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Artificial vs authentic? A neuromarketing study on AI-generated advertising

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Type of manuscript: Extended abstract

Keywords: Generative Artificial Intelligence (GAI); electroencephalogram (EEG); eye- tracking

Extended abstract

Generative Artificial Intelligence (GAI) is revolutionizing society at all levels, economic, social and cultural. Its implementation and adoption are increasingly prevalent in a wide range of functions and tasks within companies across all industries (Gupta et al., 2024; Kanbach et al., 2023; Ooi et al., 2023). The projected economic impact of this technology is estimated by various reports to exceed one trillion dollars annually (Accenture, 2024; Goldman Sachs, 2023; EY, 2024; McKinsey & Company, 2023).

The marketing industry is one of the most profoundly affected due to its exceptional capabilities in multiple areas (Kshetri et al., 2024), particularly in the creation of marketing assets due to its capabilities to enhance efficiency, reduce costs, improve productivity and enable large-scale personalization.
Some prominent companies like Coca-Cola, McDonald's and Heinz have already used this technology to create advertisements (Coca-Cola, 2024; McDonald's Japan, 2024; Campaigns of the World, 2022).

However, its use has introduced both opportunities and challenges. One major concern is the lack of human emotional intelligence and authenticity. Human-created marketing materials often incorporate deep cultural, emotional and psychological nuances that are difficult for AI to replicate despite its ability to analyze vast amounts of historical marketing data (Bera, 2024; Syam & Sharma, 2018). This connects directly with classic debates on whether machines can truly replicate human cognition and behavior, which flourished following the publication of the Turing Test (French, 2000).

Other critical factors include creativity, consumer perception, and trust in AI-generated advertisements (Ananthakrishnan & Arunachalam, 2022; Kshetri et al., 2024), as well as the potential impact on brand perception and loyalty (Huang & Rust, 2024). Moreover, the way this technology is integrated into marketing processes plays a key role. Several studies argue that AI's greatest strength lies in its ability to augment, rather than replace, human creativity and strategic thinking (Campbell et al., 2020; Daugherty & Wilson, 2018).

The rapid implementation and continuous improvement in the quality of its outputs have resulted in a scarcity of research on the aforementioned concerns and factors as well as the general effectiveness of these AI-generated assets, failing to match the significance of this paradigm shift.
This research aims to bridge this gap, which has been recognized in previous studies that highlight the profound potential impact of generative AI in marketing while emphasizing the need for further empirical validation (Kshetri et al., 2024).

To address this, a comparison is conducted between AI-generated and traditionally human- created advertisements, relying on empirical data from consumers' subconscious reactions through

neuroscience tools. The application of neuroscience to marketing, commonly referred to as neuromarketing, provides a unique perspective on how consumers respond to different types of content. Traditional advertising effectiveness has been measured through behavioral studies, surveys, and sales performance, but neuroscientific tools such as EEG (electroencephalography), and eye-tracking allow researchers to analyze subconscious consumer reactions in real-time (Gursoy, D., & Cai, R. 2025).

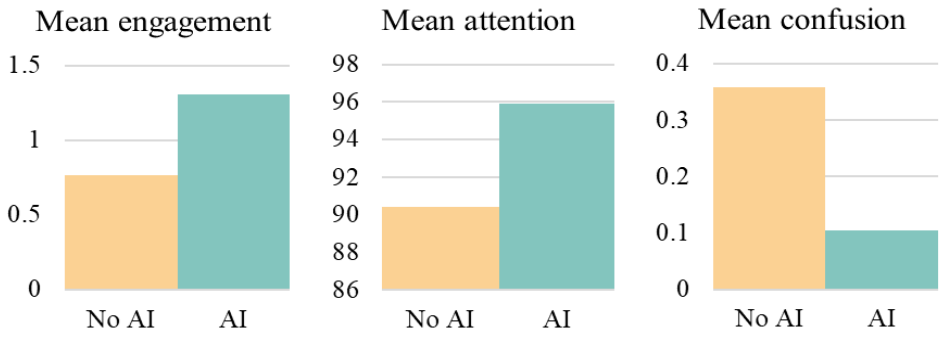
The research questions proposed are:
RQ1: How does consumer emotional engagement differ between AI-generated advertisements and human-created advertisements?
RQ2: To what extent do AI-generated advertisements capture consumer visual attention compared to human-created advertisements?
RQ3: What level of confusion do consumers place in AI-generated advertisements compared to those created by human-created advertisements?
RQ4: Does AI-generated approach, where AI assists human marketers, result in higher consumer engagement and attention than human-created advertisements?

The apparatus used were The Enobio EEG with 20 channels to obtain the metrics of engagement, attention and confusion, and the Smart Eye AI-X eye-tracking to develop visual heatmaps. The experiment was conducted in the laboratory, where participants were exposed to the stimuli, presented on a screen in randomized order. Six individuals aged between 18 and 35 (3 women and 3 men) voluntarily participated in the study, which took place in May 2024.

The selected traditionally human-created stimuli consisted of seven different advertising creatives from Burger King's social media and advertising campaigns. For each of them, a corresponding version was generated using the generative artificial intelligence tool DALL-E (see Table 1). The areas of interest (AOIs) defined were the Burger King isologo and the food or beverage products.

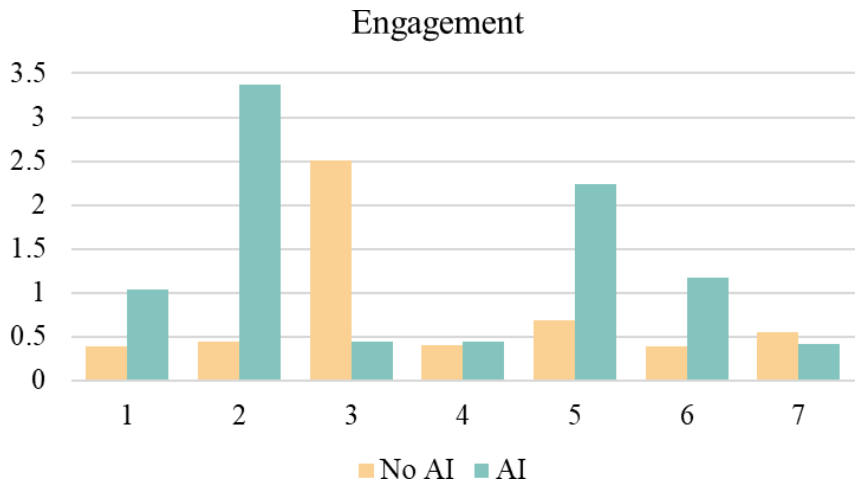
The key findings from the comparative analysis of the combined metrics obtained through neuroscience tools indicate that AI-generated advertisements have generally achieved more favorable results.

Figure 1. Bar chart General AI vs No AI



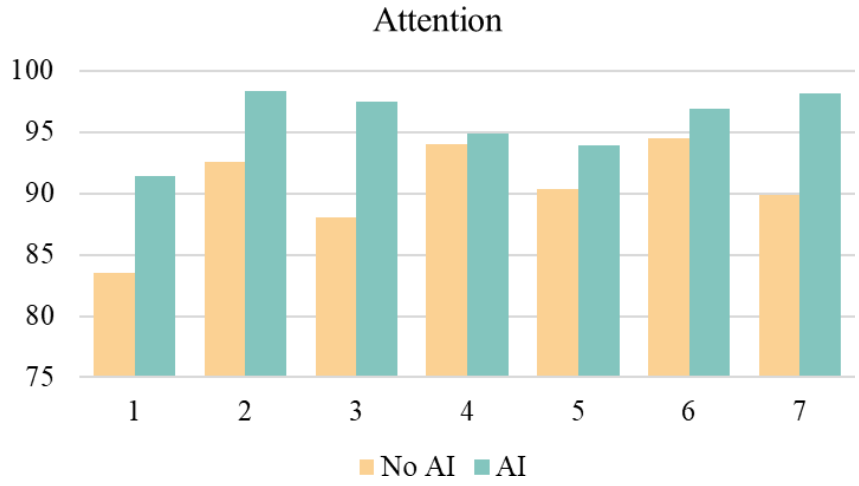
In relation to RQ1, five of the AI-generated advertisements showed a higher level of engagement, with some significant differences in advertisements 2, 5 and 6, presenting percentage variations of 651.14%, 225.78% and 202.82%, respectively, between the AI- generated and human-created versions.

Figure 2. Bar chart of engagement per advertisement



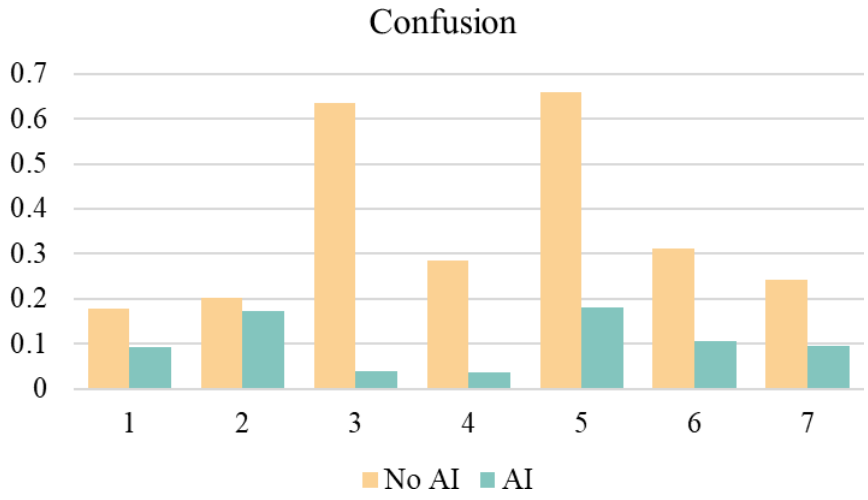
The data obtained provide a concise answer to RQ1, as the AI-generated advertisements recorded higher figures overall, with a percentage variation of 70.13%. And more consistency, achieving a coefficient of variation of 92.37% compared to 101.3% for the human-created ones.
To address RQ2, data obtained from eye-tracking analysis showed that, overall, AI-generated advertisements captured more visual attention within the defined areas of interest, as shown in the examples of figures 5 and 6. EEG results supported these findings, revealing that all AI-generated advertisements achieved higher attention levels, with an overall percentage variation of 6% and lower variability, reflected in a coefficient of variation of 2.69% compared to 4.22% for the human-created versions.

Figure 3. Bar chart of attention per advertisement



Regarding RQ3 AI-generated advertisements have achieved significantly lower confusion levels, with an overall percentage variation of -72.22%. In addition, the reaction to AI- generated advertisements was more stable, with a coefficient of variation of 50% compared to 55.56% for human-created ones.

Figure 4. Bar chart of confusion per advertisement



The comparative analysis conducted on key effectiveness metrics revealed clear trends, allowing for an affirmative response to RQ4: the AI-generated approach, where AI assists human marketers, leads to higher engagement and attention.

However, despite the identified trends, further research is considered highly valuable. Some proposed directions for expansion and exploration include: the inclusion of more brands from the same industry or other ones, increasing the sample size, the combination with qualitative or quantitative methodologies or the addition of video-format advertisements.

