrifting, has evolved from being associated with economically disadvantaged groups to becoming popular among Generation Z and Millennials, partly due to social media influence (Yangzom, 2021; Monteiro *et al.*, 2025). In the UK, thrift culture has diversified beyond non-profit foundations, encompassing thrift stores, consignment stores, markets, and online platforms (Parsons, 2004; Bardhi & Arnould, 2005; Zaman *et al.*, 2019). Thrift stores operate as non-profits selling donated clothing for humanitarian causes, while consignment stores are privately owned and feature curated fashion from third-party sellers (Seo & Kim, 2019; Zaman *et al.*, 2019). These retail environments serve an educational role by raising consumer awareness and fostering sustainable fashion consumption (Machado *et al.*, 2019). Therefore, examining thrifting spaces is essential for advancing sustainable fashion practices.

Post-pandemic consumer motivations

Consumer motivations post-pandemic reflect shifts in practical and experiential factors. The pandemic accelerated digital channel adoption due to store closures and isolation, making online second-hand fashion a cost-saving option when fashion was discretionary (Salvietti *et al.*, 2022). However, as consumers sought hedonic experiences post-pandemic, reliance on online retailers stemmed from consumption displacement rather than preference (Coskun *et al.*, 2020; Hall *et al.*, 2021). Environmentally conscious consumers showed indifference to the mode of second-hand fashion consumption, focusing on sustainability values (Evans & Wener, 2021). Price-sensitive consumers preferred physical retail experiences to assess garment quality, highlighting social and sensory limitations of online platforms (Srividya *et al.*, 2024). This contrast shows that post-pandemic consumer motivations balance cost, experience, and social interaction.

Experiential retail in thrifting

Experiential retailing in thrifting leverages emotional and sensory engagement to enhance consumer value and purchase satisfaction. Drawing on Pine & Gilmore's (1998) and Schmitt's (1999) frameworks, products in thrifting environments are experienced through multiple dimensions, sensory, emotional, cognitive, behavioural, and social, creating immersive shopping experiences. Thrifting retailers apply these principles by incorporating "treasure hunting" elements that increase purchase gratification and appeal (Bardhi & Arnould, 2005). Such experiential strategies influence consumer perceptions and purchase intentions within physical retail contexts (Cervellon *et al.*, 2012; Högberg *et al.*, 2019). In the context of thrifting pop-up markets, these approaches may also elevate the cultural capital of second-hand goods, although positive attitudes toward second-hand fashion do not always result in consumption, partly due to sustainability considerations and the performative nature of environmentally conscious shopping (Williams & Hodges, 2022; McNeill & Moore, 2015; Diddi *et al.*, 2019; Cervellon *et al.*, 2012; Guiot & Roux, 2010). This highlights the dual role of experiential retailing in thrifting as both an environmental and immersive consumer engagement strategy.

Pop-up as retail strategy

Pop-up stores function as a dynamic retail strategy designed to offer consumers novel and engaging experiences, addressing the need for tangible brand interactions alongside digital presence (Harris, 2015; Warnaby & Shi, 2017). These temporary retail formats, ranging from shops and stalls to curated brand experiences, capitalize on their temporal and spatial flexibility to raise brand awareness and provide experiential value (Warnaby & Shi, 2017; Alexander & Kent, 2016). Pop-ups enable brands to convey new narratives effectively, especially benefiting online brands seeking physical engagement with consumers (Gauri *et al.*, 2021; Khaneja *et al.*, 2022). Location selection plays a critical role in maximizing the impact of pop-up activations, contributing to urban revitalization and aligning with material, spatial, and temporal retail dynamics (Alexander *et al.*, 2018; Spitzkat & Fuentes, 2019; Warnaby & Shi, 2017). Originating from traditional markets such as flea and farmers' markets, pop-ups have evolved into strategic market initiatives

where businesses invest resources in designing temporary yet impactful installations to engage customers (Venter de Villiers *et al.*, 2018; Bardhi & Arnould, 2005; Ballantyne & Nilsson, 2017; Rosenbaum *et al.*, 2021).

THRIFTING POP -UP MARKETS – THE MODERN FORM OF FLEA MARKETS. Thrifting pop-up markets represent a modern evolution of traditional flea markets, characterized by their temporary and fluid nature as consumption spaces (Henkel *et al.*, 2021). Unlike conventional flea markets, these pop-ups focus on carefully curated thrifting environments within urban settings, highlighting second-hand and vintage fashion. They manifest in various forms such as community-driven events in creative venues, kilo sales featuring independent vendors, and time-limited thrifting markets, all reinforcing their classification as pop-ups. Although these markets cater to a niche audience, their visibility and popularity have grown significantly, largely driven by social media platforms (Monteiro *et al.*, 2025).

Retail atmospherics

Retail atmospherics encompass environmental elements that influence consumers' experiences within retail spaces, including tangible and intangible cues that impact purchasing behaviour (Kotler, 1973; Turley & Millman, 2000; Szocs *et al.*, 2023). These atmospherics engage multiple senses, combining scent, colour, lighting, and music, which shape browsing time and satisfaction with shopping experiences (Baker *et al.*, 1994; Dokcen *et al.*, 2020; Rimkute *et al.*, 2016). For visually impaired consumers, these multisensory cues are critical in fostering positive in-store perceptions and enhancing accessibility (Mediastika *et al.*, 2020). While existing literature has focused on store atmospherics broadly, a gap remains regarding visual atmospheres, particularly within ephemeral retail formats like pop-up markets. These formats leverage their transient nature to evoke urgency and "fear-of-missing-out" among consumers, relying on visual stimuli to communicate brand identity and elicit emotional responses (Henkel *et al.*, 2022; Bloch, 1995; Melewar, 2003). Visual elements in retail are often processed first by consumers, serving as a gateway for environmental stimulation and brand messaging (Bloch, 1995).

However, it remains unclear whether niche formats, like thrifting pop-ups, utilize these visual atmospherics strategically. Online retail environments face limitations in replicating offline multisensory atmospherics, as scent and music become redundant in digital contexts (Lazaris *et al.*, 2017; Doucé *et al.*, 2022; Johnson & Barlow, 2021). Online platforms depend on visual stimuli through user interface design to capture consumer attention and simulate physical shopping experiences. This presents a challenge and opportunity: implementing visual atmospheric cues effectively to blend online shopping convenience with immersive offline retail environments. This integration can enhance consumer engagement across both channels, creating a cohesive retail experience.

PERCEIVED ATMOSPHERICS. Perceived atmospherics refer to the sensory and psychological elements within a store environment that evoke cognitive and emotional responses from consumers (Backer *et al.*, 1994). The rise of 'Instagrammability' in pop-up events has amplified the significance of store atmospherics in driving consumer engagement (Boustani & Lemoine, 2021; Campbell & DiPietro, 2014). However, traditional models like the stimulus–organism–response (S-O-R) framework have limitations in fully capturing consumers' cognitive evaluations of these environments (Erul *et al.*, 2024; Saricam, 2023). While cognitive aspects were originally acknowledged in Bitner's (1992) servicescape model, experiential marketing tends to emphasize affective or emotional evaluations (Salvietti *et al.*, 2022). The cognitive theory of emotion suggests that cognitive processing precedes emotional reactions when individuals encounter psychological stimuli (Ha, 2011), and Gestalt-based research indicates that cognitive and affective processes may occur either sequentially or simultaneously depending on the nature of the stimuli (Saricam, 2023). These insights highlight the need to expand existing models to better integrate both cognitive and affective mechanisms in understanding perceived atmospherics, especially in contexts such as thrifting pop-up markets.

Crowding

Crowding in markets influences consumer behaviour and social interactions. In Chinese culture, spaces with dense crowds, narrow aisles, and loud sales pitches create a lively experience that encourages exploration among visitors (Warden & Chen, 2009; Hynes & Manson, 2016). These crowded settings generate an environment where auditory, visual, and olfactory stimuli converge to foster vibrant social dynamics, a phenomenon known as 'renao' (Zhao, 2025). Understanding how crowding shapes consumer experiences in such cultural contexts can provide insights for examining similar patterns in UK thrifting pop-up markets and their atmospherics.

CROWDING AS A VISUAL ATMOSPHERICS. Crowding as a visual atmospheric element encompasses sensory overload from visual stimuli such as cluttered displays, poor lighting, and overwhelming signage, which can detrimentally affect consumers' perception of the retail environment (Bitner, 1992; Sweller, 2011). This type of crowding shapes the atmospheric experience by influencing how consumers process and respond to retail space complexity (Stokols, 1972). Unlike spatial crowding, which concerns physical movement constraints, or human crowding, which relates to people density, visual crowding emphasizes psychological and perceptual challenges posed by environmental complexity (Galetzka, 2008; Yüksel, 2009). The resulting sensory overload can lead to cognitive fatigue, reduced attention, and decreased satisfaction, impacting consumer behaviour and decision-making. Understanding visual crowding is essential for assessing retail atmospherics, as it highlights the relationship between environmental design elements and consumer psychological responses. Integrating visual crowding with spatial and human crowding provides a framework for analyzing how different crowding dimensions influence the shopping experience, emphasizing retailers' need to balance environmental stimuli for consumer comfort and engagement (Eroglu & Harrell, 1986).

HUMAN CROWDING. Human crowding in retail environments has been shown to negatively impact consumer enjoyment and satisfaction, as densely populated settings often lead to anticipated discomfort despite sometimes signalling lower prices (Elbachir & Abderrahmane, 2017; Mehta, 2013; Pan & Siemens, 2011). However, the relationship between crowding and satisfaction is not consistent across studies, suggesting the influence of extraneous variables (De Oliveira Santini *et al.*, 2020). Field theory explains these mixed findings by emphasizing that consumer experiences are shaped by both individual dispositions and environmental factors (Lewin, 1939). For example, individuals with aggressive tendencies are more negatively affected by crowding, while optimistic consumers manage it better (Gong *et al.*, 2023; Knoeferle *et al.*, 2017). Cultural context also plays a role: in collectivist societies, crowding correlates positively with satisfaction due to social schemata that accept close physical proximity, unlike in individualistic cultures (Elbachir & Abderrahmane, 2017; De Mooij & Hofstede, 2010). Additionally, consumer motivation influences behaviour in crowded settings; recreational shoppers tend to limit their time in-store, whereas utilitarian shoppers use strategies like shopping lists to minimize exposure, and crowding can even increase impulse purchases through interpersonal pressure (Coskun *et al.*, 2019; Huang *et al.*, 2017; Jarboe & McDaniel, 1987). Cognitive load from processing high information rates further affects emotional responses to crowding, highlighting the complex interplay between motivation, cognitive effort, and environmental stimuli (Donovan *et al.*, 1994; Clement *et al.*, 2013).

SPATIAL CROWDING. Spatial crowding significantly influences consumers' affective evaluations, arousal, and emotional responses, often leading to adverse outcomes such as reduced shopping engagement and negative perceptions of the servicescape (Coskun *et al.*, 2019; Huang *et al.*, 2017; Bellizzi & Hite, 1992; Machleit *et al.*, 2000; Kim *et al.*, 2016). While spatial crowding is generally associated with unfavourable experiences, some contexts like tourism and music festivals have reported positive emotional responses to crowding (Kim *et al.*, 2016; Zehrer & Raich, 2016). However, the impact of spatial crowding remains underexplored in specific environments such as experiential thrifting pop-up markets. Environmental design elements, including functional layout, aesthetics, and symbolic features, interact with perceptions of crowding, where spatial

layout can mitigate perceived density, and inadequate signage may exacerbate congestion (Bitner, 1992; Coskun *et al.*, 2020; Gilboa & Rafaeli, 2003; Campbell & Di Pietro, 2014). Understanding these dynamics is crucial for curating environments that balance crowding effects with consumer experience.

Methodology

This study employed an inductive approach to explore consumer crowding experiences in thrifting pop-up markets, recognizing the context-dependent nature of the phenomenon. A qualitative mixed-methods design was utilized, incorporating visual methodology through photographs, drawings, and artefacts to capture non-verbal data (Rose, 2007). Complementing this, semi-structured interviews provided participant narratives, aligning with Pink and Morgan's (2013) assertion that brief ethnographic methods effectively reveal daily life aspects. Unlike traditional mixed methods combining quantitative and qualitative data, this research focused on integrating visual materials with participant perspectives (Donkoh, 2023). Methodological triangulation was applied to enhance research credibility by using multiple methods and data sources within the qualitative framework (Denzin, 2018; Donkoh, 2023).