Table 1. Original and AI-generated advertisements

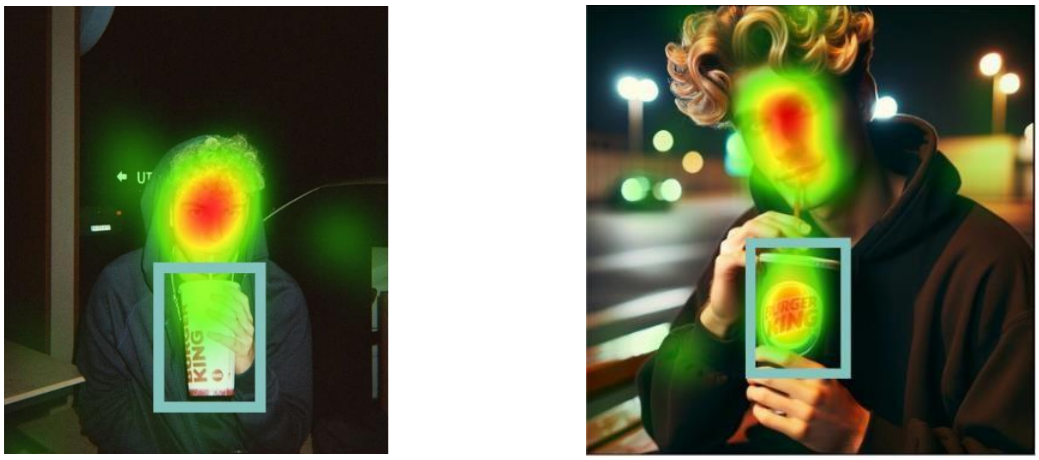
Human-created	AI-generated
Stimuli 1	
 Stimulus name: No AI 1	 Stimulus name: AI 1
Stimuli 2	

 Stimulus name: No AI 2	 Stimulus name: AI 2
Stimuli 3	
 Stimulus name: No AI 3	 Stimulus name: AI 3
Stimuli 4	
 Stimulus name: No AI 4	 Stimulus name: AI 4
Stimuli 5	
 Stimulus name: No AI 5	 Stimulus name: AI 5
Stimuli 6	

 Stimulus name: No AI 6	 Stimulus name: AI 6
Stimuli 7	
 Stimulus name: No AI 7	 Stimulus name: AI 7

Figure 5. Heatmaps of advertisements No AI 5 and AI 5

Figure 6. Heatmaps with AOIs of advertisements No AI 7 and AI 7



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Quantifying Customer Engagement: A Biometric and Visual Analysis of Responses to Generated Digital Adverts

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Type of manuscript: Extended abstract

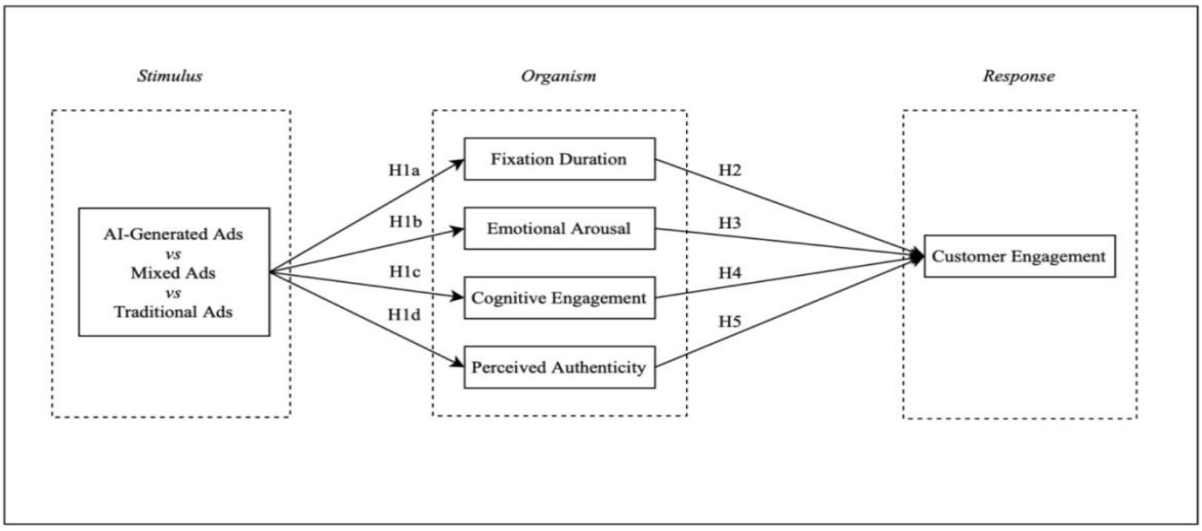
Keywords: artificial intelligence; biometric research; customer engagement; digital advertising; perceived authenticity; neuromarketing

Extended abstract

Integrating artificial intelligence (AI) into marketing practices has catalysed a significant transformation in digital advertising, particularly through AI-generated content (AIGC). While this approach offers scalability and personalisation, questions remain regarding its effectiveness in eliciting genuine consumer engagement, especially trust, emotional resonance, and perceived authenticity. This study investigates the impact of AI-generated, human- designed (traditional), and hybrid advertisements on consumer engagement, employing a mixed-methods approach that integrates biometric and perceptual measures.

Anchored in the Stimulus-Organism-Response (SOR) model (Huang & Rust, 2020), the research examines consumer reactions to static advertisements across three formats. Fifty-two participants, aged between 18 and 65, were exposed to themed advertisements in a controlled lab setting. Biometric data, including fixation duration, galvanic skin response (GSR), heart rate (HR), and blink rate, were recorded using Gazepoint GP3 eye-trackers and physiological sensors. Perceived authenticity (PA) was captured in real time using Self-Reporting Dials and supplemented with Likert-scale responses.

Figure 1. The Proposed Research Framework, based on the SOR Model



To minimise the influence of participant variability and enhance statistical reliability, a within-subjects repeated measures experimental design was employed (Charness et al., 2012). Each participant was exposed to all three advertisement types: AI-generated, traditional, and mixed, and

thus served as their control (Field & Hole, 2003). This approach improved statistical power by reducing random error and controlling for mood, personal preferences, and background differences. Participants viewed a structured and repeated sequence for each ad type, with responses collected after every exposure to ensure consistency and precision. This design also improved efficiency by allowing multiple data points from each participant, enabling more accurate engagement comparisons across ad types without inflating sample size requirements.

Each trial followed a rigorously controlled sequence: participants first viewed a blank screen, then a fixation screen featuring a central plus sign, then a scrambled version of the advertisement to normalise luminance adaptation, and finally the actual ad. This setup reduced visual distractions and stabilised physiological baselines before exposure to the stimuli. All images were pre-processed to remove logos, pricing, or text and were uploaded to the Gazepoint Control system, a biometric tool capable of capturing eye movement, pupil dilation, heart rate, GSR, and Self-Reporting Dial input (Gazepoint, 2021). Separate projects were created within the system for each ad type to ensure standardised presentation.

In parallel, a structured questionnaire was administered via Qualtrics after each block of ad exposures. It contained Likert-scale items to measure perceived authenticity, enabling direct comparison between biometric signals and subjective evaluations. The dual integration of real- time biometric tracking and reflective self-reporting allowed for a comprehensive capture of subconscious and conscious engagement dimensions.

Findings reveal that while AI-generated advertisements were more successful in capturing initial visual attention (M = 1.754 s fixation duration), they underperformed in eliciting trust and emotional engagement. Traditional advertisements, by contrast, evoked significantly stronger GSR responses and received the highest authenticity ratings (M = 3.65, SD = 0.89). Statistical analyses confirmed significant differences in GSR ($\chi^2(2) = 6.394$, $p = .041$) and PA ($\chi^2(2) = 6.924$, $p = .031$) across ad types. Post hoc tests revealed that traditional ads produced significantly higher emotional arousal than mixed ads ($p = .046$), while authenticity scores showed a marginal trend favouring traditional over AI-generated ads ($p = .071$).

A multiple linear regression model identified perceived authenticity as the only significant predictor of customer engagement ($\beta = 0.480$, $p < .001$), explaining 23.8% of the variance ($R^2 = .238$). Other biometric variables, including heart rate and fixation duration, did not contribute meaningfully to engagement outcomes ($p > .60$). These results emphasise the primacy of authenticity in shaping consumer responses, suggesting that emotional and cognitive resonance, rather than physiological intensity, drives meaningful engagement.

Thematic analysis of participant commentary supported these findings. Traditional advertisements were consistently described as more emotionally resonant, culturally relevant, and trustworthy. In contrast, AI-generated ads were often perceived as overproduced, lacking human warmth, and contextually disconnected. Participants expressed scepticism in high-trust sectors (e.g., banking, healthcare), where AI-generated visuals were seen as inadequate unless transparency regarding AI involvement was explicitly provided (Thomas & Fowler, 2021).

This study bridges biometric data with subjective engagement measures, demonstrating authenticity as a central psychological mediator. Moreover, it underscores the importance of human creative input in sustaining emotional credibility, especially in contexts where trust is a prerequisite. AI-generated ads may offer short-term advantages for sectors such as fashion or tech, where novelty and visual

impact are prioritised. However, traditional human-designed content remains superior in domains requiring emotional resonance or social credibility.

From a practical perspective, the regression model (Customer Engagement = 1.389 + 0.563 × PA) provides a valuable tool for forecasting audience response and refining creative strategy. Pre-launch biometric testing is recommended to optimise ad features that align with high authenticity perceptions. Marketers are further encouraged to implement hybrid approaches, combining the efficiency of AI with the empathy and contextual awareness of human insight.

Future research should investigate dynamic advertising formats (e.g., video, CGI), integrate branding elements, and assess whether biometric engagement translates into behavioural metrics such as click-through or conversion rates. Additionally, neuroimaging tools (e.g., EEG, fMRI) may yield more profound insights into how different ad formats activate cognitive and affective processing systems.

In conclusion, this study underscores that while AI-generated content excels in scalability and attention capture, it lacks the emotional credibility necessary for sustained engagement. However, perceived authenticity emerged as the critical determinant of consumer response, highlighting the enduring value of human creative labour in the era of automation.

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Smart Style in Digital Fashion: Virtual Influencers' Role in Consumer Engagement and Emotional Connection

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Type of manuscript: Extended abstract

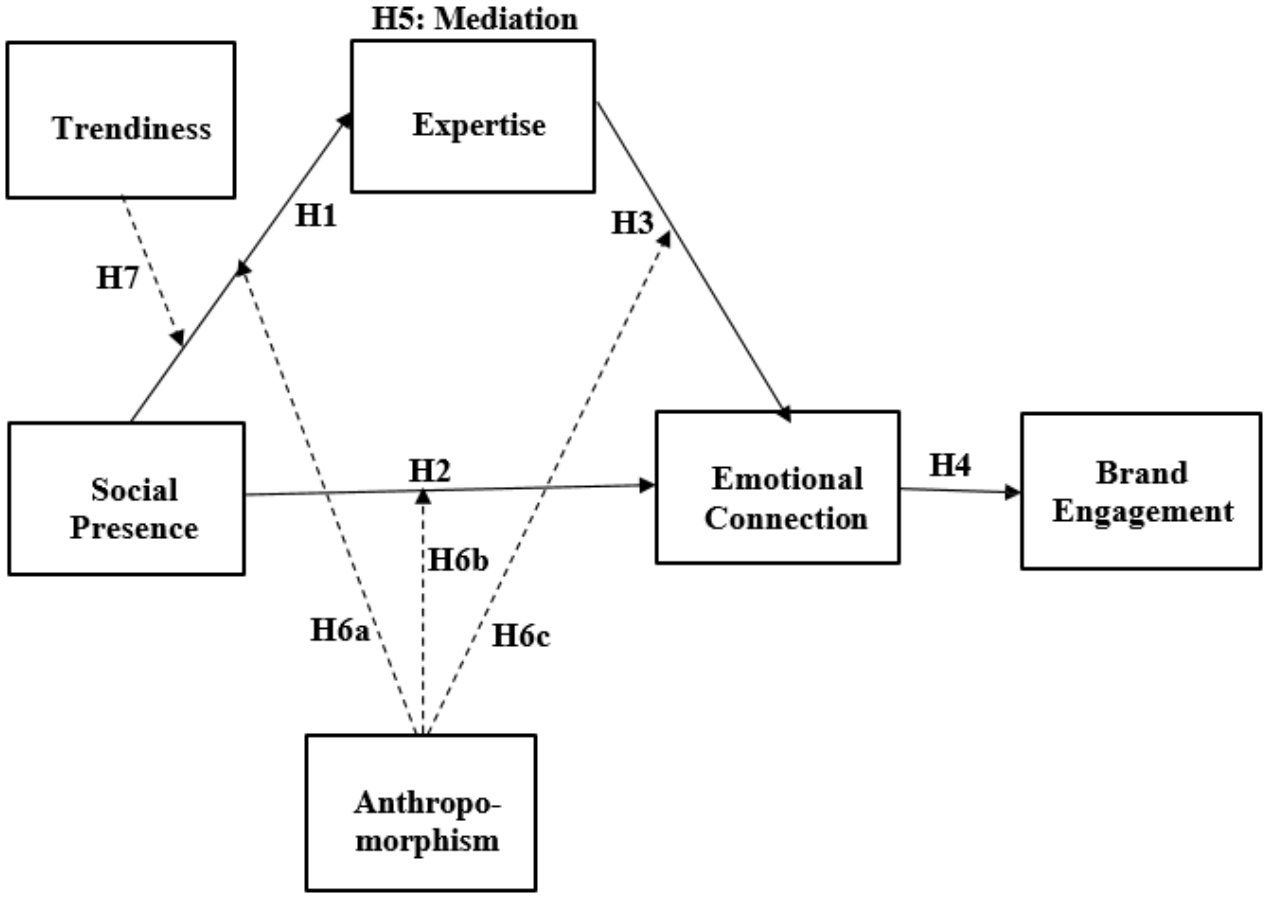
Virtual influencer; Social presence; Anthropomorphism; Trendiness; Brand engagement