RESEARCH DESIGN

The research design employed a purposive sampling approach to recruit individuals aged 18 years and above who visited a UK thrifting pop-up market or had photographs of their experiences. Due to the ephemeral nature of the event, flexible parameters for collecting photographs were implemented to address limited accessibility (King & Horrocks, 2010). Recruitment was conducted over three weeks using online posters with a Microsoft Forms consent link, which extended reach and accommodated participants preferring online engagement (Belk, 2006). Despite the small sample size, which is often problematic, this limitation was mitigated by the time-sensitive nature of the research and the use of clear criteria and consistent definitions to reduce bias (Fricker, 2012; Saunders *et al.*, 2019). Ten participants were recruited, achieving theoretical saturation necessary for meaningful data analysis, supported by rich interview and visual data (Morse, 2000). This sample size aligns with research indicating that 9 to 17 interviews in homogeneous samples can achieve saturation (Hennink & Kaiser, 2022). The design prioritized in-depth understanding over statistical generalization.

Research instruments

This study compiled primary data in the form of 110 visual materials and 10 semi-structured interviews (Figure 1).

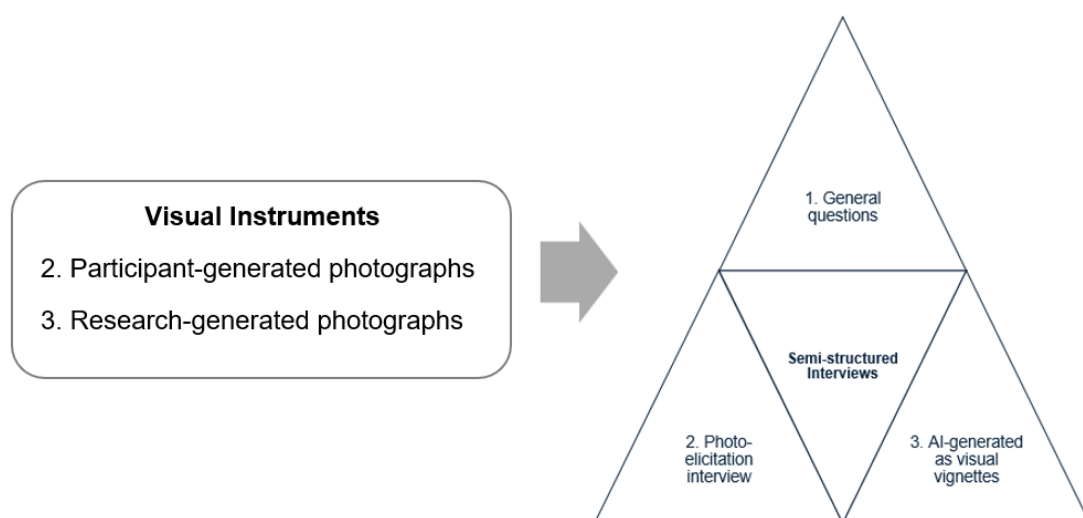


FIGURE 5 - Methodological approach

USE OF VISUAL INSTRUMENTS

The research instruments employed in this study included visual and written materials designed to capture participant experiences and environments effectively. Specifically, pictures were used both as photo-elicitation tools and vignette materials to reflect various settings, combining user-generated and researcher-generated visual methods (Rose, 2007). Participants contributed photographs of thrifting pop-up experiences to provide an emic perspective, while the research team supplemented these with AI-generated images from Deep AI3 to represent underexplored scenarios. This integration of visual techniques alongside written records served to enrich participant responses and deepen the understanding of the studied phenomena (Woodward *et al.*, 2000; Schlereth, 1985; Rose, 2007).

PARTICIPANT-GENERATED PHOTOGRAPHS: Participant-generated photographs served as a method for capturing urban consumption experiences, with participants using phones to document thrifting pop-up markets. This approach aligns with the *flâneur* concept, which frames urban observers as active participants in consumer culture (Woodward *et al.*, 2000). Following an extended S–O–R framework (Mehrabian & Russell, 1974; Saricam, 2023), participants selected images based on stimuli that evoked emotional responses, reflecting atmospheric experiences. The reflexivity in participant-selected images allowed identification of visual stimuli influencing emotions (Radley & Taylor, 2003). Using familiar photographic tools made abstract concepts like crowding more tangible and reduced miscommunication between researchers and participants.

Figure i: Clothes piled on top of each other inside racks



Source: (Participant A | Participant-generated | Outdoor thrifting pop-up market)

FIGURE 6 - Example of user-generated visuals. Source: Participant A

RESEARCHER-GENERATED VISUALS: AI-generated visuals depicted indoor and outdoor thrifting pop-up markets, illustrating crowding under various times and weather conditions (Figure 3). These images served as vignette tools for participant engagement and reflection (Figoli *et al.*, 2025). Deep AI produced diverse images from the same prompt, capturing different retail atmospheres, thereby enriching the market environment representation.

AI-pictures	Prompt	Incorporated Crowding Atmospherics
	Generate a picture of an imaginary outdoor UK thrifting pop-up market where the place is overcrowded by people and items are disorganised. Make sure it is second-hand fashion and vintage focused.	• Human crowding • Spatial crowding
	Generate a picture of an imaginary indoor UK thrifting pop-up market where the items are on the floor and overcrowded. Make sure it is second-hand fashion and vintage focused.	• Spatial crowding
	Generate a picture of an imaginary outdoor UK thrifting pop-up market where it is raining and there are a lot of people. Make sure it is second-hand fashion and vintage focused.	• Human crowding
	Generate a picture of an imaginary indoor UK thrifting pop-up market where the market is really organised and aesthetic. Make sure it is second-hand fashion and vintage focused.	• Spatial crowding
	Generate a picture of an imaginary UK outdoor thrifting pop-up market where the market is organised with signs indicating it's a kilo sale. Make sure it is second-hand fashion and vintage focused.	• Spatial crowding

FIGURE 3 - Researcher generated AI visuals

INTERVIEW PROCESS

The interview process employed a semi-structured approach to balance flexibility with sufficient guidance, allowing for an in-depth exploration of participants' experiences (Alsaawi, 2014). Ten interviews were conducted via Microsoft Teams to ensure convenience and accommodate participants' schedules. Incorporating photo-elicitation interviews using participants' images alongside AI-generated visual vignettes facilitated the uncovering of hidden narratives and promoted critical reflection and comparison (Figoli *et al.*, 2025; Patton, 2002; Rose, 2007). Each interview lasted approximately 40–50 minutes and was organized into four main sections: general questions to guide follow-ups, a photo-elicitation segment, AI-generated visual vignettes, and reflections on thrifting pop-up market experiences. To minimize field errors, jargon was avoided, clarification was encouraged, and questions were adapted dynamically during the interviews (Belk, 2006).

DATA ANALYSIS

The S-O-R framework (Mehrabian & Russell, 1974; Saricam, 2023) is used to evaluate atmospheric influences on retail experiences by examining how crowding (S) affects internal states (O) and market responses (R). Data analysis involved transcribing interviews via Microsoft Teams followed by manual verification to ensure accuracy. Thematic analysis was conducted using Clarke and Braun's (2006) six-stage process to identify both semantic and latent meanings. Initial coding was performed with NVivo 12 software, while theme development was carried out manually through an iterative process to capture the essence of the codes. Participant and AI-generated photographs were used alongside semi-structured interviews to enrich narratives and detect patterns in crowding perceptions. Cultural differences among non-UK participants were taken into account, and rigour was maintained through the application of "good subjectivity" informed by preunderstandings and common sense (Gummesson, 2001).

Results

The data reveal that the experience of crowding as a visual atmosphere varied in thrifting pop-up markets. This variation was primarily due to differences in experience, motivation, temperament, and cultural influences. Data analysis revealed four main themes: (a) navigating spatial organisation through expectation and familiarity, (b) competing sensory influences, (c) response to human crowding, and (d) experiential reward.

NAVIGATING SPATIAL ORGANISATION THROUGH EXPECTATION AND FAMILIARLY

The spatial organisation of thrifting pop-up markets influences participants' expectations through environmental familiarity. Spatial organisation, defined as the arrangement of physical elements, can create crowding when perceived as dense (Machleit *et al.*, 1994). People familiar with unorganised spaces performed better than inexperienced newcomers, whose preconceived visual expectations heightened their challenges.

THE ROLE OF SPATIAL FAMILIARITY ON EXPERIENCE FAMILIARITY IN MANAGING OVERWHELMINGNESS

The data suggest that prior experiences influenced participants' interactions with the environment. Anticipated spatial disorganisation led them to navigate with composure. Participant A viewed grace as forgiving environmental imperfections: "... *don't know where anything is, that's fine. Or there's a T-shirt that's falling onto the ground... It is fine.*" Regaining composure through selective attention showed control, as familiar arrangements facilitated exploration. Participant J noted: "[There are] *many items in one area, and you need to find them with patience as they didn't display like in the shopping mall.*" Participants' familiarity transformed spatial crowding into a manageable experience. Regaining composure through selective attention showed control, as familiar arrangements facilitated exploration. Recognizing the need to "*take [their] time*" suggested eagerness to enjoy the experience.

NEGOTIATING AUTHENTICITY AND ORDER THROUGH FAMILIARITY

Familiarity emerged from participants' reactions to AI-generated vignettes showing atypical organisation at thrifting pop-ups. Participants I and B viewed this as positive, noting the neatness from uniform hangers as

uncharacteristic. Items were expected to be *"dumped in a box...where you have to pick them out"* (Participant B). While participants valued disorganisation as authentic to thrifting, they appreciated retail norms like hangers, allowing them to embrace both disorder and retail order.

NEWCOMER CLASHING EXPECTATION

Participants' cognitive processes related to spatial organisation reveal challenges in adapting to unfamiliar retail environments. When describing a thrift pop-up market experience, Participant G felt *"completely lost just because I'm more used to certain clothing, being characterized by colours rather than sizing."* The absence of familiar cues intensified disorientation, showing how retail schemas hindered adaptation. Participant E's description of the experience as *"clustered"* indicated discomfort from spatial crowding, while Participant D stated: *"I didn't even know where to look or like where to start."* The overstimulation of the new environment induced cognitive overload, leading to avoidance of crowded areas. However, Participant H contested this view of disorganisation: *"They have arranged it pretty well...there are like tops on the top. Then there are like shirts and shorts... there are pants or trousers over there...I hate when there's a lot of mess."* The aversion to searching stemmed from unfamiliar atmospheric cues. Participants' exposure to informal markets in India influenced their perception of organised clutter as normative, suggesting that discomfort arose from misaligned expectations rather than clutter itself.

COMPETING SENSORY INFLUENCES

Sensory influences compete among visual atmospherics, with aesthetic density being key for environmental processing. Some viewed this as overwhelming crowding, while others saw colourfulness as exploratory. Beyond visual elements, participants identified smell as a dominant cue that negatively affected perception and browsing intention.

VALUE OF VISUAL AESTHETIC

The photographs show aesthetic density and crowding as key atmospheric cues. Aesthetic density is the spatial concentration of visual elements, whereas crowding is the subjective experience of density (Stokols, 1972). Density reactions were either positive, aiding navigation and perception, or negative due to crowding. Participant D found it *"hard to see"* due to excessive visual elements, suggesting density impeded navigation. This aligns with Machleit et al. (2000), who note that high-density environments can stimulate people negatively or pleasurably. Participant G responded positively: *"...when something is quite colourful...made me focus more on it than the actual clothes."* Posters and signs function as accessories that reflect the ambiance of the market.

OLFACTORY AS A DOMINANT CUE

While research focuses on crowding as a visual element, participants emphasised that odours influenced their market decisions. This aversion stems from associating unpleasant smells with poor hygiene, as Participant E noted: *"If I walk into the shop and it has a bad aroma, I'm going to go outside. But if it smells nice and fresh, then I will probably focus on the visual aspect."* This indicates that olfactory perception precedes visual aesthetics. The associations with smell align with research on olfactory dominance in affective responses (Helmefalk & Hultén, 2017). Participant C expressed concerns about persistent odours: *"Imagine if I buy it and even after washing it, the smell doesn't go... it gives you like an impression on like how these clothes were stored."* Such hygiene apprehension influences second-hand consumption, leading to market avoidance. Participants associated the smell with *"antique shops"* and *"granny's home,"* with positive connotations arising from nostalgia (Spaid & Fllint, 2014) as Participant I noted: *"[the air freshener] was more for decoration...it might just have run out, but you don't mind the smell of old clothes."* Retailers' efforts to manage smells demonstrate the importance of olfactory atmospherics.

RESPONSE TO HUMAN CROWDING

Crowding often causes discomfort and disrupts browsing activities. People plan ahead to avoid disturbing others and adapt by quickly browsing or avoiding crowds. Social pressure drives consumer curiosity and competition.