Extended abstract

The utilization of virtual influencers (VIs) in marketing and advertising has undergone a notable rise in recent years. This shift highlights the evolving digital marketing landscape, where brands compete to apply innovative solutions to engage consumers and create competitive advancements effectively (Rachmad, 2024). VIs are virtual social robots that illustrate brands and participate in online marketing experiences or advertising via social media platforms (Haikel-Elsabeh, 2023). They are a fascinating alternative that can reshape digital marketing and social media advertisements (Dondapati & Dehury, 2024). Nowadays, brands collaborate with VIs to share sponsored ads, posts, and events on social media (Mouritzen et al., 2024). Prior studies indicated that virtual influencers significantly impact consumer purchase behavior (Kim & Park, 2023) and positive brand outcomes such as engagement (Goel & Garg, 2025). However, extant literature has primarily focused on the direct impact of AI influencers on these aspects and less deeply explored the role of virtual influencers' unique characteristics (i.e., expertise, social presence, anthropomorphism, and trendiness) in shaping and enhancing consumers' emotional connection and engagement as moderating and mediating factors. The present study has three objectives: (1) to examine the multiple moderating roles of anthropomorphism in the relationship between virtual influencer social presence and followers' emotional connection with the brand via the expertise of virtual influencer; (2) to investigate the role of trendiness in the association between expert, social presence, and emotional connection as a vital moderator; and (3) to propose a theoretical model integrating with the brand engagement to explain these phenomena through the Social Cognitive Theory (SCT) (Bandura, 1986).

According to SCT, consumer behavior is shaped by continuous interaction between personal factors (e.g., thoughts, emotions, beliefs), the social environment, and behavioral responses. In the context of VIs, this study considers perceived expertise and anthropomorphism (personal factors) that refer to the influencer's perceived intelligence and human-like characteristics (de Boissieu & Baudier, 2023; Feng et al. 2024). Social presence and trendiness (social environment cues) - how interactive, engaging, or current the influencer appears (Feng et al, 2024; Higgins et al. 2022). Emotional connection is the consumer's internal psychological response, reflecting the affective bond between the consumer and the brand (Yan et al. 2024), which can lead to behavioral outcomes such as brand engagement - the consumer's active involvement and interaction with the brand (Goel & Garg, 2025). Anthropomorphism and trendiness are treated as moderators because their influence is expected to enhance or diminish the effects of social presence and expertise rather than directly shaping the emotional connection. By integrating SCT, the study explores how different combinations of virtual influencer characteristics (i.e., expertise, social presence, anthropomorphism, and trendiness) influence consumer perceptions and ultimately lead to brand engagement. Fig 1 shows the proposed research model.

Figure 1. Proposed research model based on Social Cognitive Theory (SCT)



Method

Data was collected from consumers familiar with the virtual influencer Lil Miquela and the Gucci brand in November and December 2024 through an online survey via Google Forum in Istanbul, Turkey. The study used a purposive sampling technique, where only individuals who followed the virtual influencer Lil Miquela and the Gucci brand on social media could participate in the survey. There were three screening questions: (a) Do you follow the Gucci brand on social media? (b) Have you purchased any products from Gucci in the last six months? and (c) Do you follow Lil Miquela virtual influencer on Instagram? The purposive sampling technique allows us to focus on specific individuals who are most likely to provide relevant and rich information, enhancing the quality of the data collected (Etikan et al., 2016). Participants were not exposed to a specific post but responded based on their prior experience and familiarity with both the virtual influencer Lil Miquela and the Gucci brand. In total, 300 surveys were collected. After removing the incorrect and incomplete questionnaires, 285 valid surveys were used to examine the hypothesis. The online survey consisted of three parts. When participants clicked on the online survey, the first section asked them to indicate their familiarity with virtual influencers and the Gucci brand. The second section included the measurement scales related to the proposed research model, and the final section asked about participants' sociodemographic factors. Partial least squares structural equation modeling (PLS-SEM) using Smart-pls 4.1.10 was used to test the hypothesized relationships (Hair et al., 2011).

Findings

Based on the results of Table 1, all proposed hypotheses are supported. Findings showed that social presence positively affects VIs' expertise ($\beta = 0.299$, $P < 0.001$) and consumers' emotional connection

(β = 0.051, P = 0.003). H1 and H2 were supported. Virtual influencers' expertise enhances emotional connection to the brand (β = 0.171, P = 0.003), eventually leading to brand engagement (β = 0.181, P < 0.001), supported by H3 and H4. Furthermore, the indirect path from social presence to emotional connection through expertise is significant, demonstrating that social presence influences emotional connection primarily through its impact on experts, supporting H5 (β = 0.051, P = 0.005). It highlights the mediating role of expertise in converting social presence into followers' emotional attachment to the brand.

Table 1. Hypothesis test results and statistical significance

Hypothesis	**β Value**	**Std. Dev.**	**T-statistic**	**P-value**	**Supported**
H1: Social presence → Expertise	0.299	0.054	5.485	0.000	Yes
H2: Social presence → Emotional Connection	0.051	0.020	2.606	0.003	Yes
H3: Expertise → Emotional Connection	0.173	0.064	2.727	0.003	Yes
H4: Emotional Connection → Brand Engagement	0.181	0.057	3.133	0.001	Yes
H5: Social presence → Expertise → Emotional Connection (Mediation)	0.051	0.020	2.606	0.005	Yes
Moderated Effects					
Anthropomorphism → Expertise	0.173	0.055	3.099	0.001	Yes
Anthropomorphism → Emotional Connection	0.292	0.053	5.555	0.000	Yes
H6a: Anthropomorphism × Social presence → Expertise	-0.139	0.054	2.624	0.004	Yes
H6b: Anthropomorphism × Social presence → Emotional Connection	-0.024	0.003	1.855	0.004	Yes
H6c: Anthropomorphism × Expertise → Emotional Connection	-0.170	0.064	2.638	0.004	Yes
Trendiness → Expertise	-0.004	0.063	0.072	0.471	No
H7: Trendiness × Social presence → Expertise	0.084	0.064	1.954	0.051	Yes

Anthropomorphism positively influences VIs' expertise (β = 0.292, P < 0.001) and consumers' emotional connection (β = 0.173, P < 0.001). However, the interaction between anthropomorphism and social presence negatively affects virtual influencers' expertise (β = - 0.139, p = 0.004) and users' emotional connection (β = -0.24, p = 0.004), suggesting that while anthropomorphism and social presence are crucial individually, their combined effect may create complexity or reduce overall effectiveness, provide support for H6a and H6b. In addition, the interaction impact between anthropomorphism and expertise on social presence is significant and negative (β = -0.170, p = 0.004), supporting H6c. It suggests that when the levels of anthropomorphism and expertise are high, the emotional connection decreases. Finally, the result indicated that trendiness alone did not appear to influence the perceived expertise of VIs (β = - 0.004, P = 0.471). H7 was supported. Consumers may perceive trendiness as a superficial characteristic that does not necessarily correlate with knowledge or expertise. However, the moderating effect showed that social presence strengthens the impact of trendiness on experts. When an influencer is trendy and socially engaged, consumers are more likely to perceive them as experts (Freberg et al., 2011).

Conclusion

The study found that creating an appropriate balance of virtual influencer characteristics (i.e., expertise, social presence, anthropomorphism, and trendiness) is critical to optimizing emotional connection and brand engagement. Findings highlighted a crucial role of VIs anthropomorphism in the proposed model. Results revealed that anthropomorphism particularly improves emotional connection (Mehta et al., 2024), while its multiple interactions with social presence and expertise may weaken this effect. Our results show that when both anthropomorphism and social presence are both high, users' emotional connection may decrease. This suggests that too much social presence may lead to overfamiliarity, making the relationship feel less authentic (Khamis et al., 2017). In addition, if users perceive a virtual influencer as highly anthropomorphic and knowledgeable, this may reduce emotional engagement because participants may pay more attention to the VI's knowledge rather than focusing on emotional relationships or human-like engagement (Muntinga et al., 2011). Finally, although high social presence alone leads to emotional connection (Lin et al., 2024), it may undermine perceptions of the influencer's knowledge because consumers may perceive VIs with high levels of anthropomorphism and social engagement as more approachable, but perhaps less professional or knowledgeable.

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Who talks to me about luxury? Between admiration and envy

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Extended abstract

Social media platforms have become key spaces for the dissemination of visual content related to vacation experiences in luxury destinations, which in turn stimulates users' desire to replicate similar experiences. Social media content elicits social comparison (Ding et al., 2024). It is crucial in luxury consumption because users may compare their peers when sharing upgrade experiences. In this context, luxury consumption has undergone a significant transformation, extending beyond tangible products to include exclusive services. This evolution has led to an increase in both the demand for luxury travel experiences and the trend of sharing such experiences in digital environments (Park & Lee, 2024). In recent years, travel-related content shared through platforms such as Instagram and TikTok has gained increasing importance, fostering the emergence of content creators specialising in this thematic category (Forbes, 2024). Given the aspirational nature of these experiences, prior research has shown that influencers' posts can trigger processes of upward social comparison, evoking emotions such as envy (Ng et al., 2023; Wahba et al.2025) or feelings of admiration towards the content creators (Lim & Yang, 2019).

Build upon the Cognitive Appraisal Theory (Myers 2006) this study aims to analyse admiration and envy in social media (the emotion of envy emerges when an individual perceives the absence of a valued attribute, achievement, or possession that they observe in others (Tandon et al., 2021)). In the academic literature, this emotion has been categorised into two distinct dimensions: benign envy and malicious envy (Van de Ven et al., 2009; Lange & Crusius, 2015; Lim & Kim, 2018). Benign envy is expressed when another's success is perceived as legitimate, and the observer believes they have the ability to achieve similar goals through their own effort (Van de Ven et al., 2011). In contrast, malicious envy arises when others' success is seen as undeserved, leading to frustration, hostile feelings, and the impulse to reduce the distance with the envied person through their discrediting or devaluation (Van de Ven et al., 2011, p. 985). In contrast to envy, admiration represents a prosocial emotion centred on the recognition of outstanding virtues or skills. It is an emotional response that combines the acknowledgment of others' excellence with a sense of awe, evoking a form of pleasure linked to appreciating the achievements of others (Onu et al., 2016).