ANTICIPATORY PLANNING TO AVOID HUMAN CROWDING

Participants demonstrated an awareness of their impact on thrifting pop-up markets' spatial dynamics by avoiding obstructions and choosing less crowded times. These strategies were used to minimise discomfort. Participant I emphasized "*planning*" to avoid interfering with others. Participant G linked this to anxiety about causing inconvenience: "*I feel there's going to be a lot of people trying to look at the same things I want to...I don't want to be in the way.*" Participants preferred to return later when spaces were crowded. Early mornings were considered optimal, as noted by Participant I: "*I think usually they'd be busier in the afternoon...I'm glad I went in the morning; it was less crowded.*" Participants preferred to return later when spaces were busy.

BEHAVIOURAL ADAPTATION

The influence of crowding enhanced shopping enjoyment in empty or moderately occupied spaces, as Participant F noted: "*I could look at this at my own pace...Not unnecessarily stressed out.*" This shows how personal space allows individuals to focus on products rather than managing social proximity, demonstrating how spatial emptiness increases consumption autonomy. When crowded, participants adapted by accelerating browsing. Participant G stated: "*Knowing it's an enclosed space...anybody near could be picking anything you want. That makes me hurry in thrifting.*" This hastening serves as a coping mechanism, showing how crowding modifies consumption depth, with quieter areas enabling extended exploration.

SOCIAL PRESSURE

Human crowding in outdoor thrifting pop-up markets is distracting, creating "*competition between the stalls*" (Participant D). Crowding acts as a stimulant that reduces participants' agency, limiting autonomous exploration. They noted that the Red Brick Market's absence of stall sellers allowed them to "*browse away, and nobody will disturb me,*" suggesting outdoor environments amplify crowding perceptions, whereas indoor settings provide controlled atmospheres. Human density served as a social signal, with Participants F and A finding crowds curiosity-inducing: "*if there are people standing next to a certain area, I want to see what they were looking at.*" This indicates crowding as a functional cue for popularity. Crowding also shaped competition perceptions: "*if someone found something that could fit you, the other person may get [it] before you*" (Participant C). This duality positions human crowding as both a stressor and a stimulant in thrifting experiences.

EXPERIENTIAL REWARD

Evidence suggests that experiential rewards include social interaction spaces and gamified experiences. Thrifting pop-ups provide temporary venues for diverse engagements. Their ephemeral nature and variable inventory encourage participants to gamify experiences, whereas scarcity and social distinction make visiting as valuable as acquisition.

SOCIAL SPACES FOR ENGAGEMENT

The pandemic's residual effects persist, as going out is now seen as a privilege, with Participant D noting "*I am more appreciative of being able to go outside.*" Social isolation has renewed interest in physical spaces, making browsing more significant beyond consumption. Self-expression, rather than ecological concerns, drives market attendance. Despite the links between second-hand fashion and sustainability (Guiot & Roux, 2010), participants indicated that ethical motivations were secondary. Respondents argued that buying pre-owned clothing is not inherently sustainable, as lower-quality items are often discarded. Instead, longevity and style were emphasised, with thrifting seen as affordable access to fashion trends. Thrifting pop-up markets serve as social venues, with their mobile nature making visits planned events. Participant F described it as communal: "*...we can...browse things together,*" noting that companions influence purchasing decisions: "*It's usually when someone else wants to buy something. Then I'm like, 'oh, maybe I should get something for myself as well.'*"

GAMIFIED EXPERIENCE

Thrifting is perceived as a gamified experience of exploration and hedonic rewards as likened by Participant F "*...a kid in a candy store,*" expressing desire to explore everything. The layouts are curated to create a "*treasure-hunting*" experience, in which browsing areas feel like completing missions. Such excitement shows how novelty fosters playful engagement. Participant F's metaphor of a "*racing game*" suggests the fear of missing out (FOMO), as the transient nature of items intensifies urgency. Ephemerality shaped gratification.

The temporality of market sellers created scarcity, enhancing the emotional rewards of discoveries: "... *you can treat thrift markets as sort of a game. Find the item you like the best, that has the least price, that you like.*" (Participant I). This self-imposed mission transformed browsing into a playful challenge. Similarly, Participant D described unique finds as "*gems*," framing the search as a quest where exclusivity and finding a piece acted as a status symbol of skill.

TA revealed that thrifting pop-up market experiences in the UK involve spatial and sensory cues that function as stimuli, which, along with driving factors and adaptive behaviours, influence motivation and experiences. Sensory and spatial orientation guided participants' market movements. Aesthetic crowding served either as a positive stimulus or as a coping mechanism fostering familiarity. Olfactory responses varied; experienced visitors reported minimal disturbance, whereas newcomers found the "old" smell detracted from their experience. Regarding human crowding, planning shaped behavioural adaptations when expectations differed from reality, with participants browsing slower when crowds were anticipated or shopping quickly to avoid obstructing others. Social pressure influenced behavioural adaptation based on the type of interaction and voluntariness. Experiential rewards moderated tolerance levels, as finding unique items increased the willingness to remain in crowded conditions. Expectation and familiarity determined reward appraisal, whereas for aesthetic crowding, experiential reward functioned as both a moderator and an outcome. In high-density environments, experiential value moderated negative perceptions of human crowding.

Conclusions and discussion

This study investigated crowding as a visual atmospheric element on consumer behaviour in UK thrifting pop-up markets (Machado *et al.*, 2019). The findings showed that crowding influenced motivation, behaviour, and shopping experience through sensory/spatial stimuli, behavioural adaptation, and experiential reward. Sensory and spatial cues facilitated the navigation of the disorganised environment, with narrow spaces directing attention and managing overstimulation. According to field theory (Lewin, 1939), perceived crowding reflected the interaction between the market's disorganised environment and participants' dispositions. This supports the notion that visual crowding elements shape behaviour, as shown in previous studies (Hui & Bateson, 1991; Jang *et al.*, 2018). Participant photographs of densely packed displays indicated aesthetic crowding's functional role beyond visual processing, challenging spatial crowding literature's negative effects (Mehta, 2013; Pan & Siemens, 2011) while aligning with environmental design research (He *et al.*, 2024). This study extends the understanding of how aesthetic atmospherics add value to thrifting pop-up market experiences.

Reactions were influenced by expectations and familiarity. Newcomers evaluated conditions negatively, whereas familiar shoppers reframed these as part of the experience. Negative affect may arise from clashing expectations rather than motivation (Coskun *et al.*, 2019; Huang *et al.*, 2017; Jarboe & McDaniel, 1987). Information rate theory shows that familiarity facilitates this process (Donovan *et al.*, 1994). While cognitive overload lowers motivation (Clement *et al.*, 2013), familiarity can mitigate these effects. Experienced visitors timed their visits to avoid crowds, showing active management of crowding (Pan & Siemens, 2011). Without familiarity, crowding increased cognitive load, supporting cognitive overload theory (Sweller, 2011). Avoidant behaviours aligned with crowding-triggered avoidance (Elbachir & Abderrahmane, 2017); however, discomfort toward outdoor markets contradicted "*renao*" research in East Asian markets (Hynes & Manson, 2016; Zhao, 2025).

Bourdieu (1977) viewed avoidant behaviours as socially structured practices, with UK crowding avoidance being normalised. While Pan & Siemens (2011) linked discomfort to negative crowding responses, this study shows anticipation as a coping mechanism. Anticipatory awareness enhanced engagement in spaces. Negative experiences hindered experiential rewards as cognition shifted to environmental processing.

Following Saricam's (2023) S-O-R framework, human crowding outcomes varied by cognitive evaluation. Experiential reward and crowding had bidirectional effects (C). Positive rewards reduced stress, whereas their absence increased it. High-density crowds sometimes indicate popularity (Huang *et al.*, 2017), contradicting Santini *et al.*'s (2020) findings. Unlike Bloch's (1995) focus on visual elements, smell dominated thrifting pop-up markets. Olfactory atmospherics reduced patronage (Yangzom, 2021), suggesting that markets could benefit from smell curation (Rimkute *et al.*, 2016).

Cultural familiarity influenced responses to spatial crowding through social factors. Participants with market experience reported less overstimulation in UK thrift pop-ups. While "social schemata" apply to human crowding (De Mooij & Hofstede, 2010; Elbachir & Abderrahmane, 2017), their impact on spatial crowding remains unexplored. This study suggests that schemata can ease the processing of spatial disorganisation. For experienced participants, disorganisation became positive, generating hedonic rewards aligned with experiential shopping literature (Bardhi & Arnould, 2005; Cervellon *et al.*, 2012; Ritzer & Jurgenson, 2010). These perceptual differences reveal the limitations of one-dimensional crowding models.

This qualitative study examined the influence of crowding on consumer behaviour in UK thrifting pop-up markets through a thematic analysis. The findings showed that familiarity shaped responses to spatial organisation, with newcomers introducing retail norms that conflicted with thrifting environments. The study repositioned aesthetic crowding beyond atmospherics as a distinct retail factor. Olfactory elements emerged as key sensory influences, affecting intentions to enter and browse. Human crowding elicited complex responses, with high-density crowds triggering avoidance, while social pressure generated positive rewards. Participants' behaviours demonstrated cognitive appraisal processes mediating affective responses, supporting the extended stimulus–organism–response framework (Saricam, 2023). Visual and social cues influenced attention and motivation. Familiar participants viewed spatial disorder positively, whereas newcomers experienced discomfort. Unpleasant odours inhibited engagement, but social atmospheres enhanced impulse purchases. The study used participant photographs with AI-generated vignettes to examine market conditions.

This research shows that crowding can create experiential rewards and act as a context-dependent cue influenced by novelty and expectations. It emphasises maintaining treasure hunting and social elements while managing negative cues to differentiate pop-ups from online competitors. The study examines thrifting pop-ups in the UK's second-hand fashion sector, which has become vital for revitalising brick-and-mortar retail. Despite limited budgets and space constraints, carefully curated atmospherics remain essential for sustaining consumer engagement through unique pieces.

LIMITATIONS AND FUTURE RESEARCH

This study had several limitations. The ephemeral nature of retail formats created methodological challenges. A key constraint was the inability to conduct ethnographic observations of thrifting pop-up markets to gain insights into participant interactions and crowding experiences. Although AI-generated images simulated extreme crowding conditions, the generative AI software was in its early stages, raising uncertainty about the visual representations of alternative tools. The purposive sampling limitation led to a convenience-skewed sample of Gen Z women, although they represented the primary demographic. Exploring the perspectives of other generations could yield different responses. This study provided a qualitative synthesis of personal accounts. Future research should quantify crowding using objective measures and examine how men interpret the visual logics of thrifting pop-up markets, as these spaces may be designed for women.

PRACTICAL IMPLICATIONS

Experiential rewards can mitigate adverse emotions from crowding at UK thrifting pop-up markets. Integrating resting areas allows newcomers to recuperate and try on clothing. These spaces manage foot traffic and reduce crowding concerns (Clement *et al.*, 2013), as markets often lack such areas. This maintains personal comfort thresholds (Högberg *et al.*, 2019). Managing expectations can challenge stereotypes about

second-hand fashion demographics. Pop-ups' transient nature encourages visits, aligning with post-pandemic social experiences (Salviotti et al., 2022). Markets should prioritise experiential appeal over pricing (Monteiro et al., 2025). Perceived odours impact willingness to enter thrifting pop-ups, especially indoors, where confined spaces intensify smells. Managers should enhance ventilation and use fans as hygiene indicators. QR codes can provide clarity on garment conditions, aligning with retail technology trends (Simonetti & Bigne, 2025). Data show scepticism about second-hand fashion sustainability, often misunderstood in academic circles (Guiot & Roux, 2010). Phygital experiences could educate consumers on environmental benefits. Following Pine and Gilmore's (1999) framework, transforming experiences into educational opportunities may foster conscious spending. Machado et al. (2019) suggested that expanding such spaces could reduce the environmental impact of fashion overconsumption. Phygital strategies could help UK thrifting pop-ups address odour concerns and enhance sustainability awareness.

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Believe it or not? effects of untrue online comments on the AI era

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Abstract. Online comments from previous customers play a crucial role in influencing potential customers' decisions in retail, food, and beverage markets. Nonetheless, some comments are unreliable, as they are not customers' true experiences but are paid for by sellers. The fake comment experiment conducted by Oobah Butler on TripAdvisor in 2017 drew attention from sellers and customers. Nonetheless, the situation may become even worse if AI can automatically perform such services, making it difficult to uncover the truth with mere human resources. Customers may overlook valuable comments or even leave the market if they are misled. In some online retailing platforms in China, it is not uncommon to find service providers offering “likes,” false comments, and even responding to services against negative comments from genuine customers. A mixed-methods approach to investigate untrue online comments and their associated reactions, blending digital analysis with qualitative insights. The method uses automated web scraping tools to collect a large dataset of product reviews, reviewer histories, and full response threads from major Chinese e-commerce platforms, with a focus on the hospitality market. This article consists of three parts. First, it examines the impacts of misinformation on online retailing and the food and beverage industries, from user dissatisfaction to potential market losses. Second, it estimates the cost and difficulty of removing misinformation. Finally, the authors analyze whether the government and regulatory bodies should legislate against these behaviors and suggest how legislators and platforms can enhance the reliability of online comments.