Given their high prevalence in the digital environment, emotions such as envy and admiration have attracted the attention of the scientific community, which has examined their influence on consumer responses across various domains, such as influencer marketing (Jin & Ryu, 2020; Lee & Eastin, 2020), aspirational tourism (Liu et al., 2019), and conspicuous consumption (Taylor & Strutton, 2016). Although research focusing on tourism has delved into the effects of these emotions on variables such as attitude towards the destination (Feng et al., 2023), visit intention (Ahmad et al., 2024; Dedeoglu et al., 2025), status-oriented consumption patterns (Gupta & Srivastav, 2016), or individual efforts to match the perceived standards of others (Belk, 2011; Van de Ven et al., 2009),

the analysis of their specific impact on the influencer figure remains limited. Drawing from Social Comparison Theory (Festinger, 1954), which posits that individuals tend to evaluate themselves by referencing others, this study aims to examine the role of envy and admiration evoked by visual content of tourism experiences in shaping consumer behavioural responses towards influencers. Posts by these content creators—particularly those related to tourism—constitute a context particularly conducive to triggering upward comparison processes, fostering intense and multifaceted emotional responses (Van de Ven et al., 2011), due to the volume and informational richness they offer their audiences. In recent years, influencers have become a highly effective promotional tool, particularly in the tourism sector, which is profoundly shaped by the logic of social media due to its visual, social nature and its orientation towards intensive information dissemination (Xie- Carson et al., 2023). These content creators, positioned as key figures within specific thematic niches, succeed in attracting and retaining audiences through posts on platforms such as Instagram or TikTok. However, the influencer figure is not limited solely to real individuals (Lou & Yuan, 2019). In this regard, virtual influencers have emerged as a transformative phenomenon that challenges conventional persuasion models in the digital environment (Dondapati & Dehury, 2024). These entities, developed through artificial intelligence and endowed with hyper-realistic human-like appearances, blur the boundaries between the authentic and the simulated, captivating large segments of users on visually-oriented social networks such as Instagram (Kim et al., 2023; Conti et al., 2022).

Despite the considerable number of studies on influencer marketing in the tourism sector (Xie-Carson et al., 2023; Wahba et al., 2025), most existing research has predominantly explored its positive effects on consumer responses. In this regard, various studies have demonstrated the favourable effect of influencer marketing on followers' attitudes towards tourist destinations (Liu et al., 2024; Dedeoglu et al., 2025) and on behaviours directed towards the influencers themselves (Ballester et al., 2025). However, with the rapid growth of social platforms, studies focusing on the potential negative effects of influencer marketing have also begun to emerge (Barari et al., 2023). To the best of the authors' knowledge, there is currently no research that comprehensively examines both the positive effects (Influencer Advocacy) and the negative effects from the perspective of the influencer (negative behavioural engagement). From a behavioural perspective, this study adopts the online negative engagement model proposed by Dong et al. (2024), which distinguishes between constructive and destructive behaviours. The former includes criticisms aimed at improvement or constructive negative feedback, while the latter encompasses actions such as hostile comments, spreading unfavourable content, or attempts to boycott the influencer.

The purpose of this study is to investigate the impact of the type of influencer (virtual with a human appearance versus human) on consumer responses, specifically influencer advocacy and both constructive and destructive forms of negative behavioural engagement. Special emphasis is placed on the mediating role of the emotions of envy and admiration. Furthermore, luxury and non-luxury tourist destinations are incorporated into the analysis, exploring how the luxury component may moderate the influence of the type of influencer on consumer responses. Consequently, the central objective of this work is to analyse how different types of content generated by influencers and the tourism experiences they share affect consumer reactions towards the influencers.

The experiment will be carried out at a Neuro Lab of a European university. To evaluate the proposed model, a between-subjects factorial experiment was conducted, in which two independent variables were manipulated: the type of influencer (human versus virtual) and the type of tourist destination (luxury versus non-luxury). Participants were randomly assigned to one of the four experimental conditions. In each condition, the influencer's Instagram profile was initially shown, followed by a post that included an image and a textual description of the promoted product. After reviewing this information, participants will complete an online questionnaire. The key variables of the study were

measured using multi-item scales, adapted from previous research: admiration (Schindler, 2014; Kim et al., 2023), benign envy (Lange & Crusius, 2015; Ng et al., 2023), malicious envy (Lange & Crusius, 2015; Ng et al., 2023), online advocacy (citation), constructive online engagement (Dong et al., 2023), and destructive online engagement (Dong et al., 2023). All scales used a seven-point Likert response format, ranging from 1 ("strongly disagree") to 7 ("strongly agree"). Additionally, the type of influencer was coded (virtual = 0; human = 1). The participants' visual behaviors will be recorded with a 23-inch, 1920 × 1080-pixel resolution PC monitor (that also displayed the experimental instructions and stimuli). The data was collected by using a Tobii X2-30 Compact Eye Tracker. The duration of expressed emotions will be measured through facial reading and arousal through galvanic skin responses (EDA).

It is anticipated that human influencers will generate higher levels of envy and admiration compared to virtual influencers, due to the greater perceived authenticity that the former tend to convey (Kim et al., 2023; Van de Ven et al., 2011). However, luxury-related content, due to its symbolic value and exclusivity, could intensify these emotional responses, regardless of the type of influencer (Liu et al., 2019). It is expected that both benign envy and admiration will foster constructive behaviours towards the influencer, such as positive interactions or the sharing of content in favourable terms. In contrast, malicious envy could be associated with destructive behaviours such as disqualification, hostile comments, or online boycotts (Dong et al., 2024).

This study makes a significant contribution to the literature on Social Comparison Theory, applying it to the contemporary context of influencer marketing within the tourism sector. Furthermore, it extends the body of research on digital engagement by incorporating negative aspects of consumer behaviour, distinguishing between constructive and destructive online engagement (Dong et al., 2024). The results are enriched by using objective neuroscientific measures. When asked to reflect on their behaviors, consumers often provide socially desirable responses which accord with their perceptions of the questioner's expectations. From a practical perspective, the findings of this research could be useful for brands in selecting the most appropriate type of influencer based on the emotional and behavioural objectives sought, also considering the impact of the content (luxury versus non-luxury). Finally, the importance of designing content strategies that minimise potential adverse reactions or feelings of social injustice, especially in sensitive sectors such as aspirational tourism, is emphasised.

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Artificial Intelligence in Action: Fighting Financial Crime in Morocco's Banking Sector

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Extended abstract

Money laundering continues to represent a critical threat to financial systems worldwide that creates fertile ground for the development of crimes linked to corruption and terrorism among others. Criminals turn to banks as their principal intermediaries by exploiting the vast range of financial services they offer to disguise illicit funds (He, 2010). As a result, financial institutions are responsible for detecting and preventing these illegal flows (Financial Action Task Force, 2025). In this context, recent advances in artificial intelligence (AI) hold promise for reinforcing anti-money laundering (AML) systems by detecting schemes that are often overlooked by traditional methods (Sobreira Leite et al., 2019).

In February 2023, Morocco was officially removed from the Financial Action Task Force (FATF) grey list (Financial Action Task Force, 2023), and three months later the European Union followed up by removing the country from their own list (European Commission, 2023). This demonstrates Morocco's efforts to strengthen the resilience and transparency of its financial system. Yet, to maintain this momentum and align with international standards, it is crucial for Morocco to embrace emerging technologies such as AI, machine learning and data mining in order to improve the agility of its compliance frameworks.

Against this backdrop, this study explores how Moroccan banks are using AI for AML purposes to highlight the opportunities and limitations they face. It also benchmarks Morocco's approach with advanced jurisdictions already applying AI in compliance. Using a qualitative methodology, the study draws on semi-structured interviews with industry professionals, alongside a literature review of international AML frameworks and case studies of global institutions using AI based solutions.

This paper appraises the transformational potential of artificial intelligence in AML compliance within the Moroccan banking sector, offering a focused analysis of current AI integration levels. By situating the national experience within a global comparative framework, it identifies both challenges and opportunities for alignment with international standards. Uniquely, the study highlights context-specific constraints and practices in Morocco, contributing original insights to a literature still sparse on emerging market perspectives and offering practical implications for policy and institutional reform.

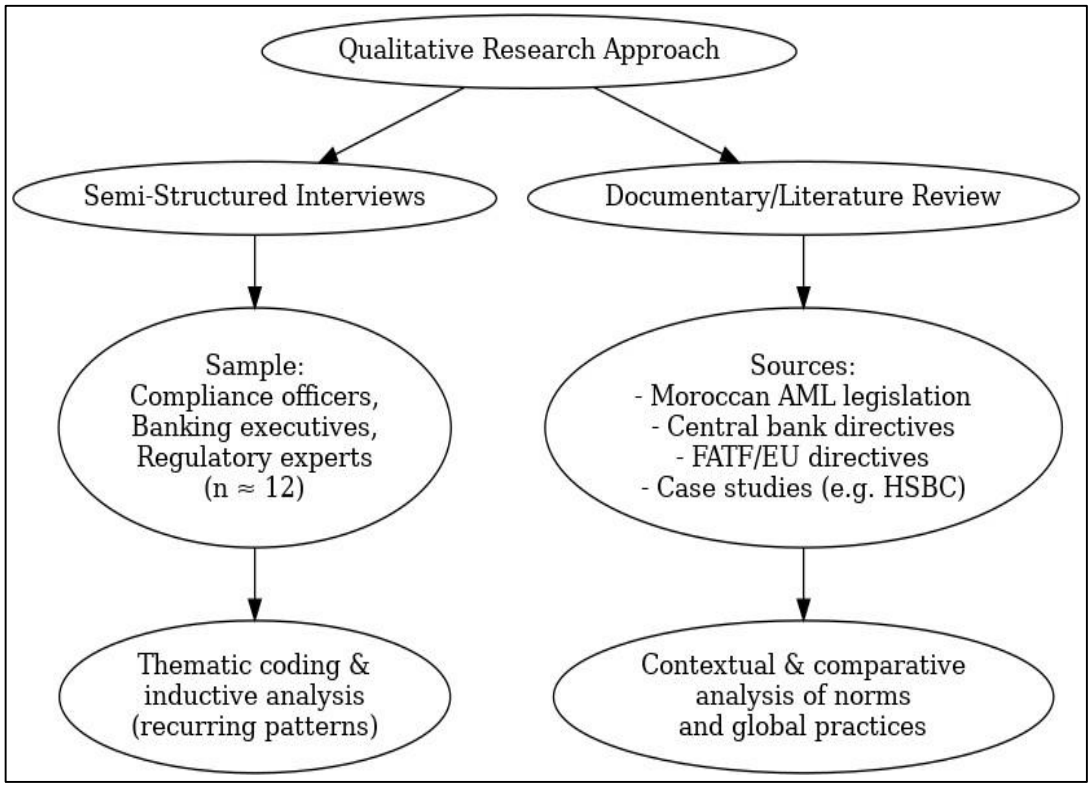
The study is guided by the following research questions:

1. How is AI currently being adopted in AML practices among Moroccan banks, and how do stakeholders perceive both its potential and its compliance risks?

2. What are the main technical, regulatory and organizational obstacles to the implementation of AI-based AML solutions in Morocco?
3. How are international trends and regulatory developments influencing Morocco's approach to AI-based AML?

The study adopts a qualitative research model that allows us to grasp both the complexity and contextual nuances of technological and regulatory developments. There are two main strands to the methodology. Firstly, semi-structured interviews are conducted with stakeholders in the Moroccan banking ecosystem, including compliance officers and banking executives along with regulatory experts. These interviews seek to explore current practices, perceptions of AI's potential and institutional or regulatory challenges surrounding its adoption. Secondly, the study includes a literature review of relevant national and international sources such as Moroccan AML legislation, central bank directives, FATF recommendations, European AML directives and case studies from global institutions.