Keywords: Fake comments; imbalance of information; misrepresentation; online platform; online shopping;

Introduction

Online reviews, false reviews, and consumer decisions

Online reviews were originally an important source of information for consumers when making purchase decisions. Especially in service-consumption scenarios such as hotel reservations, consumers cannot truly experience the hotel rooms, services, hygiene, or location before checking in. Therefore, they often rely on the reviews left by other consumers to reduce uncertainty. In other words, the role of reviews is not only to "providing information" but also to influence consumers' overall judgment of whether the hotel is trustworthy, risky, and worth booking.

However, once reviews are manipulated by humans, they no longer merely represent consumers' true experiences; instead, they become a fabricated information environment. Wu *et al.* (2020) pointed out that

false online reviews are not isolated minor issues but rather problems that systematically affect consumers' judgments, platform trust, and market efficiency. Luca & Zervas (2016) also found that in businesses under greater competitive pressure, with weaker reputations, or those that have recently received negative evaluations, the motivation for review fraud is stronger. He *et al.* (2021) further explained that purchasing false reviews may temporarily increase product ratings, the number of reviews, and sales performance.

In the context of the rapid development of artificial intelligence, this issue has become more complex. In the past, fake reviews might have needed to be written manually, but now generative AI can quickly generate a large number of seemingly natural, positive, and complete reviews. The MAiDE-up hotel review dataset constructed by Ignat *et al.* (2025) includes both real human hotel reviews and fake hotel reviews generated by GPT-4. Compared with manually written false reviews, the uniqueness of AI-generated reviews lies in their ability to produce large amounts of text quickly and cost-effectively, making the output appear smooth and natural. As a result, consumers are more likely to encounter a review environment in which it is more difficult to distinguish true from false. For hotel booking platforms, the problem is not just "whether there are fake reviews" but, more importantly, whether, after consumers see these reviews, they change their trust in the hotel, risk assessment, and booking intention.

Assessing the authenticity of reviews: the first step in influencing consumers

Existing research has already noted that consumers do not simply passively accept review information. Instead, consumers will judge whether a review is genuine based on its language, details, tone, repetition, and credibility cues. Walther *et al.* (2023) noted that consumers use multiple cues to assess the authenticity of online reviews. For instance, whether the review contains specific details, whether it resembles a real experience, whether it is overly exaggerated, or whether it resembles an advertisement can all affect consumers' judgment of the review's authenticity. However, the focus of this study is not on whether consumers can accurately identify each false review, but rather on whether they form different "perceptions of authenticity" after encountering different types of reviews. Therefore, this paper takes "perception of review authenticity" as the core variable, because consumers' subjective feelings often have a greater impact on their subsequent trust, risk assessment, and booking intentions than the objective truthfulness of the reviews. Here, "perception of authenticity" refers to consumers' subjective judgment of whether the review is true, credible, or written by a real user.

False reviews usually have some suspicious characteristics, such as overly general expressions, overly positive tone, lack of specific accommodation details, or seeming more like promotional texts. These characteristics may reduce consumers' judgment of review authenticity. On the contrary, genuine reviews usually contain more natural descriptions of experiences and more specific details, making them easier for consumers to find credible. Therefore, this study proposes:

H1: Compared with genuine reviews, fake reviews will reduce consumers' perception of the authenticity of the reviews.

Assessing the authenticity and trustworthiness of reviews

Trust is a very crucial variable in online consumption. When consumers book a hotel, they are actually purchasing a future service experience. Since consumers cannot fully confirm in advance whether the hotel is really clean, quiet, convenient, and has good service, they need to form trust in the hotel through reviews. Furner *et al.* (2022) found in the hotel and Airbnb contexts that online reviews affect consumers' trust, and trust further influences purchase and recommendation intentions. The judgment of review authenticity directly affects the formation of trust. In other words, the judgment of review authenticity serves as the crucial psychological bridge that helps consumers move from "seeing the reviews" to "believing in the hotel". If consumers believe the reviews were left by real guests, they are more like reliable third-party information. Consumers are also more likely to believe that the advantages displayed on the hotel's page are

real. On the contrary, if consumers believe the reviews are fabricated or written by the business itself, they not only fail to increase trust but may also make consumers doubt whether the hotel has any problems. Pedersen and Li (2024) also pointed out that when consumers encounter identified false reviews, their perceived trust declines. That is to say, false reviews do not necessarily directly lead consumers to abandon a purchase, but they will first undermine consumers' trust in the source of information and the merchant. Based on this logic, this study believes that the higher the authenticity of the reviews, the stronger the consumers' trust in the hotel. Therefore, it is proposed:

H2: The higher the consumers' perception of the authenticity of the reviews, the stronger their trust in the hotel.

Assessing the authenticity of reviews and perceiving risks

Apart from trust, perceiving risks is also an important variable in consumer decision-making. Perceived risk refers to the degree to which consumers believe the chosen option may result in losses, trouble, or uncertain consequences. In hotel reservations, risks may include the room not meeting expectations, poor hygiene, an inconvenient location, poor service, difficulty obtaining a refund, or spending money only to have a dissatisfying experience. Wu *et al.* (2019) pointed out that false reviews can increase consumers' functional, time, and economic risks and further reduce their purchase intentions. That is to say, when consumers doubt the authenticity of the reviews, they will be more concerned about being misled. For example, if a hotel review is full of positive reviews but lacks details, consumers might think: "Are these positive reviews genuine? What if I make a reservation and then find it's not good?" This suspicion will increase perceived risks. Pedersen & Li (2024) also found that false reviews can affect consumers' perception of risk. The less credible the reviews are, the more difficult it is for consumers to judge the hotel's true quality, and the more likely they are to feel the booking outcome is uncontrollable. Therefore, there should be a negative relationship between perceived review authenticity and perceived risk. In the research framework of this article, perceived risk does not occur in isolation; rather, it is a psychological concern that arises among consumers after they doubt the authenticity of the reviews. Based on this, this study proposes:

H3: The higher the consumers' perception of the authenticity of the reviews, the lower the perceived risk.

Trust, risk perception, and hotel reservation intentions

The willingness to book is the direct manifestation of whether consumers are willing to choose a hotel after reading the reviews. Online reviews influence consumers' decisions and are ultimately reflected in their purchase or booking intentions. Which? The 2020 behavioral experiment showed that when low-quality products were accompanied by false-positive reviews, the probability of consumers choosing them increased significantly. This indicates that false reviews not only affect "ideas" but also may change the actual direction of choice. In hotel reservations, the higher the level of trust, the more likely consumers are to believe the hotel can provide a satisfactory experience and to have the intention to make a reservation. Furner *et al.* (2022) found that trust is an important predictor of purchase intention. In other words, consumers do not simply make reservations based on the number of reviews or high ratings; instead, they make reservations because the reviews lead them to believe the hotel is trustworthy. On the contrary, the higher the perceived risk, the more likely consumers are to hesitate, continue to compare other hotels, and even abandon the booking. Wu *et al.* (2019) pointed out that when false reviews increase consumers' risk perception, purchase intention declines. Pedersen and Li (2024) also demonstrated that perceived risk plays a significant role in the process where false reviews affect purchase intention. Therefore, this study proposes:

H4: The stronger consumers' trust in the hotel is, the greater their willingness to make a hotel reservation after reading the reviews will be.

H5: The higher the consumers' perceived risk is, the weaker their willingness to make a hotel reservation after reading the reviews will be.

The indirect impact mechanism of false reviews on booking intentions

Previous studies have shown that false reviews can influence consumers' choices, but this influence is not necessarily immediate. After consumers see false reviews, they may not immediately react with "I won't book" or "I will book" respectively. A more likely process is as follows: Consumers first judge whether the review is true; if they think it is not, they will reduce their trust in the hotel or increase their concerns about booking risk; finally, these psychological changes will affect their booking intention. This logic is also in line with the summary of Wu *et al.* (2020) on research on false reviews: The issue of false reviews not only concerns the truthfulness of the reviews themselves but also consumers' judgments, platform trust, and market outcomes. Walther *et al.* (2023) focused on how consumers judge the truthfulness of reviews, while Wu *et al.* (2019), Pedersen & Li (2024), and Furner *et al.* (2022) further supported the relationship chain of "truthfulness judgment - trust/risk - purchase intention". Therefore, this study aims not only to examine whether false reviews directly affect the willingness to make a reservation but also to further investigate their psychological mechanisms. Specifically, false reviews may first reduce consumers' perception of review authenticity and then, by lowering trust or increasing perceived risks, indirectly reduce willingness to make a hotel reservation. Based on this, this study proposes:

H6: False reviews will indirectly reduce the willingness to make a hotel reservation after reading the reviews by lowering the perceived authenticity of the reviews and further weakening trust.

H7: False reviews will indirectly reduce the willingness to make a hotel reservation after reading them by lowering the perceived authenticity of the reviews and further increasing perceived risks.

Research gaps and theoretical positioning of this study

Overall, existing studies have demonstrated that false reviews can influence consumers' judgment and purchasing behavior; there have also been discussions on how consumers can identify false reviews and how they affect trust, risk, and purchase intention (Pedersen & Li, 2024; Walther *et al.*, 2023; Wu *et al.*, 2019, 2020). However, existing research still leaves a question worthy of further investigation: In contexts where AI can generate false hotel reviews, in real hotel booking scenarios, how exactly do consumers progress from "seeing the reviews" to "changing their booking intentions"? The research gap of this article is not merely "whether false reviews will affect consumers", but "how AI-generated false hotel reviews can influence consumers' booking intentions through several psychological steps, such as authenticity judgment, trust, and risk". Rather than merely focusing on identifying false reviews, this study pays closer attention to the consumer decision-making process. Specifically, this study situates consumers in the context of hotel reservations, compares the effects of real reviews and AI-generated false reviews, and simultaneously examines the relationships among perceived review authenticity, trust, perceived risk, and booking intentions. Such a research design can more clearly illustrate that false reviews do not necessarily directly change consumers' final booking intentions but may first alter consumers' judgment of the review's authenticity, and then influence the booking decision through the psychological channels of trust and risk.

Discussion

Online reviews were originally an important tool to help consumers reduce information asymmetry. However, once the reviews are manipulated, what consumers see is no longer the true information about the product, but an artificially influenced information environment. Wu *et al.* (2020) summarized fake online reviews as a problem that systematically affects consumers' judgments, platform trust, and market efficiency, and it is not just scattered noise. That is to say, the problem with fake reviews is not simply that "some

statements are not true" but that they directly interfere with the purchase decisions consumers should make based on true information.

Regarding consumer decision-making, these papers can be connected into a very clear logical line. Wu *et al.* (2019) found that fake reviews increase consumers' functional, time, and economic risks, and that these risks can be so high as to lower purchase intention. Pedersen & Li (2024) further explained that when consumers see identified fake reviews, their perceived trust would decrease, their perceived quality would decline, their perceived risks would increase, and ultimately their purchase intention would also be affected. Furner *et al.* (2022), although not studying fake reviews themselves, reported experimental results that are very important because they showed that trust is an important predictor of purchase intention. When these several papers are viewed together, it can be explained that fake reviews would further change consumers' purchase intentions and decisions by influencing trust and perceived risk.

This influence is not abstract. The behavioral experiments conducted revealed that when low-quality products are accompanied by false positive reviews, the probability of consumers choosing these products significantly increases. If additional manipulations such as star rating manipulation, false text, and platform recommendation tags are added, the misleading effect becomes even stronger. Even if a reminder like "These reviews may not be genuine" is added to the page, it can only partially mitigate the deception and cannot completely eliminate its impact. This is very important because it indicates that consumers are influenced not only when "no signs of problems can be detected"; even when there are some suspicious signals on the page, as long as the overall presentation remains positive, consumers may still make choices that differ from their original intentions.

From the supply side, the act of merchants fabricating fake reviews is not accidental but driven by a clear economic motive. Luca & Zervas (2016) found that approximately 16% of restaurant reviews on Yelp are automatically filtered by the system as suspicious, and that review fraud is more likely to occur in businesses with weak reputations, few reviews, recent negative reviews, and greater competitive pressure. He *et al.* (2021)'s study of the fake review market on Amazon also indicates that purchasing fake reviews can indeed increase ratings, the number of reviews, and sales in the short term, but this effect is usually only temporary; once the purchase of fake reviews stops, the average rating of the product will decline, and the proportion of one-star negative reviews will increase. This shows that fake reviews do indeed change the product's image in consumers' eyes in the short term, and that consumers' initial choices were likely misled. The citation of these two articles is not intended to write an article titled "Why do merchants fake reviews?", but rather to illustrate that: The reason why fake reviews are worthy of study is that they do enter the market and do affect the information that consumers come into contact with.

However, this study does not intend to focus on "how to identify fake reviews". Walther *et al.* (2023) reviewed how consumers determine the authenticity of reviews, indicating that consumers use certain cues to assess whether a review is trustworthy; however, "whether consumers can detect suspicious reviews" and "whether these reviews will influence consumers' purchasing decisions" are not the same question. The former focuses on identification clues, while the latter focuses on behavioral consequences. For your study, the more important aspect is the latter, that is, whether consumers will change their original judgment after reading the reviews. This perspective is closer to consumer decision-making and is more suitable for directly incorporating into a questionnaire study.

Wu *et al.* (2020) specifically pointed out that many key questions regarding fake reviews are difficult to answer solely using existing platform data. The reason is simple: researchers usually find it challenging to prove with 100% certainty which reviews are definitely fake, and it is also difficult to directly observe the counterfactual result of "what consumers would have chosen if these fake reviews did not exist". Because the real platform data does not show this "what would have happened" situation, experiments and

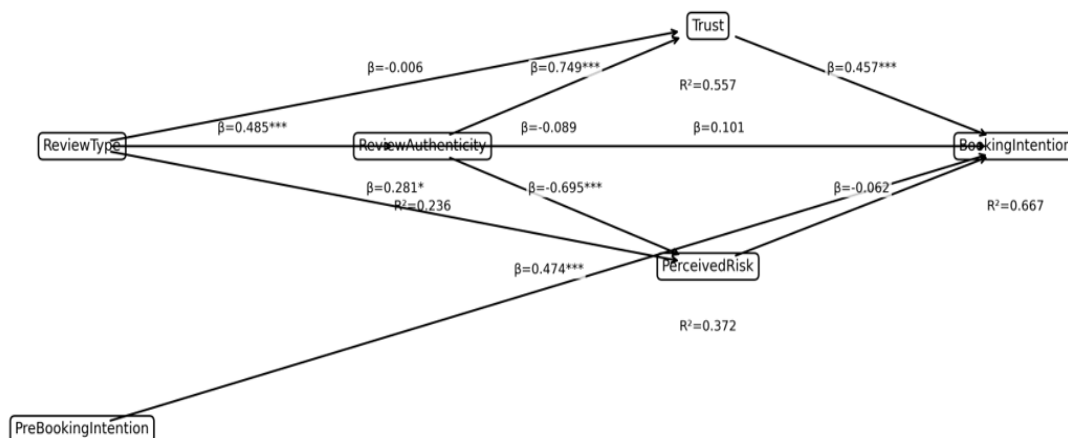
questionnaire experiments are particularly suitable. Wu *et al.* (2019) and Which? (2020) both demonstrated that as long as the respondents are placed in a specific shopping scenario and their risk perception, trust changes, and purchase intentions are measured, it is possible to effectively capture the mechanism by which fake reviews affect consumers. Therefore, the use of questionnaire or situation experiment methods in this study is reasonable: it can directly compare whether the respondents' purchase intentions have changed before and after reading the reviews, determine whether there is a change, whether they are more willing to buy, whether they are more hesitant, and whether they need more time to consider.

Based on these previous studies, this research focuses on "whether the purchase decision changes after consumers read the reviews", which is well-grounded. Wu *et al.* (2019), Pedersen & Li (2024), and Furner *et al.* (2022) can be used to support the relationship between trust, risk, and purchase intention; Which? (2020) can be used to support the claim that fake reviews can directly alter the selection outcome; Wu *et al.* (2020) can be used to support the reason for using questionnaires and situational experiments; Lucas & Zervas (2016) and He *et al.* (2021) can be used to illustrate that fake reviews do exist in the real market and do indeed shape the information environment that consumers are exposed to. Therefore, this study places consumers in a product browsing scenario, compares whether their judgments change before and after viewing the reviews, and simultaneously measures trust, risk, and purchase intention. This is a relatively complete and robust research path.

Methodology

Research design and experimental context

This study employs a situational questionnaire experiment to examine how the types of online hotel reviews affect consumers' perceptions of review authenticity, trust, perceived risks, and post-review booking intentions. The research context is set as online hotel booking. In this context, consumers typically rely on user-generated reviews to assess the credibility of hotel information and identify potential risks in their booking decisions. Therefore, the core issue of this study is not whether consumers can accurately identify false reviews, but rather how their judgments on the authenticity of hotel reviews, trust in the hotel, perceived risks, and booking intentions will change after they come into contact with different authenticity cues in hotel reviews.



Note: The numbers on the arrows represent the standardized path coefficients. R square indicates the degree to which the model explains the dependent variable.

FIGURE - The PLS-SEM structural model of the influence of comment types on the willingness to make a reservation after reading the comments.

This study prepared two versions of the review stimulus materials. The materials for the real review group used more natural, closer-to-personal-experience expressions, with more specific experience details and stronger credibility cues. The materials for the fake review group had a more overtly promotional tone and were more general, with weaker authenticity cues. Therefore, the review type was treated as an exogenous variable manipulated in the experiment, with the real review group coded as 1 and the fake review group as 0. To avoid the influence of the direction of the comments' emotions on the results, this study controlled both sets of comment materials to be positive hotel reviews. Only the authenticity cues of the comments were changed. The questionnaire process was divided into three stages. First, participants entered the hotel booking context and reported their pre-review booking intentions before reading the review materials. Second, participants read one of the versions of the online review materials. Third, participants evaluated the perceived authenticity of the review, trust, perceived risk, post-review booking intention, and several supplementary behavioral outcomes. Measuring pre-review booking intention before exposure to review materials helps distinguish consumers' original interest in the hotel from the psychological evaluation formed after reading the reviews.

Sample and data collection

Data was collected through online questionnaires. The front page of the questionnaire informed participants that this study is for academic purposes only, that all responses are anonymized, and that the data will be analyzed only in summary form. Participants first completed the informed consent and screening questions. Respondents entering the formal analysis needed to meet two conditions: being over 18 years old and having experience in online shopping, online hotel booking, or other online appointment activities. This study received 72 questionnaire responses. According to the screening criteria, 4 responses were excluded because the respondents did not report relevant online shopping or booking experience. The final valid sample comprised 68 participants, with 32 in the real review group and 36 in the fake review group. Given the small sample size, this study should be regarded as exploratory; however, this article still presents the measurement and structural model results in accordance with the complete PLS-SEM reporting framework to transparently display the measurement properties and structural relationships of the model. This study chose PLS-SEM because it is exploratory in nature, the sample size is relatively small, and the model includes multiple psychological variables and mediating paths. The research objective is also more focused on explaining and predicting consumers' booking intentions following review reading.

Measurement and variable operationalization

All multi-item constructs, except for review type, were measured on a five-point Likert scale, with 1 indicating "strongly disagree" and 5 indicating "strongly agree". The model included five core constructs: pre-review booking intention, perceived review authenticity, trust, perceived risk, and post-review booking intention. The review type was entered as a single binary experimental variable into the model. To reduce the possibility of mechanical responses, several reverse-scored items were included in the questionnaire; these items were reverse-scored according to $X_{reversed} = 6 - X$ before the formal analysis.

TABLE 1 - Sample screening process

Screening step	Sample size
Initial responses	72
After adult-status screening	72
After online shopping or booking experience screening	68

Note. The final sample used in the PLS-SEM analysis contained 68 valid responses.

Table 2 - Constructs and operationalization

Construct	Variable name	Items	Reverse-coded items	Role in the model
Review type	ReviewType	Single binary variable	Real = 1; fake = 0	Experimentally manipulated exogenous variable
Pre-review booking intention	PreBookingIntention	PRE1-PRE4	PRE4	Control for consumers' baseline booking tendency
Perceived review authenticity	ReviewAuthenticity	AUTH1-AUTH4	AUTH2, AUTH3	Credibility, genuineness, and accuracy of the reviews
Trust	Trust	TRUST1-TRUST4	TRUST4	Trust in the hotel after reading the reviews
Perceived risk	PerceivedRisk	RISK1-RISK4	None	Concerns about experience, monetary loss, and wrong decisions
Post-review booking intention	BookingIntention	BI1-BI7	BI5, BI7	Final booking intention after review exposure

Pre-review booking intention was used to control the consumers' original booking tendency. Perceived review authenticity indicated the degree to which respondents believed the review information was true, credible, and accurate. Trust indicated the respondents' confidence in the hotel after reading the review. Perceived risk indicated the respondents' concerns about the accommodation experience, financial loss, and incorrect booking decisions. Post-review booking intention indicated respondents' final booking intentions after reading the review materials. Decision changes and other supplementary behavioral outcomes were only used for descriptive analysis and were not included in the core structural model.

Data processing and analysis program

First, merge the data from the two questionnaire versions and generate binary comment-type variables. Second, rename the items listed in the questionnaire platform and match them to the corresponding measurement indicators. Third, recode the reverse items before estimating the construct. Fourth, the analysis follows the two-step logic commonly used in PLS-SEM research: first, evaluate the measurement model, and then evaluate the structural model. Specifically, the data analysis proceeds in the following sequence: "data cleaning, reverse item recoding, descriptive statistics, manipulation test, measurement model test, structural model test, Bootstrap mediation effect test, and IPMA analysis". This study uses a Python-based PLS-SEM workflow to estimate the model. All multi-item constructs are set to reflective. The latent variable scores are estimated from their respective indicators, and the relationships among latent variables are reported as standardized path coefficients. Statistical significance is assessed using 5000 bootstrap resamples. The measurement model is evaluated using outer loadings, Cronbach's alpha, rho_A, composite reliability, average variance extracted (AVE), Fornell-Larcker criterion, and HTMT ratio. The structural model is evaluated using internal VIF, path coefficients, explanatory power (R-squared), predictive relevance (Q-squared predict), effect size (F-squared), bootstrap indirect effect, and importance-performance diagram analysis (IPMA). In IPMA, the post-comment reservation intention is set as the target construct; the importance is represented by the total effect, and the performance value is recalibrated to the 0-100 range.

Program control of common method bias and collinearity test

This study employs various procedural methods to reduce common method bias. Specifically, the questionnaire was designed for anonymous submission, presented the experimental materials and core measurement items in separate pages, included reverse questions and attention checks, and during the statistical analysis stage, VIF was used to detect potential multicollinearity issues in order to reduce the impact of common method bias on the research results.

Table 3 - Descriptive statistics of core constructs

Construct	N	Mean	SD	Min	Max
Pre-review booking intention	68	2.846	0.768	1.000	4.250
Perceived review authenticity	68	2.941	0.781	1.000	4.750
Trust	68	3.213	0.682	1.750	5.000
Perceived risk	68	3.754	0.710	2.000	5.000
Post-review booking intention	68	3.284	0.734	1.286	5.000

Note. All multi-item constructs were measured on five-point Likert scales.

TABLE 4 - Mean comparison between the real-review and fake-review groups

Construct	Real mean	Fake mean	Mean difference	t-value	p-value	Cohen's d
Pre-review booking intention	2.891	2.806	0.085	0.449	.655	0.110
Perceived review authenticity	3.336	2.590	0.746	4.520	< .001	1.080
Trust	3.477	2.979	0.497	3.197	.002	0.778
Perceived risk	3.719	3.785	-0.066	-0.385	.702	-0.092
Post-review booking intention	3.397	3.183	0.215	1.209	.231	0.294

Note. Positive mean differences indicate higher scores in the real-review condition.

This study also conducts a statistical test for collinearity. Most VIF values are below the stricter 3.3 standard. The VIF for perceived comment authenticity in predicting post-comment reservation intention is 3.706, higher than 3.3 but still below the more lenient 5.0 standard. Therefore, collinearity is not considered to pose a serious threat to structural estimation. However, when interpreting the structural model, note the relatively close relationship among comment authenticity, trust, and reservation intention.

Results

Descriptive statistics and manipulation test

Table 3 reports the descriptive statistics of the core constructs. The means of perceived comment authenticity, trust, perceived risk, and post-comment reservation intention are 2.941, 3.213, 3.754, and 3.284, respectively. Table 4 reports the mean comparison between the two experimental groups. The perceived comment authenticity of the real review group was significantly higher than that of the fake review group (mean difference = 0.746, $p < .001$, Cohen's $d = 1.080$). The trust level of the real review group was also significantly higher (mean difference = 0.497, $p = .002$, Cohen's $d = 0.778$). In contrast, there were no significant differences in pre-review reservation intention, perceived risk, and post-review reservation intention between the two groups. This indicates that the experimental manipulation mainly functions through authenticity-related judgments and trust-related judgments, rather than directly causing changes in the mean values of downstream behavioral intentions.