Figure 1. Overview of the Research Design



The adoption of artificial intelligence in financial institutions can be examined through several theoretical frameworks. The Technology–Organization–Environment (TOE) framework emphasizes that technology implementation depends on technological factors (e.g., compatibility, complexity), organizational conditions (e.g., resources, culture), and environmental pressures (e.g., regulation, competition) (Tornatzky et al., 1990). Complementing this, the Technology Acceptance Model (TAM) explains technology adoption through perceived usefulness and perceived ease of use (Davis, 1989). In the context of AI, these models are increasingly integrated with algorithmic governance principles that stress transparency, accountability, and human oversight (Vogl et al., 2019; Wirtz et al., 2019). Moreover, the concept of human-AI collaboration is central in compliance domains, where researchers argue that maintaining trust and regulatory alignment requires a careful balance between machine autonomy and human control (Bao et al., 2021).

Preliminary results from our qualitative fieldwork suggest that AI adoption for AML in Morocco is at a very early stage. While most banks rely on rule based systems that often leads to high false positive rates, compliance professionals are gaining awareness of AI's potential (Pavlidis, 2023; AL-ABABNEH et al., 2024). Initial interviews highlight major obstacles to AI adoption in AML compliance, including fragmented data, limited infrastructure, and the lack of a dedicated legal framework. Despite these challenges, internationally connected Moroccan banks express growing interest in AI tools for transaction monitoring and risk scoring, while emphasizing the continued need for human oversight in line with regulatory demands for explicability and accountability.
Globally, early findings suggest that major international banks use AI through strategic partnerships to enhance financial crime detection. For instance, HSBC's collaboration with Google led to doubling detection rates while reducing false positives by 60% (HSBC, 2024). Meanwhile, Citi worked with AI company Feedzai to improve real-time risk monitoring for its transaction services (Feedzai, 2019). These cases exemplify how AI is reshaping compliance through improved efficiency and accuracy.

Preliminary snapshots suggest that Morocco represents a promising regulatory context that is in the early stages of engaging with the challenges and opportunities posed by AI in financial compliance. While reforms aligned with international standards are already in place, the integration of AI-specific dimensions into the regulatory framework remains in its infancy. Policy tools such as regulatory sandboxes and targeted capacity building, as well as international cooperation particularly with EU and MENA partners may offer useful pathways to support this transition.

On a theoretical level, the research is intended to contribute to the RegTech and AI governance discourse through exploring an underrepresented regional context and investigating how innovation can be incorporated responsibly into evolving financial systems. The next steps in this qualitative study will concentrate on continued fieldwork together with deeper interviews among experts and a broader analysis of institutional and regulatory dynamics with particular attention to how practices and policy expectations regarding AI in the fight against money laundering are crafted in the Moroccan banking and reflected in international comparisons.

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The Role of Artificial Intelligence (AI) Chatbots in Mobile Banking

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Keywords: AI chatbots; mobile banking; media synchronicity theory

Extended abstract

The rapid expansion of digital transformation and Artificial Intelligence (AI) has reshaped the banking industry, with mobile banking platforms increasingly relying on AI-powered chatbots to provide cost-effective, real-time customer supporthas reshaped the banking industry, with mobile banking platforms increasingly relying on AI-powered chatbots to provide cost-effective, real-time customer support (Bueno et al., 2024; Graham et al., 2025). Despite their growing use, current chatbots face challenges in handling complex customer inquiries and lacking adaptability, which negatively impact user experience, satisfaction, and customer loyalty (Chanda & Prabhu, 2023; Shaikh et al., 2022). To address these concerns, this study examines how the design and communication quality of AI chatbots affect user task performance in mobile banking contexts.

Media Synchronicity Theory (MST) emphasizes the importance of transmission velocity, parallelism, symbol sets, rehearsability, and reprocessibility, which enhance service quality in real-time digital interactions (Dennis & Valacich, 1999; Thomas et al., 2023). These features are especially relevant for AI chatbots in mobile banking, where speed and clarity affect user satisfaction and task success (Ashfaq et al., 2025; Rajaobelina et al., 2019). Previous studies have primarily focused on users' initial acceptance and adoption of technology using frameworks like the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Kelly et al., 2023; Menon & Shilpa, 2023). Limited research investigates how high synchronicity interactions offered by AI chatbots impact users' sustained engagement and productivity. Integrating Computers Are Social Actors (CASA) theory (Nass et al., 1994), when the technological system has human-like social cues, such as voice tone, emotional expression, and response style, users automatically assign it a social role and respond to the system in an interpersonal interactive manner. Through this CASA theory, this research focuses on three AI chatbot traits, anthropomorphism, perceived intelligence, and perceived safety, which reflect social, cognitive, and trust-related dimensions. Task engagement and productivity provide a more precise evaluation (Marikyan et al., 2022). Task engagement refers to users' psychological focus and involvement in tasks such as managing accounts, monitoring transactions, or using budget tools. Productivity captures tangible outcomes like completing transfers efficiently, retrieving information quickly, or making timely financial decisions. This study develops and tests a model applying MST and CASA to mobile banking AI services, and develops the research model illustrated in Figure 1.

The hypotheses are as follows:

H1: The anthropomorphism of mobile banking AI chatbots will positively affect synchronous service quality.

H2: The perceived intelligence of mobile banking AI chatbots will positively affect synchronous service quality.

H3: The perceived safety of mobile banking AI chatbots will positively affect synchronous service quality.

H4: Synchronous service quality will positively affect user task engagement.
H5: Synchronous service quality will positively affect user productivity.

A quantitative research approach was adopted, using an online survey distributed via Amazon Mechanical Turk (MTurk), and 233 valid responses were used for analysis. Data were analyzed using Structural Equation Modeling (SEM) with SmartPLS to examine the relationships between AI characteristics, synchronous service quality, and the user outcomes of task engagement and productivity. Table 1 summarizes the item loadings and reliability indicators (CA, CR, AVE), confirming acceptable reliability and convergent validity for all constructs.

Table 1. Construct reliability and convergent validity

Construct	Items	OA	CA	CR	AVE
Anthropomorphism (AN)			0.723	0.844	0.644
	AN1	0.739			
	AN2	0.846			
	AN3	0.819			
Perceived Intelligence (PI)			0.736	0.834	0.557
	PI1	0.735			
	PI2	0.764			
	PI3	0.735			
	PI4	0.752			
Perceived Safety (PS)			0.685	0.827	0.614
	PS1	0.789			
	PS2	0.755			
	PS3	0.806			
Synchronous Service Quality (SSQ)			0.844	0.889	0.616
	SSQ1	0.789			
	SSQ2	0.766			
	SSQ3	0.785			
	SSQ4	0.842			
	SSQ5	0.739			
Emotional Response			0.703	0.817	0.528
	ERC1	0.723			
	ERC2	0.728			
	ERC3	0.719			
	ERC4	0.736			
Cognitive Response			0.829	0.875	0.539
	CRC1	0.737			
	CRC2	0.747			
	CRC3	0.754			
	CRC4	0.706			
	CRC5	0.718			
	CRC6	0.742			

Note(s): OA: Outer Loading; CA: Cronbach's Alpha; CR: Composite Reliability; AVE: Average Variance Extracted
Source(s): Research data

The SEM analysis revealed notable insights. The model explained 64.4% of the variance in synchronous service quality. Specifically, anthropomorphism ($\beta = 0.213$), perceived intelligence (β

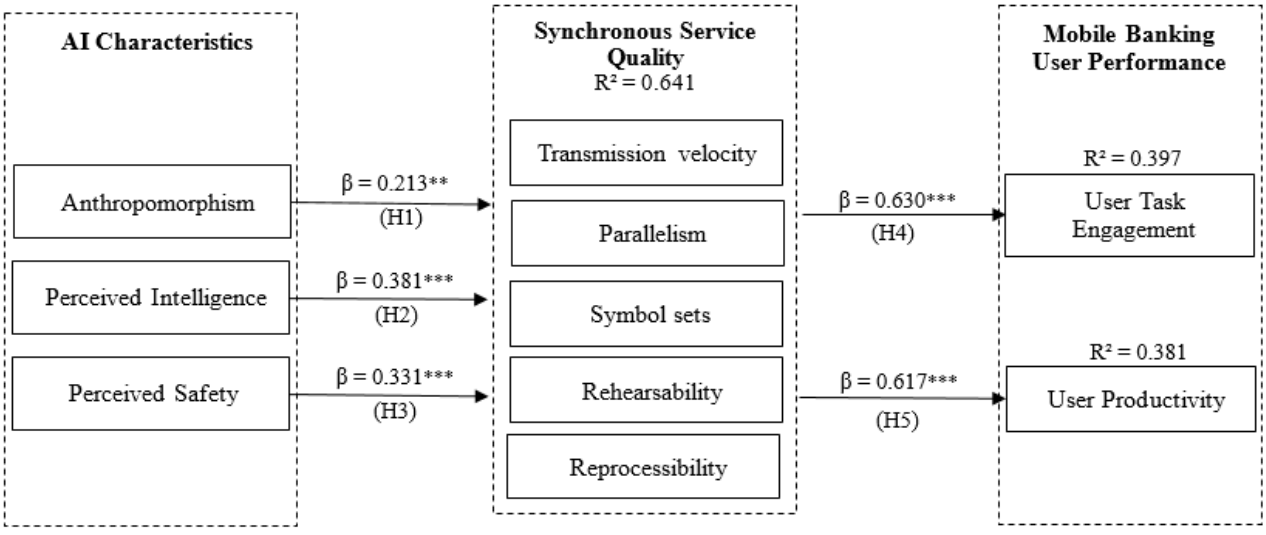
= 0.381), and perceived safety (β = 0.331) significantly positively influenced synchronous service quality. Furthermore, synchronous service quality positive impact on task engagement (β = 0.630) and productivity (β = 0.617), confirming the critical role of service synchronicity in enhancing user performance (Figure 1).

This research provides significant theoretical and practical contributions, addressing clear gaps identified in previous literature:

- Novel Theory integration: Combines CASA and MST to explain how AI traits influence user performance through synchronous service quality.
- Mediating mechanism: Positions synchronicity as a mediator, addressing its underexplored role in the mobile banking context.
- Performance-based outcomes: Introduces task engagement and productivity to go beyond satisfaction-focused measures.
- Practical relevance: Offers design insights for banks to improve chatbot responsiveness, reduce human support needs, and enhance customer loyalty.

Overall, the findings emphasize the importance of service synchronicity and AI chatbot design in delivering high-performance mobile banking experiences. However, several limitations should be acknowledged. First, using MTurk for participant recruitment may introduce concerns regarding sample representativeness, especially within the financial services. Second, both user engagement and productivity were measured via self-reported items, which are susceptible to perceptual bias. Future research should incorporate behavioral data, such as AI chatbot usage logs or task completion rates, to validate these outcomes. Moreover, extending the model to other service sectors and including cultural or technological moderators can help broaden the generalizability and robustness of this framework.

Figure 1. Research Model of AI Characteristics and Synchronicity Service Quality for Mobile Banking AI Chatbots



Note: Standardized coefficients, * p<0.05; ** p<0.01; *** p<0.001

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Artificial Intelligence in Health Promotion: A Framework and Research Agenda

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Extended abstract

The rapid advancement of artificial intelligence (AI) presents transformative opportunities for health promotion and disease prevention worldwide. With global investment in healthcare projected to exceed $45 billion by 2026 (Markets and Markets, 2024), AI technologies are poised to revolutionize how we approach population health, behavior change, and wellness promotion. AI can be described as machine-based systems designed to simulate human intelligence to perform tasks, such as analysis and decision-making (Smith *et al.*, 2024). As health systems globally face mounting pressures from resource limitations, rising demands for preventive services, and persistent health disparities, AI-enabled solutions offer compelling opportunities for innovation. Healthcare organizations increasingly rely on AI algorithms that can process vast amounts of health data, predict risk factors, personalize interventions, and optimize health promotion campaigns (Yun *et al.*, 2021). Consumers benefit from these applications through more accessible health information, personalized wellness recommendations, early warning systems, and AI-enabled health coaching that promotes positive behavior change (Cadario *et al.*, 2021; Lee *et al.*, 2024).