Evaluation of the measurement model

First, evaluate the internal consistency, reliability, and convergent validity of the reflective measurement model. As shown in Table 5, the combined reliability of multi-item constructs ranges from 0.840 to 0.900, all exceeding the recommended standard of 0.70. The AVE values range from 0.564 to 0.693, all exceeding the standard of 0.50. The Cronbach's alpha for pre-review reservation intention is slightly below 0.70, but the construct's reliability and AVE are acceptable. Therefore, for this exploratory study, the reliability and convergent validity evidence are acceptable.

TABLE 5 - Reliability and convergent validity

Construct	Items	Cronbach's alpha	rho_A	CR	AVE
Review type	1	-	-	1.000	1.000
Pre-review booking intention	4	0.695	0.833	0.840	0.610
Perceived review authenticity	4	0.853	0.902	0.900	0.693
Trust	4	0.737	0.843	0.844	0.584
Perceived risk	4	0.825	0.891	0.888	0.669
Post-review booking intention	7	0.865	0.898	0.898	0.564

Note. Review type is a single binary experimental variable; internal consistency statistics are therefore not interpreted for this variable.

Table 6 presents the outer loadings. Most indicators exceed the recommended standard of 0.708. A few indicators have lower loadings, including PRE4, TRUST4, RISK2, BI5, and BI7. Since these items reflect the theoretical related aspects of the constructs and deleting items may narrow the coverage of the measurement content in a small sample exploratory study, these items were retained in the main analysis. However, further studies should revise and re-examine these indicators in a larger sample.

Table 6 - Outer loadings

Construct	Indicator	Outer loading	Loading squared	Assessment
Review type	ReviewType	1.000	1.000	Above 0.708
Pre-review booking intention	PRE1	0.906	0.821	Above 0.708
Pre-review booking intention	PRE2	0.921	0.848	Above 0.708
Pre-review booking intention	PRE3	0.859	0.739	Above 0.708
Pre-review booking intention	PRE4	0.178	0.032	Below 0.708
Perceived review authenticity	AUTH1	0.891	0.794	Above 0.708
Perceived review authenticity	AUTH2	0.763	0.581	Above 0.708
Perceived review authenticity	AUTH3	0.814	0.662	Above 0.708
Perceived review authenticity	AUTH4	0.857	0.735	Above 0.708
Trust	TRUST1	0.824	0.679	Above 0.708
Trust	TRUST2	0.921	0.849	Above 0.708
Trust	TRUST3	0.728	0.530	Above 0.708
Trust	TRUST4	0.529	0.280	Below 0.708
Perceived risk	RISK1	0.840	0.706	Above 0.708
Perceived risk	RISK2	0.609	0.371	Below 0.708
Perceived risk	RISK3	0.925	0.856	Above 0.708
Perceived risk	RISK4	0.862	0.744	Above 0.708
Post-review booking intention	BI1	0.819	0.671	Above 0.708
Post-review booking intention	BI2	0.829	0.687	Above 0.708
Post-review booking intention	BI3	0.729	0.531	Above 0.708
Post-review booking intention	BI4	0.843	0.711	Above 0.708
Post-review booking intention	BI5	0.579	0.335	Below 0.708
Post-review booking intention	BI6	0.866	0.749	Above 0.708
Post-review booking intention	BI7	0.515	0.265	Below 0.708

Note. Indicators below 0.708 were retained because of conceptual coverage and the exploratory nature of the study.

TABLE 7 - Fornell-Larcker discriminant validity assessment

	RT	PreBI	PRA	TR	PR	PostBI
RT	1.000	0.043	0.485	0.358	-0.056	0.148
PreBI	0.043	0.781	0.081	0.337	-0.026	0.635
PRA	0.485	0.081	0.833	0.746	-0.558	0.473
TR	0.358	0.337	0.746	0.764	-0.377	0.685
PR	-0.056	-0.026	-0.558	-0.377	0.818	-0.299
PostBI	0.148	0.635	0.473	0.685	-0.299	0.751

Note. Diagonal values represent the square root of AVE; off-diagonal values represent construct correlations. RT = review type; PreBI = pre-review booking intention; PRA = perceived review authenticity; TR = trust; PR = perceived risk; PostBI = post-review booking intention.

Table 8. HTMT discriminant validity assessment

	RT	PreBI	PRA	TR	PR	PostBI
RT	1.000	-	-	-	-	-
PreBI	-	1.000	0.248	0.524	0.287	0.788
PRA	-	0.248	1.000	0.912	0.656	0.513
TR	-	0.524	0.912	1.000	0.494	0.820
PR	-	0.287	0.656	0.494	1.000	0.347
PostBI	-	0.788	0.513	0.820	0.347	1.000

Note. HTMT values involving the single-item review type variable are not interpreted. The HTMT value between perceived review authenticity and trust exceeds the conservative threshold.

TABLE 9 - Inner VIF values

Target construct	Predictor	VIF	Assessment
Perceived review authenticity	Review type	1.000	Below 3.3
Trust	Review type	1.308	Below 3.3
Trust	Perceived review authenticity	1.308	Below 3.3
Perceived risk	Review type	1.308	Below 3.3
Perceived risk	Perceived review authenticity	1.308	Below 3.3
Post-review booking intention	Review type	1.435	Below 3.3
Post-review booking intention	Pre-review booking intention	1.220	Below 3.3
Post-review booking intention	Perceived review authenticity	3.706	Between 3.3 and 5.0
Post-review booking intention	Trust	2.752	Below 3.3
Post-review booking intention	Perceived risk	1.602	Below 3.3

Note. All VIF values were below 5.0.

Discriminant validity is evaluated using the Fornell-Larcker criterion and HTMT. The Fornell-Larcker results in Table 7 show that the square root of the AVE for each multi-item construct is generally higher than its correlations with other constructs. The HTMT results are reported in Table 8. Most HTMT values are within the acceptable range. However, the HTMT value between Perceived Comment Authenticity and Trust is 0.912, which exceeds the more conservative threshold. This indicates that, in the

context of hotel reviews, respondents may view judgments of comment authenticity and trust as highly correlated psychological evaluations. Therefore, the structural paths involving these two constructs need to be interpreted with caution.

Structural model evaluation

Before evaluating the structural paths, this study used the internal VIFs to assess collinearity among the predictor variables. As shown in Table 9, all VIF values were below 5.0, indicating that collinearity would not cause serious problems for the model estimation. The VIF for the perception of comment authenticity in predicting post-comment reservation intention was 3.706, indicating that this variable was only moderately correlated with other predictors, but did not reach the level of severe multicollinearity.

Table 10 reports the estimated results of the structural paths. The perception of comment authenticity has a significant positive effect on the comment type predictor variable ($\beta = 0.485, p < .001$), indicating that the real comment group is perceived as more authentic than the false comment group. The perception of comment authenticity has a strong positive effect on trust ($\beta = 0.749, p < .001$), and a strong negative effect on perception of risk ($\beta = -0.695, p < .001$). These results indicate that authenticity cues are closely related to higher trust and lower perception of risk. When predicting post-comment reservation intention, pre-comment reservation intention ($\beta = 0.474, p < .001$) and trust ($\beta = 0.457, p < .001$) are significant positive predictors. In contrast, the direct effect of the perception of comment authenticity on post-comment reservation intention is not significant ($\beta = 0.101, p = .479$), and the direct effect of perception of risk is also not significant ($\beta = -0.062, p = .554$). Comment type cannot directly predict post-comment reservation intention. Therefore, the structural model indicates that comment authenticity primarily affects reservation intention through the trust mechanism, rather than via a direct behavioral path. The positive coefficient for Comment Type on Perceived Risk should be interpreted with caution. The mean comparison shows no significant difference in Perceived Risk between the genuine comment group and the fake comment group; meanwhile, there is a strong negative relationship between Perceived Comment Authenticity and Perceived Risk. Therefore, this significant positive coefficient is more appropriately understood as a suppressive effect that occurs after controlling for Perceived Comment Authenticity, rather than suggesting that genuine comments will substantially increase Perceived Risk.

TABLE 10. Structural path results

Structural path	beta	t-value	p-value	95% CI	Significant
Review type -> Review authenticity	0.485	6.195	< .001	[0.323, 0.633]	Yes
Review type -> Trust	-0.006	-0.063	.950	[-0.190, 0.176]	No
Review authenticity -> Trust	0.749	11.302	< .001	[0.622, 0.878]	Yes
Review type -> Perceived risk	0.281	2.542	.011	[0.064, 0.487]	Yes
Review authenticity -> Perceived risk	-0.695	-7.790	< .001	[-0.847, -0.500]	Yes
Review type -> Post-review booking intention	-0.089	-1.002	.317	[-0.258, 0.095]	No
Pre-review booking intention -> Post-review booking intention	0.474	5.960	< .001	[0.308, 0.620]	Yes
Review authenticity -> Post-review booking intention	0.101	0.708	.479	[-0.225, 0.346]	No
Trust -> Post-review booking intention	0.457	4.207	< .001	[0.267, 0.693]	Yes
Perceived risk -> Post-review booking intention	-0.062	-0.592	.554	[-0.271, 0.140]	No

Note. The results are based on 5,000 bootstrap resamples. Significant = Yes indicates $p < .05$.

TABLE 11 - Explanatory power and predictive relevance

Endogenous construct	R-squared	Adjusted R-squared	Q-squared predict	RMSE	MAE
Perceived review authenticity	0.236	0.224	0.216	0.886	0.700
Trust	0.557	0.543	0.546	0.674	0.524
Perceived risk	0.372	0.353	0.344	0.810	0.654
Post-review booking intention	0.667	0.640	0.598	0.634	0.505

Note. Positive *Q*-squared predict values indicate predictive relevance for the endogenous constructs.

TABLE 12 - *F*-squared effect sizes

Target construct	Predictor	F-squared	Effect size
Perceived review authenticity	Review type	0.308	Medium
Trust	Review type	0.000	Very small
Trust	Perceived review authenticity	0.969	Large
Perceived risk	Review type	0.096	Small
Perceived risk	Perceived review authenticity	0.588	Large
Post-review booking intention	Review type	0.016	Very small
Post-review booking intention	Pre-review booking intention	0.554	Large
Post-review booking intention	Perceived review authenticity	0.008	Very small
Post-review booking intention	Trust	0.228	Medium
Post-review booking intention	Perceived risk	0.007	Very small

Note. Effect size interpretation follows conventional benchmarks: 0.02 = small, 0.15 = medium, and 0.35 = large.

The model explains 23.6% of the variance in Perceived Comment Authenticity, 55.7% in Trust, 37.2% in Perceived Risk, and 66.7% in Post-Booking Intent. The R-squared value for Post-Booking Intent indicates that the model has strong explanatory power for the final outcome variable. Additionally, all Q-squared predicted values are positive, supporting the model's predictive relevance.

The F-squared results further indicate that perceived comment authenticity has a significant effect on both trust and perceived risk. Pre-comment booking intention has a significant effect on post-comment booking intention, whereas trust has a moderate effect. After including other predictor variables, the direct effects of comment type, perceived comment authenticity, and perceived risk on post-comment booking intention are all very small.

Mediation effect analysis

This study uses bootstrap indirect-effect tests to examine the mediating relationship. As shown in Table 13, the indirect effect of comment type through perceived comment authenticity on post-comment booking intention is not significant. However, the chain indirect effect from comment type to perceived comment authenticity, to trust, and finally to post-comment booking intention is significant (effect = 0.166, $p = .004$). Additionally, the indirect effect of perceived comment authenticity through trust on post-comment booking intention is also significant (effect = 0.342, $p < .001$). These results indicate that the authenticity cues mainly affect booking intention by enhancing trust.

TABLE 13 - Specific indirect effects

Indirect path	Effect	t-value	p-value	95% CI	Significant
Review type -> Review authenticity -> Post-review booking intention	0.049	0.692	.489	[-0.110, 0.174]	No
Review type -> Review authenticity -> Trust -> Post-review booking intention	0.166	2.902	.004	[0.076, 0.303]	Yes
Review type -> Review authenticity -> Perceived risk -> Post-review booking intention	0.021	0.571	.568	[-0.049, 0.101]	No
Review type -> Trust -> Post-review booking intention	-0.003	-0.059	.953	[-0.099, 0.085]	No
Review type -> Perceived risk -> Post-review booking intention	-0.018	-0.516	.606	[-0.097, 0.041]	No
Review authenticity -> Trust -> Post-review booking intention	0.342	3.634	< .001	[0.189, 0.556]	Yes
Review authenticity -> Perceived risk -> Post-review booking intention	0.043	0.582	.560	[-0.100, 0.196]	No

Note. Bootstrapped confidence intervals are based on 5,000 resamples.

Performance map analysis

This study conducted an IPMA analysis with post-booking intention as the target construct. In this analysis, importance denotes the total effect of each antecedent variable on post-booking intention, and performance value denotes the latent variable score, recalibrated to the 0–100 range. Table 14 and Figure 1 summarize the analysis results.

Table 14. Importance-performance map analysis for post-review booking intention

Target construct	Antecedent construct	Importance	Performance
Post-review booking intention	Perceived review authenticity	0.487	48.529
Post-review booking intention	Pre-review booking intention	0.474	46.140
Post-review booking intention	Trust	0.457	55.331
Post-review booking intention	Review type	0.128	47.059
Post-review booking intention	Perceived risk	-0.062	68.842

Note. Importance refers to the total effect on post-review booking intention. Performance values are rescaled to a 0-100 metric.

The perceived authenticity of the review has the highest total importance (0.487) on post-review booking intention, but its performance value is relatively low (48.529). The pre-review booking intention also shows high importance and low performance value, while trust has both high importance and medium performance value. These results indicate that in the current model, authenticity cues and trust-building signals are the most promising directions for improving booking intention. The total effect of perceived risk is negative and has a high-performance value, suggesting that in this specific situation, continuing to reduce perceived risk may not be as effective as strengthening authenticity and trust cues.

Overall, the results present a consistent pattern: Real review conditions enhance perceived review authenticity; perceived review authenticity further strengthens trust and reduces perceived risk; and trust and consumers' pre-review booking intention jointly explain post-review booking intention. Therefore, the results of this study support a trust-based explanation: Online review authenticity mainly affects consumers' booking decisions through the trust formation process.

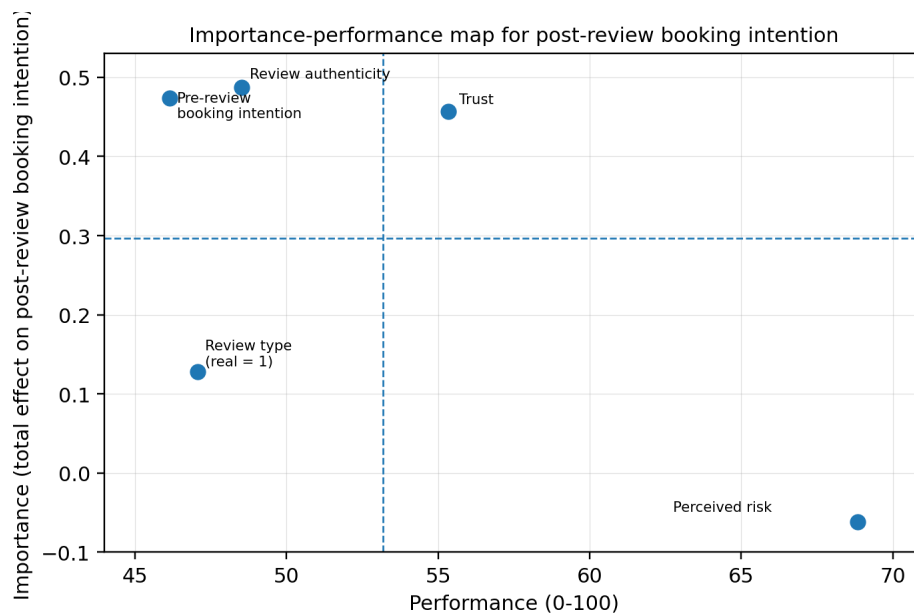


FIGURE 1 - Importance-performance map for post-review booking intention

Note. The dashed lines indicate the average importance and performance values across antecedents.

Conclusions and discussion

From the viewpoint of the law, sellers may be liable if they induce the consumers to form a contract by (1) providing false statements of fact, (2) the statement is important information to induce the formation of a contract, and (3) the consumers do not have another source of information, but rely on the statement providers, known as “misrepresentation”. Consumers may have other sources of information. However, it is not easy for them to identify which information is in conflict of interest without the government’s intervention. This study may serve as a reference for legislators considering such statutes.

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Residents' preferences regarding apartments in inner city shopping areas: a stated choice experiment

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Abstract. This paper provides some insights into residents' preferences regarding apartments in inner city shopping areas. The preferences are collected using a stated choice experiment and analyzed using a standard multinomial logit model. In total, 113 respondents evaluated 1,665 choice tasks each consisting of two apartments. The apartments were described by various location and building related attributes. The model estimation shows that residents valued the available floorspace of the apartment and corresponding rent price as most important decision attributes. To illustrate the working of the model an application in the city of Heerlen is presented.

Keywords: apartments; shopping areas; residents' preferences; stated choice.

Introduction

The lack of houses in the Netherlands has triggered urban planners to extent the search area for building new houses and apartments. One area of extension concerns inner city shopping areas that are dealing with an increase in vacant stores, especially at the outskirts of these areas (Exterkate & Eringfeld, 2022). Based on some posts, it appears that it is a more global issue (Figures 1 and 2) which is supported by the work of Wiejak-Roy (2025) who investigated the needs for retail real estate market transformation in the UK. When looking at inner city shopping areas special circumstances should be considered. On the one hand, these areas offer many facilities at short distance including shopping and transport facilities. On the other hand, these areas face challenges with parking, on-street crowdedness, distance to greenery, and building layouts. To see what (vacant) stores are interesting for transformation from store into housing, the current study is set up looking in more detail for attributes that residents prefer when searching for an apartment in inner city shopping areas. Therefore, the following research question was formulated: What location and building related attributes do residents prefer when searching for an apartment in an inner city shopping area?

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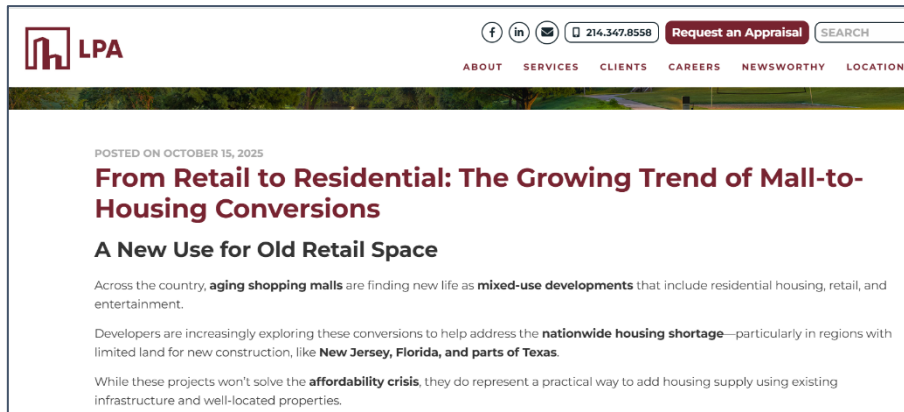


FIGURE 1 - Example of post regarding transformation retail to residential (LPA, 2025)



FIGURE 2 - Online discussion of converting vacant retail (Ortiz, 2024)

The remainder of this paper is organized as follows. First, some insights from literature are presented. Based in these insights a stated choice experiment is designed. Next, details of the data collection are presented, followed by a discussion model estimation results, and an application of the model in a real world situation. The paper ends with the conclusions and suggestions for both practice and future research.

Literature

The literature review covers the ‘transformers’ perspective and the residents perspective. The transformers are those who initiate and/or manage the transformations including the municipality, developers, and constructors. Adam (2024) raised the following drivers of adaptive reuse of buildings: location, public demand, construction period, financial consideration, legislative policy, and physical design. In addition, Adam (2024) identified location, existing building structure, and building guidelines as a risk factor for transforming commercial properties into housing. Exterkate & Eringfeld (2022) give some reasons why adding dwellings in city centers is promising: extra support for (shopping) facilities, provide in urban housing need, possibility to stimulate the flow on local housing market, and keeping city centers lively during the day and nighttime. They also provide an overview of promising functions per type of shopping area (Table 1).

TABLE 1 - Overview of promising functions in shopping areas (Exterkate & Ploem, 2021)

Order	Main shopping streets Inner city		Minor shopping streets Inner city		Main shopping streets Medium sized city		Minor shopping streets Medium sized city	
	Functions	%	Functions	%	Functions	%	Functions	%
1	Hospitality	89	Living	79	Hospitality	79	Living	83
2	Leisure	56	Hospitality	74	Leisure	53	Hospitality	67
3	Offices	28	Crafts	68	Living	32	Leisure	56
4	Hotels	28	Art/Culture	63	Crafts	32	Crafts	50
5	Divers	22	Divers	53	Offices	32	Care/sport	44

Clifford (2022) also stresses that conversion of shops to other uses transform High Streets into a ‘social space, where people meet and engage in a broader range of experiences’. He also emphasized that ‘the well-being of new residents should be a primary consideration’: with priority to minimum space standards and privacy retaining the history of the shop front. Achieving privacy by taking care of space between private space of the home and the public space fronting it. Attention for private or communal amenity spaces such as balconies, roof terraces or courtyard gardens. Münster & Adriansen (2025) stress the contribution of stakeholders including tourists, residents, local business, and policy makers while analyzing the opportunities within the local building stock. Future housing can be considered as part of the solution to the housing shortage. They also refer to Danish studies showing that vacant storefronts on shopping streets weaken the vibrancy of urban life at the neighborhood level.

Most studies regarding transforming retail property into housing focus on the technical, economical, and legal aspects. For example, Taylor *et al.* (2022) developed a decision support system to evaluate commercial and industrial properties based on gross development value, development costs, building conditions, statutory and legal elements, environmental elements, risks, and location and site attributes. Limited attention has been paid to the preferences of potential residents. Clifford (2022) noticed insufficient attention to design quality provided for residents of converted shops. Conversions set up in the context of Planning Deregulation (stripping away of planning strictures on the use of land and buildings; Madeddu & Clifford, 2023) tend to be of lower design quality. Propose design principles based on case studies: site visit and examination of available documents such as floorplans. No residents view were included in the process.

Looking at residential perspective, both location and building characteristics are considered when people choosing a house. An overview of characteristics with corresponding studies can be found in Krus (2024). Location related characteristics include transportation accessibility related characteristics, neighborhood amenities, and socio-economic neighborhood characteristics. Building characteristics include housing size, number and size of different rooms, housing type, availability and size of balcony or yard, building façade, energy efficiency, and price. In addition to these perspectives, it is important to look at potential target groups. The main target groups for inner city housing identified in the literature are students, starters, young couples, and senior citizens (e.g. Boissevain, 2020). These target groups could live in relatively small dwellings and they frequently underline the importance of having access to the amenities that the inner city provides.

Methodology

To collect the residents’ preferences, a stated choice experiment was developed in which residents were invited to select between two hypothetical apartments located in an inner city shopping street. The apartments were specified using four location and five building related attributes. Included location related attributes were walking distance to nearest public transport stop (levels: 250, 500, and 750 meters), walking distance to nearest private parking space (levels: 100, 300, and 500 meters), walking distance to nearest large park (levels: 300, 800, and 1300 meters), and crowdedness on street (levels: Low, Medium, and High). Building related attributes included percentage of façade that is identified as historical (levels: 0, 50, and 100 percent), floor level of the apartment (levels: Ground, First, and Second level), width of the façade (levels: 5, 7.5, and 10 meters), total floor area (levels: 40, 60, and 80 square meters), and rent price per month (levels: 900, 1100, and 1300 euro). To support the respondents’ decision making, the attributes crowdedness, historical façade, and façade width are visualized using photographs (see Figure 3).

Based on a fractional factorial design, 54 different hypothetical apartments are generated that are randomly placed in 54 choice sets of two alternatives. The choice option ‘Neither’ is added to the choice set for the cases that a respondent was not able to indicate their preferred apartment. To reduce respondents’ burden, the choice sets were placed in 6 blocks of 9 choice sets. Respondents were invited to indicate which inner city apartment they prefer most (Figure 4).



FIGURE 3 - Illustrations used in the online survey to clarify attributes and corresponding levels (Krus, 2024)

* Welk binnenstedelijk pand heeft uw voorkeur?