Research on AI in health promotion has expanded rapidly, examining applications of AI- enabled health monitoring systems (Nasr *et al.*, 2021), automated treatment planning (Kisling *et al.*, 2019), AI-powered health communication strategies (Miller *et al.*, 2024), and AI as a tool to promote health behavioral changes (Aggarwal *et al.*, 2023; Lee *et al.*, 2024). Additional streams focus on AI ethics and inclusive deployment of technology in healthcare (Fisk *et al.*, 2023; Morley *et al.*, 2020; Siala & Wang, 2022), as well as patient´s perception of AI tools in medical settings (Cadario *et al.*, 2021; Zhang *et al.*, 2024). Despite the growing body of research, there remains a critical need for a systematic understanding of how AI applications influence health promotion and a clear roadmap for future development to maximize their potential for improving population health outcomes (Singh *et al.*, 2024).

Using a dual-methodological approach, we combine Natural Language Processing (NLP) with machine learning techniques to systematically map the intellectual landscape of AI applications in health promotion. Specifically, we employ topic modeling and scientometric analysis (Mustak *et al.*, 2021; Nikolenko *et al.*, 2017; Zhao *et al.*, 2019) to conduct a comprehensive examination of the field. Our analysis reveals eight critical themes, including user-centered health app design, digital health interventions, wearable technologies, AI in clinical research, behavioral responses to health communication, and AI in healthcare systems.

Theoretically, this study offers a significant contribution by introducing the AI–Health Promotion Framework, an evidence-based model that categorizes AI applications in healthcare along two key

dimensions: embedded vs. standalone AI, and patient-centered vs. provider- centered AI. This framework enhances our understanding of how AI interacts with various stakeholders, ranging from individual consumers to healthcare professionals, and clarifies the main areas of research and development in AI-driven health promotion.

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The Transformative Potential of Generative AI Therapists – An Exploratory Study

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Extended abstract

Mental health is a worldwide problem, yet access to the services remains limited due to high costs, workforce shortages, and stigma. Generative AI (GenAI) has advanced learning capabilities, cognition, and intelligence, allowing it to simulate emotions and engage in human-like interactions (Chui et al., 2021), offering potential solutions to ease the existing problems in mental health services. However, given the limited knowledge in the field, it is still unclear how customers perceive GenAI as the role of virtual therapists, especially when such services require high engagement and emotional-related tasks. Guided by cognitive appraisal theory, this study explores the potential of integrating GenAI into mental health therapy, specifically investigating individuals' perceptions of GenAI therapists, aiming to investigate the subsequent research questions:

RQ 1: How do customers perceive and evaluate GenAI therapy?
RQ 2: What factors influence customers' interaction with GenAI therapy?

Semi-structured in-depth interviews were conducted to identify factors influencing customers' perception and adoption of GenAI therapists. Purposeful sampling was adopted, and participants were recruited through public platforms such as LinkedIn and university advertising resources. In total, 30 participants were recruited, consisting of nineteen females and eleven males, with the ages ranging from 18 to 78 years (M_{age} = 32). Software MAXQDA is used for data analysis. A thematic analysis approach was followed (Miles, 2014), encompassing both vertical (examining interviews individually) and horizontal (comparing across interviews) analyses to identify common patterns and themes (Greiner & Lemoine, 2025). Eventually, themes about participants' cognitive appraisals, emotional responses, and coping strategies are identified.

Although the current research is a work in progress, the preliminary findings reveal different customer reactions and behavioural intentions. Specifically, it appears that customers with different characteristics pay attention to varying attributes of GenAI therapy, shaping distinct perceptions of GenAI therapists. Participants are segmented into four personas—tech-savvy users, health-driven users, socially influenced users, and socially isolated users—each with distinct motivations, concerns, and adoption patterns. Table 1 compares four personas representing distinct customer segments and the factors influencing their adoption of GenAI therapy. Demographic characteristics such as age, education, personality traits, and technological experience significantly influence customers' perceptions and adoption decisions. This study expects to contribute both theory and practice by extending cognitive appraisal theory to GenAI therapy contexts and by providing insights for service providers designing GenAI mental health solutions.

Table 1. Identified customer personas.

	Tech-savvy User	**Health-driven User**	**Socially influenced User**	**Socially isolated User**
Age	Less than 30 years old	30-50 years old	Less than 30 years old	n.s
Personality	Curious, innovative, open-minded	Cautious, practical	Social, influenced by others.	Introverted, emotionally sensitive
Technology experience	Have previous experience/regular use AI-based services.	Moderate; familiar but cautious about adopting new digital tools.	Familiar through social media and digital networking tools.	Have previous experience/regular use AI-based services.
Attitudes towards GenAI therapy	Positive	Positive yet cautious	Neutral to positive	Positive and hopeful
Goals for using GenAI therapy	Seeking convenient and innovative experiences. Out of curiosity.	Using GenAI therapy as an alternative option or supplement to human therapy.	Motivated by recommendations or testimonials from friends, family, or social media.	Emotional companionship, reducing isolation through AI interaction.
Main drivers	Fun, convenience, innovation, time, and cost-efficiency	Accountability, accuracy, transparency	Recommendations, reviews, word-of-mouth	Empathy, confidentiality, non-judgments
Main barriers	Complexity, subscription fee, privacy concerns	Privacy concerns, ethical considerations, doubts regarding credibility	Accessibility, privacy concerns	limited emotional capabilities, restricted communication methods
Examples of participants' quotes	"I would try it to see how it is like I would just do it because I'm curious. I want to see how it looks like."	"Prior to reaching the human therapist, we can get a rough idea about the situation from GenAI therapists."	"I would download if other people had good reviews of the GenAI therapy."	"I don't really socialize much in the real world. So socializing with an AI from time to time does help, and it does allow me to cope with life a little bit."
	"I guess what's most important to me is that I get de-identified. So I'm anonymous in that way if they're going to use my data."	"If AI says something that ends up making me doubt myself, and then I go on a wrong path and something bad happens to me, AI probably won't be responsible for that because it's AI."	"I've heard a lot about it from my friends who have used it. Most of them are in the technology sector."	"If you're talking to a person, you can see them physically. You can see their facial expressions, gestures. There's indirect communication, whereas with AI is just mainly through words."
	"Because what is behind managing AI they potentially could use shared or sell the data for other purposes. So I think that's more of an actual barrier."	"GenAI therapists doesn't really know what really triggers one's problems, and it's just treating the symptoms rather than the root cause."	"With a human therapist, there's always an assurance of confidentiality—they explicitly tell you that your information stays within the room. However, with GenAI therapy, it's uncertain how your information might be used."	"When an AI validates my experience and empathizes, I feel like that it's a person who gets it because the AI gives us the illusion that it's another human."

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Addressing Legal Issues Related to the Use of AI Chatbots in Marketing

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Extended abstract

In recent years, businesses have increasingly adopted various artificial intelligence (AI) technologies to enhance operational efficiency. One of the most significant advancements in this field is the emergence of AI chatbots, which are now widely used in marketing to support content creation, customer engagement, behavioral analytics, and targeted marketing strategies. The rapid integration of chatbots into marketing practices also raises important ethical and legal concerns. Addressing these issues effectively is crucial to ensuring the responsible and successful application of AI chatbots in marketing. Kumar and Suthar (2024) indicate that there is a noticeable gap in research and a need to investigate the ethical and legal challenges specific to AI in marketing. They emphasize that conducting research to propose solutions tailored to this domain is necessary (Kumar & Suthar, 2024). The literature review conducted as part of this study also revealed a limited number of studies addressing ethical and legal issues related to the use of AI chatbots in marketing. This study contributes to filling this gap in literature. Since the present study discusses the main legal consequences associated with the use of AI chatbots in marketing and suggests practical solutions, ethical issues that do not have legal consequences and cannot be addressed through legal solutions are not considered within the scope of this study. In this context, a literature review was conducted using primary academic sources retrieved from Scopus, Web of Science and Google Scholar. Preference was given to literature published within the past five years (2020-2025) to ensure timeliness and relevance.

Table 1. Summary of Literature Review Results

Author	**Scope**	**Database**		
		Scopus	**WoS**	**Google Scholar**
Diurni and Riccio (2023)	analyze the legal and ethical risks of ChatGPT, introducing "digital vulnerability" as a threat to user autonomy. They highlight GDPR's limitations and call for flexible, multi-layered regulations	X	-	X
Gromova et al. (2023)	discuss legal, ethical, and technical concerns like bias, privacy, and lack of transparency. They advocate clear regulations and ethical frameworks to ensure responsible chatbot use	X	-	X
Huang and Ma (2023)	focus on issues such as intellectual property, accountability, and ethical alignment. They stress the need for updated laws and proactive risk	-	-	X

Author	Scope	Database		
		Scopus	WoS	Google Scholar
	management to maintain trust in generative AI			
Ungureanu and Amironesei (2023)	explore GenAI's legal challenges within the European context, including data use and liability. They propose clearer regulations, international collaboration, and fair contracts	X	X	X
Migliorini (2024)	warns about societal risks from advanced chatbots, such as low user awareness and commercial pressures. They examine how the EU AI Act could guide responsible AI development	X	X	X
Panagopoulou et al. (2023)	investigate ChatGPT's impact on education, highlighting benefits and risks like plagiarism and privacy concerns. They emphasize ethical integration and digital literacy in education systems	-	-	X

From a legal perspective, the literature review has identified the following challenges faced by AI chatbots in marketing (Gromova et al., 2023; Huang & Ma, 2023):

- Possible threats to personal safety
- Data privacy and protection issues
- Intellectual property issues
- Lack of transparency, explainability and terms of use

Possible threats to personal safety: Personal data obtained from AI chatbots can be misused illegally, leading to crimes like cyberbullying and burglary. AI chatbots can also pose risks to individuals' safety by misusing user data (Gromova et al., 2023; Huang and Ma, 2023). These risks must be considered under the AI Act, which came into force on August 1, 2024 (Vasel, 2024). The AI Act adopts a risk-based framework, categorizing AI systems as unacceptable, high, limited, or minimal risk. AI systems classified as posing an unacceptable risk under Article 5 are strictly prohibited due to their potential to cause serious harm. This includes systems that deceive users, exploit vulnerable individuals, predict criminal behavior based solely on personality traits, or perform real-time biometric identification in public spaces. For instance, if an AI chatbot interacts with psychologically vulnerable individuals in a way that manipulates their behavior and causes harm, such a practice may fall under the scope of prohibited uses in Article 5.

Although most AI chatbots are generally classified as limited-risk systems, the risk level depends on their context of use. For example, basic informational chatbots may pose limited risk, whereas generative chatbots that collect user data or provide psychological advice may require stricter oversight. Eiven limited-risk systems must comply with the transparency obligations set out in Articles 52–54, including disclosing when content is AI-generated, providing general information about the training data, and establishing a plan for intellectual property management and content accountability.

Data privacy and protection issues: Data protection issues related to AI chatbots can be addressed on two main levels: (1) the risk that the data used to train the chatbot may contain personal information, and (2) the risk that personal data collected during real-time interactions with users may be stored, processed, or shared without the users' explicit consent—resulting in violations of data privacy laws (Gromova et al., 2023).

The main legal framework governing these issues is the General Data Protection Regulation (GDPR). According to Article 6 GDPR, the processing of personal data is generally prohibited unless it is based on one of the legal grounds listed in Article 6(1). In the context of large language models (LLMs), personal data may be processed at two stages (Werry, 2023):

- Training data: Typically sourced from publicly available internet content, licensed materials, and user contributions (Singh, 2023; Ray, 2023).
- Operating data: Generated during real-time interactions between the chatbot and users.