		Pand A	Pand B	Geen van beide
Locatie	Openbaar vervoer halte	250m	250m	
	(Prive) parkeerplek	100m	300m	
	Park (>5000m2)	1300m	1300m	
	Drukke op straat	Gemiddeld	Hoog	
Gebouw	Historische gevel	50%	0%	
	Verdieping	Begane	Tweede	
	Gevelbreedte	7,5m	5,0m	
	Totaal vloeroppervlakte	40m2	80m2	
	Huurprijs per maand	€1300	€1300	

● Kies één van de volgende antwoorden

☐ Pand A
 ☐ Pand B
 ☐ Geen van beide

FIGURE 4 - Example of choice task as presented in the online survey (Krus, 2024)

TABLE 2 - Personal details of respondents (N = 113)

Characteristics	Levels	Frequencies	Percentages
Gender	Male	53	46.9
	Female	60	53.1
Age	Younger than 25 years	54	47.8
	25-40 years	42	37.2
	Older than 40 years	17	15.0
Employment status	Student	59	52.2
	Employee	54	47.8
Gross annual income	40,000 euro or less	47	41.6
	Between 40,000 and 80,000 euros	39	34.5
	80,000 euros or more	15	13.3
	Prefer not to say	12	10.6
Family composition	Living alone	44	38.9
	Living with partner and without children	56	49.6
	Living with partner and with children	10	8.8
	Prefer not to say	3	2.7
Residential location	Big settlement (>100,000 inhabitants)	69	61.1
	Medium sized (30,000-100,000)	12	10.6
	Small settlement (< 30,000 inhabitants)	33	28.3
<i>Statements</i>			
Considered to move to center of city	Yes	63	55.8
	No	50	44.2
Experience liveliness in residential area	I like liveliness	36	31.9
	No preference	29	25.7
	I dislike liveliness	48	42.5

The experiment was included in an extensive online survey that was distributed among the researchers personal networks. The online survey consisted of three sets of questions: questions related to current living situation, the stated choice experiment, and questions concerning personal information. In advance, each respondent was invited to evaluate 9 choice tasks. After completing the personal information part, respondents were invited to evaluate another 9 choice sets.

Data

In total, 113 respondents completed the questionnaire. The respondents evaluated 1,665 choice sets (41 respondents evaluated 9 choice sets and 72 completed 18 choice sets). Some details of the respondents are presented in Table 2. Looking at the personal details, it can be concluded that the majority of sample consists of students with corresponding characteristics such as young age, living alone or with a partner, living in a big city, and having a low income. It fits nicely in the three groups suggested by Boissevain (2020); students, starters, and young couples. The group of senior citizens is underrepresented.

Analyses

The evaluations were analyzed using a standard multinomial logit model. The attribute levels are coded using dummy coding. It appears that the model performs quite well (Rho-square > 0.2) and all included attributes significantly contribute to the attractiveness of an apartment in shopping streets.

TABLE 3 - Estimation results of standard Multinomial Logit Model

Group	Attributes	Attribute levels	Coefficient	Significance
Location	Constant		1.2549	0.000
	Walking distance PT	250 meters	0.3047	0.004
		500 meters	0.0714	0.537
		750 meters*	0	-
	Walking distance parking	100 meters	0.2480	0.016
		300 meters	0.1730	0.090
		500 meters	0	-
	Walking distance park	300 meters	0.3327	0.000
		800 meters	0.2065	0.049
		1,300 meters	0	-
	Crowdedness	Low	0.4240	0.000
		Medium	0.4051	0.000
		High	0	-
Building	Historical façade	0 percent	-0.2139	0.050
		50 percent	-0.1797	0.076
		100 percent	0	-
	Floor level	Ground	-0.5904	0.000
		First	-0.2130	0.030
		Second	0	-
	Width of façade	5 meters	-0.2229	0.030
		7.5 meters	0.1171	0.280
		10 meters	0	-
	Total floor area	40 square meters	-1.5543	0.000
		60 square meters	-0.5171	0.000
		80 square meters	0	-
	Rent price per month	900 euros	1.1615	0.000
		1,100 euros	0.5530	0.000
		1,300 euros	0	0.000
	Model goodness-of-fit			
	Loglikelihood of null model (LL0)		-1829.1895	
	Loglikelihood of final model (LL β)		-1397.8885	
	Loglikelihood ratio statistic (-2[LL0-LL β])		862.602	
	Test value for 19 degrees of freedom		30.14	
	McFadden's pseudo Rho-square		0.238	
	Adjusted McFadden's Rho-square		0.229	

* Base level of dummy coded as 0 (level 1) and 0 (level 2)

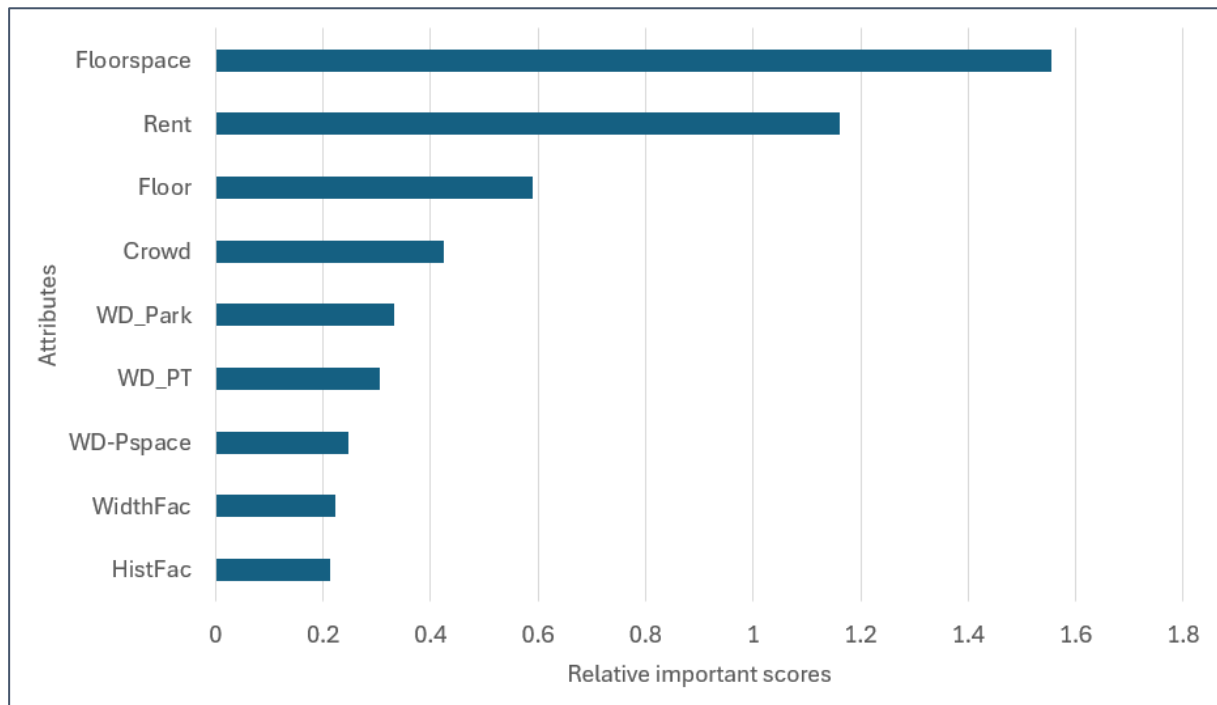


Figure 5 - Relative importance scores (WD=walking distance)

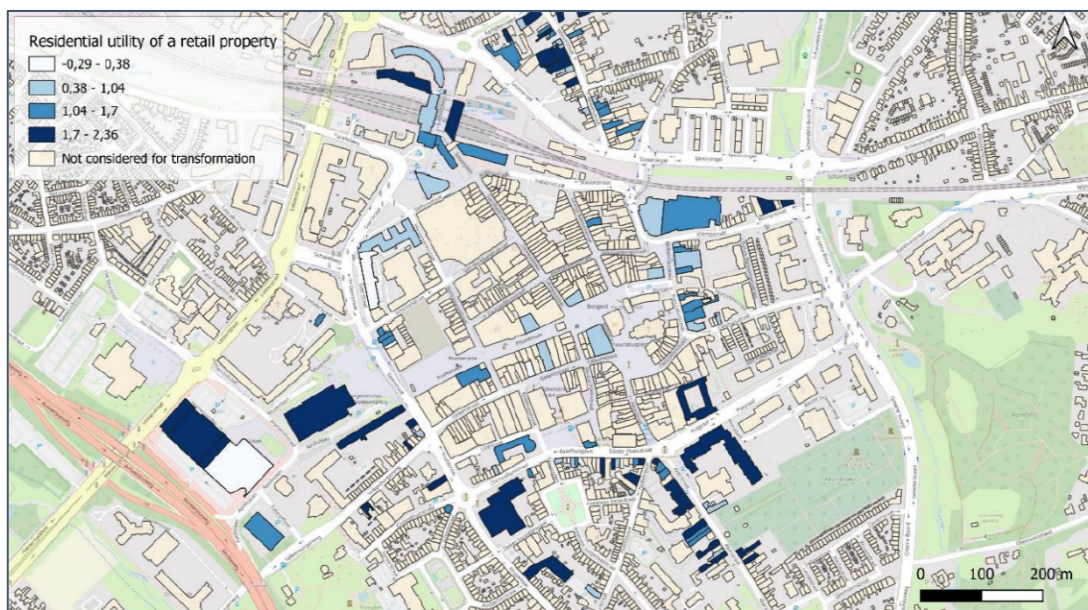


FIGURE 6 - Overview of residential utilities of retail properties in Heerlen (Krus, 2024)

The positive parameter for the constant shows that overall respondents are willing to express their preference for an apartment in the inner city shopping area. Building related attributes are the most contributing attributes with largest contribution of the apartment's total floor area and rent price (Figure 5).

Application

To illustrate the usefulness of the estimated model, an application is set up in the city of Heerlen, the Netherlands. With a vacancy percentage of approximately 25 percent, the city has the highest vacancy rate among big and medium-sized inner cities (Locatus, 2024). Based on the model estimates and assessments of the real world values of vacant buildings (Table 4), a map with residential utilities of retail properties is generated (Figure 6). The map shows the utilities in case all retail buildings in the city are included. When

focusing on the core shopping area and the ‘Geleenstraat’ several interesting retail properties pop up for transformation (Figure 7). The ‘Geleenstraat’ is of interest because the municipality of Heerlen started buying retail properties (for example Geleenstraat 40-42) for future transformations (Pot, 2023).

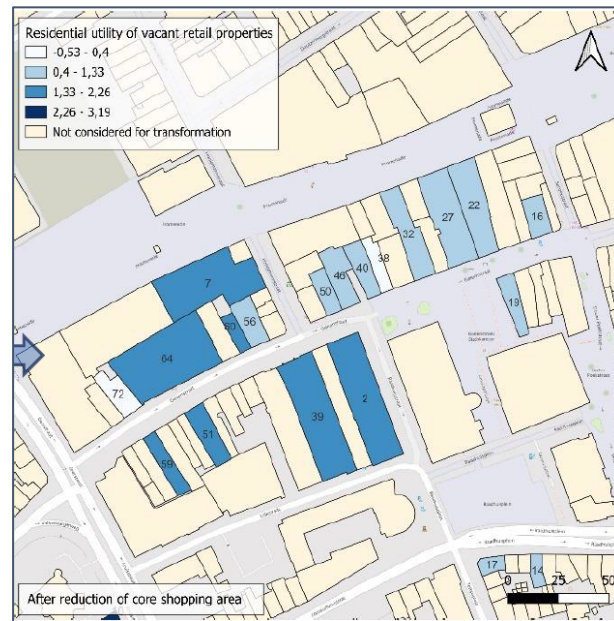


FIGURE 7 - Residential utilities of vacant retail properties in the ‘Geleenstraat’ (Krus, 2024)

TABLE 4 - Overview of assessed real world values of some retail properties (Krus, 2024)

Geleenstraat	Nr 38	Nr 51	Nr 56	Nr 59	Nr 72
Distance to public transport	243m	187m	186m	179m	139m
Distance to parking place	247m	142m	203m	121	138m
Distance to park	691m	755m	703m	767m	730m
Crowdedness of the street	Low	Low	Low	Low	Low
Floor level	0	0	0	0	0
Floor area	40m2	111m2	70m2	130m2	30m2
Price	€1,300	€1,000	€1,100	€1,100	€1,100
Total Utility	-0.53	1.78	1.19	1.78	0.37



FIGURE 8 - Retail properties with the highest expected residential utility (Krus, 2024)

Figure 8 shows photos of the two retail properties in the 'Geleenstraat' with the highest expected residential utility.

Conclusions and discussion

This paper presents the results of a study of residents' preferences of various location and building attributes of apartments located in an inner city shopping area. Based on the results of a data collection using a stated choice experiment and the estimation of a multinomial logit model, it was concluded that residents valued the available floorspace of the apartment and corresponding rent price as most important decision attributes. The usefulness of the model is shown in a case study in the city of Heerlen. The application shows the residential utilities of several buildings in the inner city shopping area of Heerlen. In general, the application shows how to evaluate vacant retail buildings in any inner city area and what attributes are most relevant in this process of evaluation.

While conducting the study several assumptions were made to keep the study and the stated choice experiment accessible and understandable. In future studies, the number of included attributes and their detailing by means of text and/or illustrations could be refined. The same is valid for the connection between attribute levels and the real world situation. In addition, the number respondents and the variety in their background should be increased to get a more representative sample.

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