AI training qualifies as a data processing activity under the GDPR, and therefore requires a lawful basis. This can be ensured through:

- user consent (Article 6(1)(a)), often obtained through cookie banners (Hardan, 2024),
- legitimate interests (Article 6(1)(f)), provided the interests of the controller are not overridden by the rights and freedoms of the data subject. This justification may be more applicable in areas of public interest, such as healthcare.

Furthermore, the principle of data accuracy, set out in Article 5(1)(d), imposes additional obligations. When AI systems generate incorrect or misleading personal data, providers are required to correct or delete such data (Pesch et al., 2023). Although a certain degree of error is inherent in AI training, this does not exempt developers from the duty to ensure the accuracy of retained and disseminated personal data.

Intellectual property issues: Ownership of AI-generated content and infringement of existing rights (e.g. infringement of copyright by using protected material without authorization, trademark infringement) are key legal concerns regarding the use of AI chatbots in relation to intellectual property (Gromova et al., 2023; Huang & Ma, 2023).

The European Union adopted the Digital Single Market (DSM) Directive in 2019 to harmonize copyright and related rights within the internal market, particularly for digital and cross-border uses of protected content. The directive permits text and data mining for commercial purposes, provided rights are respected (Stieper & Denga, 2024). However, outputs entirely created by AI without human input are usually not eligible for copyright protection under current law (Baumann, 2023). Copyright law is territorial, granting protection only in the recognized jurisdiction. The applicable law is that of the sought-after country (Stieper & Denga, 2024). These principles complicate enforcing intellectual property rights in globally distributed AI-generated content.

Regarding intellectual property issues, the AI Act requires implementing a copyright strategy to ensure AI training complies with EU copyright law, particularly in relation to text and data mining (Article 53). Providers must disclose used content (Stieper & Denga, 2024).

Lack of Transparency, Explainability and Terms of Use: These issues span several dimensions, including a lack of data transparency, making it unclear which datasets are used for training, and limiting trust and legal accountability. AI chatbots often cannot explain their decision-making. Their output may be biased or inaccurate if trained on flawed data (Gromova et al., 2023, Huang and Ma, 2023). Users face an imbalance of rights, with terms of use favoring developers and placing full liability for generated content on users. However, developers may still be legally accountable if the content violates laws (Gromova et al., 2023, Huang and Ma, 2023). Finally, ambiguous data usage terms raise concerns about privacy and content ownership when user input is used for training without clear consent (Gromova et al., 2023).

In response to the growing societal and regulatory challenges posed by evolving digital business models, the Digital Services Act (DSA) came into force on November 16, 2022, as an EU regulation. The DSA aims to safeguard democracy and fundamental rights in the digital environment by enhancing transparency, accountability, and consumer protection (Legner, 2024). Key provisions of the DSA include:

- requiring clear and fair content moderation practices,
- banning the use of dark patterns,
- introducing transparency obligations for advertising and recommender systems, with additional duties for very large online platforms.

Regulatory developments—particularly the DSA—represent a significant step toward balancing user rights with platform accountability and transparency in AI-driven digital services. However, further measures are needed to ensure that contractual terms, liability frameworks, and data usage policies reflect fairness, clarity, and truly informed consent.

In conclusion, while current regulations offer a foundation, the lack of a unified EU framework for AI-generated content creates ongoing legal uncertainty. The AI Act aims to provide a balanced solution, but it risks falling behind technological developments. Ethical issues like harmful AI outputs and user manipulation are still insufficiently addressed, highlighting the urgent need for more defined legal and ethical guidelines.

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Source Signals: The Impact of Referencing Information Sources on the Intention to Use Conversational Agents

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Extended abstract

Conversational agents (CAs), such as chatbots and voice assistants, are computer interfaces that enable users to obtain information on various topics by engaging in conversations that mimic human interactions. Significant technological advancements, including machine learning and natural language processing, drive their adoption in customer service, thereby enhancing firms' efficiency (Davenport et al. 2020). Nonetheless, recent reports indicate consumers are reluctant to use CAs (Gartner 2023). Therefore, this research contributes to the understanding of the determinants of consumers' CA use intentions by examining the role of transparency regarding CAs and, more specifically, how referencing CAs' sources affects use intentions. In doing so, this work adds to the knowledge about CA usage by introducing a novel determinant that previous work has overseen, even when discussing the transparency about or design of algorithms (Ling et al. 2021; Mariani et al. 2023; Van Pinxteren et al. 2020).

Drawing on lay belief theory (Dweck, 2000), we hypothesize and test that consumers hold the general assumption that merely referencing information sources enhances the credibility of information; they apply this lay belief or intuition to decide whether they want to interact with a CA. Hence, we suggest that referencing the sources of CAs' information is a critical enabler of a consumer's decision to interact with CAs. In doing so, this research also contributes to the understanding of algorithmic transparency and tests recent practices in CA design (e.g., newer versions of ChatGPT making source information more accessible).

In a Pilot Study, we surveyed Prolific panelists (N = 101, average age = 31.5 years, 45% female) to see whether consumers associate the referencing of information sources with in- formation credibility. Hence, participants indicated the extent to which they agreed with the following statement: "Articles that disclose their sources provide information of higher credibility" (1 = strongly disagree, 7 = strongly agree). As the average agreement with this statement was above the scale's mean (M = 5.98, SD = 1.03; t(100) = 24.214), we conclude that consumers generally hold the assumption that "disclosure of information sources equals in- formation credibility."

In the Main Study, we build on the findings of our pilot study and investigate whether people apply this intuition to other contexts. In particular, this study examines the impact of referencing CAs' information sources on the intention to use CAs (H1) and the role of the anticipated credibility of the information provided by CAs in explaining this effect (H2: mediation). To test H1 and H2, two hundred forty panelists from Prolific US participated in a one- factor between-subjects experiment with three conditions (i.e., disclosure of CAs' information sources vs. disclosure about how the CA works vs. no disclosure). We defined a second control group to test whether the differences in

anticipated credibility are explained by the disclosure of information sources rather than by the disclosure of any information.

Sixteen participants failed an instruction attention check; thus, we used the responses of 224 participants (average age = 33.2 years, 42% female). We created the stimulus material for this study using an existing CA implemented in a mobile app. This conversational agent is an AI- powered travel assistant that helps users with trip planning and travel management. The scenario description asked participants to imagine planning a trip and encountering this travel assistant. Afterwards, participants were randomly assigned to one out of three descriptions of the CA. All groups read a general description of the CA. Those assigned to the experimental group also received information provided by the CA, based on sources including travel plat- forms, travel guides, tourism boards, and event calendars. Those assigned to a control group with information about how the CA works received information on the use of algorithmic techniques. After reading the scenario, all participants indicated their intention to use the CA (1 = not at all likely, 7 = very likely), and their beliefs of the CA's information credibility (i.e., using five items from Chang et al. 2021 on a seven-point Likert scale anchored with 1 = not at all likely, 7 = very likely; $\alpha = .857$). Participants also reported their demographics (age and gender) and level of familiarity with CAs.

A one-way analysis of variance (ANOVA) on use intention showed a significant main effect of referencing information sources ($F(2, 221) = 4.993$, $p = .008$, $\eta^2 = .043$), in support of H1. Adding CA familiarity as a covariate did not change this result ($F(2, 220) = 5.443$, $p = .005$, $\eta^2 = .047$). Planned contrast analyses revealed that participants' intention was significantly higher if there was information about CA's sources ($M = 5.94$, $SD = 1.22$) than there was in- formation about CA's functioning ($M = 5.26$, $SD = 1.71$; $t(221) = 2.78$, $p = .006$) or no information ($M = 5.28$, $SD = 1.59$; $t(221) = 2.65$, $p = .009$), with no significant difference between the control conditions ($t(221) = -0.10$, $p = .921$).

Likewise, an ANOVA on perceptions of information credibility showed a significant main effect of the disclosure of the CA's information sources ($F(2, 221) = 5.604$, $p = .004$, $\eta^2 = .048$). Adding CA familiarity as a covariate did not change this result ($F(2, 220) = 6.068$, $p = .003$, $\eta^2 = .052$). Planned contrast analyses revealed that participants' credibility perceptions were significantly higher if there was information about CA's information sources ($M = 5.81$, $SD = .94$) than there was information about CA's functioning ($M = 5.39$, $SD = .94$; $t(221) = 2.64$, $p = .009$) or no information ($M = 5.32$, $SD = 1.08$; $t(221) = 3.07$, $p = .002$), with no significant difference between the control conditions ($t(221) = .45$, $p = .652$).

To test H2, we conducted mediation analysis (10,000 resamples, Model 4; Hayes 2018) with use intention as the dependent variable, information source disclosure (information about CA's information sources vs. information about how the CA works vs. no information) as the independent variable, and perceived CA's information credibility as the mediator. We con- structed different contrasts to compare the individual groups. The results showed that disclosing information about CA's information sources had a significant indirect effect on use intention through perceptions of credibility (see Table 1 for more details), in support of H2.

Table 1. Summary of mediation results

Comparison	Indirect effect
Referencing information sources vs. control[+]	B = 0.53, SE = 0.18, 95% CI [0.194, 0.878)
Other information about CAs vs. control[+]	B = 0.08, SE = 0.18, 95% CI [-0.268, 0.430)
Referencing information sources[+] vs. other information about CAs	B = -0.45, SE = 0.16, 95% CI [-0.774, -0.133)
[+] reference point	

The findings of this research indicate that disclosing the sources that CAs use can increase consumers' intention to use CAs. This is because consumers associate higher credibility with the CAs' information when information about the sources they employ is available. Our results have implications for organizations that employ CAs, as they reveal that source disclosure is an effective intervention to enhance CA use intention. In addition, our results have implications for consumers and policymakers, as source disclosure can be an instrument to empower consumers. However, the heuristic use of this information, which requires further examination in subsequent studies, can also be detrimental to consumers. Finally, this re- search contributes to existing research by establishing the "source disclosure = information credibility" effect and applying it to broaden the understanding of CA use intention. This study is subject to several limitations that should be acknowledged. First, using a relatively homogeneous sample may limit the generalizability of the findings, as this population may not fully represent the broader diversity of consumer technological literacy levels. Second, the study was conducted in a single contextual domain, specifically a travel-related CAs. Future research should aim to replicate and extend these findings in more diverse settings, such as healthcare CAs, where privacy stakes and user expectations may differ substantially.

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“Is something missing…?” Exploring the emotional impact of a non-empathic chatbot on user experience in Canadian Insurance sector

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Extended abstract

Introduction and theoretical background

In an era where AI-digital transformation shapes the service landscape, AI tools have emerged as critical touchpoints in customer-firm interactions (Belanche et al., 2021; Pizzi et al., 2023; Kim and Im, 2023) by engaging users through conversational interfaces and creating value (Casaló et al., 2025). In sectors such as Insurtech, where interactions are infrequent yet often sensitive or emotionally charged, chatbots present significant potential for enhancing user experience (UX) (Riikkinen et al., 2018; Robson, 2015). According to Gartner (2022), chatbot integration is expected to cut labor costs by up to $80 billion by 2026, underscoring their growing strategic importance. However, alongside these technological gains, questions remain regarding how users emotionally experience such interactions, particularly when these bots lack the human touch.

Recent advancements in conversational AI design emphasize anthropomorphism, endowing machines with human-like features such as names, avatars, personalities (Ma et al., 2025; Crolic et al., 2022; Pizzi et al., 2023) and empathy, defined as a machine’s capacity to recognize and appropriately respond to users' emotions (Spring et al., 2019; Chiang et al., 2022). These features are increasingly seen as mechanisms to foster user engagement, trust, and disclosure (Kronemann et al., 2023). However, while empathetic cues can humanize the interaction and promote relational depth, they can also evoke discomfort or skepticism when perceived as insincere or manipulative (Grudin and Jacques, 2019; Rajaobelina et al., 2021; Belanche et al., 2024).

In the context of insurance, where consumers often engage in conversations involving accidents, claims, or financial disclosures, the stakes of trust and emotional alignment are particularly high (Ma et al., 2025). Scholars such as Spring et al. (2019) and De Kervenoael et al. (2020) suggest that empathy may serve as a catalyst for trust and satisfaction, especially when interactions involve vulnerability. Conversely, other studies have identified a potential *uncanny valley* effect, where excessive human-likeness without authenticity undermines UX (Chiang et al., 2022; Mori, 1970). This paradox raises the following question: what happens when chatbots lack empathy in customer-firm interactions altogether?

Although the literature on chatbot design has extensively addressed anthropomorphism and empathetic cues, it remains largely silent on the consequences of their absence, particularly from a psychological standpoint (Chi and Hoang Vu, 2022; Molina-Collada et al., 2021). Prior studies have predominantly focused on intention to use metrics, overlooking the deeper emotional responses and perceived authenticity of AI interactions in real-world service scenarios. While prior studies have extensively explored how empathetic chatbots shape user experiences, few have examined what happens when empathy is deliberately omitted from human, AI interactions, especially in emotionally sensitive industries like insurance**.**

This paper addresses that gap by investigating how users interpret and emotionally respond to a non-empathic chatbot in a real-world auto insurance quote scenario. Specifically, we explore how the absence of empathetic cues in chatbot interactions influences users' perceptions of trust and comfort with disclosing personal information (Klein and Martinez, 2023). In doing so, this research directly responds to recent calls from the Marketing Science Institute (MSI.org, 2024–2026) to deepen our understanding of consumer interactions with artificial intelligence (AI) technologies. Furthermore, it builds upon emerging literature that advocates for a more nuanced analysis of chatbot-user dynamics, particularly in emotionally sensitive service environments (Bălan, 2023; Blut et al., 2021). Recent national survey data reinforces this relevance: according to Léger (2023), Canadian consumers remain skeptical of AI systems**,** citing a lack of empathy as a key barrier to trust and effective decision-making. By combining the Retrospective Think-Aloud Protocol (RTAP) with Gioia's inductive coding framework, this study provides unique insights into the emotional void left by the absence of empathy, offering a rare perspective on the relational and cognitive dynamics triggered by emotion-neutral AI.

Methodology

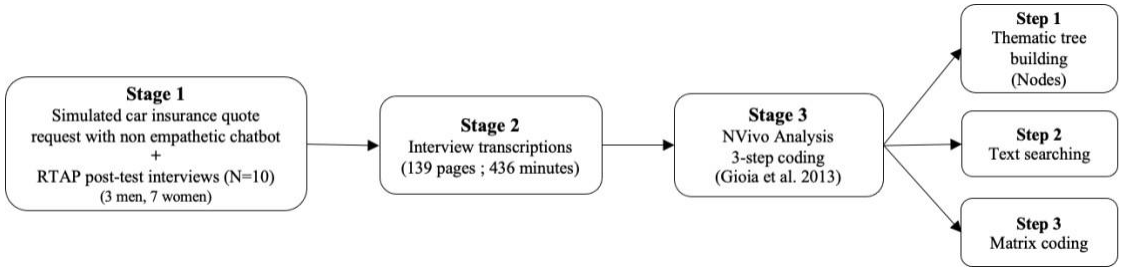
This qualitative study employed RTAP design to explore participants' emotional and cognitive responses to a non-empathic chatbot within the context of an auto insurance quote scenario. RTAP enabled participants to review a recording of their own interaction with the chatbot and verbalize their thoughts, emotions, and reactions, providing rich access to real-time cognitive and affective processes (van den Haak et al., 2003). The study followed a three-stage qualitative inductive design (Fig. 1). In the first stage, participants engaged in a simulated interaction with a non-empathic chatbot designed to handle an auto insurance request. To simulate realism and test anthropomorphic cues, the chatbot was presented with a human first name and a visual avatar.

The study presents the results of the second phase (N=10) of a large work in progress[b] , in which participants completed the same task but with a non-empathic version of the chatbot interface, exposed of emotional cues such as personalized acknowledgments, compassionate language, and social presence markers.

All participants were recruited voluntarily and participated remotely. Their interactions and subsequent interviews were conducted via Zoom, video recorded, and professionally transcribed. This dual-layer protocol, real-time chatbot interaction followed by immediate self- reflection, provided a rich corpus of qualitative data.

Data were analyzed using NVivo software and followed the Gioia et al. (2013) methodology to ensure analytical transparency and conceptual depth. The coding process included three tiers: (1) first-order participant-centric codes (verbatim expressions), (2) second-order researcher-centric themes (interpretive categories), and (3) aggregated dimensions (conceptual insights).

Figure 1: Methodological process of the study



Results

The thematic analysis draws three core aggregated dimensions that structure UX with a non- empathic chatbot in the context of auto insurance quotes: *Trust and Data Sensitivity, Humanization and Emotional Disconnect, and Efficiency vs. Emotional Resonance*. These themes encapsulate how the absence of empathy shaped participant attitudes toward privacy, interpersonal connection, and interaction quality.

Trust and Data Sensitivity

Participants were especially vigilant and cautious about the information they disclosed. Many emphasized discomfort sharing details like full names, exact home addresses, or Equifax credit access unless justified. P2 admitted, *"I hesitated with the credit info, I mean, who exactly sees it?"* P6 added, *"If you ask for my address, at least tell me why… it's too sensitive otherwise."*

While some participants had greater confidence due to their knowledge of financial tools, trust remained conditional. Despite recognizing the importance of certain information (e.g., age or driving history), users frequently emphasized the need for transparency and justification of each data request. As P10 expressed, *"I have no problem sharing credit info because I know my bureau and I trust it."* In contrast, P4 linked their caution to recent events: *"After what happened with Desjardins, you think twice before entering anything.*" P9 echoed this sentiment: "There's always that fear… even if it's on a company site, I don't really know who's behind the robot."

Participants consistently valued transparency: clear explanations for data requests encouraged disclosure. P3 suggested, "If the bot had said why they needed my zip code, like for risk calculation, I'd feel better." This demand for justification reflects an underlying skepticism, especially in automated settings.

Humanization and Emotional Disconnect

Although several users accepted the transactional nature of the chatbot, many perceived the absence of empathy as jarring, especially in emotionally relevant moments like declaring an accident. Transitions between questions felt abrupt, reducing their sense of being understood. As P8 highlighted, "They just moved to the next question… nothing. It felt like something was missing." Similarly, P7 shared, "I said I had an accident. No reaction. Not even a 'hope you're okay.' It felt cold."

While participants like P10 preferred a fast interaction, others P9, P6 noted they would have appreciated some acknowledgment: "Even a small message like 'I'm sorry you experienced that' would've shown they were paying attention." Yet others felt such cues would not add value unless truly meaningful. As P10 argued, "We're not here to talk about feelings. I want the most accurate premium as fast as possible."

Anthropomorphic features, such as photos or emojis, were described as either helpful or confusing, leading to diverse reactions. While some viewed them as useful: P9 “It made the question easier”, P1 noted "The little icons helped me choose fast,", however others found them disingenuous or even misleading, P8: “It felt like a scam, not a bot”, P5 disagreed, "It was weird. Like, why put a smiling face next to a serious question? It felt fake."

The results reveal that while not all users expect or desire emotional resonance, the lack of acknowledgment in clearly emotional moments (e.g., accident disclosure, dissatisfaction with prior insurers) was perceived as an oversight by several.

Efficiency vs. Emotional Resonance
A large majority of participants emphasized their preference for speed and clarity over emotional engagement. P3 noted, "Honestly, I don’t need sympathy. Just give me the quote so I can move on." While P10 added: "Efficiency is the priority. The human side doesn’t help if it wastes time." Still, several participants expressed appreciation for subtle interpersonal touches. P6 suggested, “Even a simple ‘thanks’ or ‘this helps us give you the best price’ would’ve made it smoother,” and P5 emphasized, “I’m not asking for a conversation, but small touches, like saying why they ask things, matter.”

Paradoxically, the absence of emotional cues made users more aware of the interaction’s robotic nature. P2 stated, "It was very obvious I wasn’t speaking to a person. And that made me less willing to share." P8 tied this directly to trust: "The whole thing felt automated. Like my info was going into a black box."

These insights underscore a key tension: while users welcome efficiency, an overly mechanical tone, especially in emotionally sensitive contexts like insurance, can undermine trust and diminish the overall UX.

Discussion, implications, limitations and future research
This study contributes to the literature by exploring a rarely examined scenario, UX with a non-empathic chatbot. It reveals that while empathy may not always be essential, its absence must be thoughtfully managed to avoid emotional disconnects in service delivery. The findings support a design approach that balances transactional efficiency with context-sensitive emotional engagement (Crolic et al., 2022; Pizzi et al., 2023).

Participant reactions seem to vary according to digital literacy, privacy concerns, and prior AI exposure. While some users appreciated the chatbot’s clarity and speed, others viewed the lack of empathy as mechanical and impersonal, especially during emotionally sensitive exchanges. These insights highlight that even minimal, strategically placed empathy can act as a relational signal, enhancing user comfort, trust, and willingness to disclose information. In contexts involving emotionally salient scenarios, such as recounting a previous accident or filing an insurance claim, subtle humanization can meaningfully enhance the perceived quality of chatbot interactions.

This study yields several actionable insights for organizations deploying chatbots in insurance and other data-sensitive service settings. First, transparent communication is critical. Clearly explaining the rationale behind each request for personal data, such as credit assessments or location-based risk factors, can significantly increase users’ willingness to disclose information. Second, anthropomorphic design elements should be used with restraint. While features like names, avatars, or emojis can enhance approachability, overly humanized cues may elicit discomfort or distrust if perceived as artificial or manipulative. Third, the integration of subtle, context-relevant empathy, such

as acknowledging dissatisfaction with a prior insurer or expressing mild regret after an accident, can help humanize the interaction. These empathic elements should be brief and strategically placed to avoid disrupting the flow or efficiency of the task. Finally, offering users more autonomy in the disclosure of sensitive data, such as postal codes or credit bureau access, can foster trust. Optional responses and clear justification mechanisms enhance perceived control, which is essential for sustained engagement and compliance in digital service contexts.

Yet, like other studies, this research is not without limitations. First, findings are context- specific to the Canadian insurance sector, where consumers may be less familiar with AI-driven interactions (Marshall, 2021), potentially limiting generalizability to other cultural or industrial contexts with more advanced AI integration. Second, the small sample size (N = 10) and focus on a single service setting constrain the breadth of insights; future studies should involve larger and more diverse participant groups to validate and extend these findings. Third, while this study captures rich qualitative insights, ongoing analysis of emotional timelines and mixed- method triangulation with a complementary empathetic chatbot condition (N = 12) are in progress to further refine and validate current interpretations.

This research forms part of a broader comparative design that aims to examine how the presence versus absence of empathy influences emotional responses, trust formation, and willingness to disclose sensitive information in service encounters. In addition, longitudinal designs could assess the impact of repeated exposure to non-empathic chatbots over time. Future research should investigate how individual differences and consider user-level moderators such as trust propensity, digital literacy, emotional intelligence and pre-interaction expectations shape user experiences and perceptions of empathy in chatbot design across service contexts. A mixed-methods approach combining sentiment analysis and RTAP could provide deeper insight into the emotional dynamics of human-chatbot interaction. Finally, further studies should explore how users' familiarity with AI and their pre-interaction expectations shape emotional responses and overall user experience, to better inform empathetic chatbot design across service environments.
To enhance methodological robustness, future research can complement the present findings through quantitative approaches such as large-scale surveys or experimental designs, to assess their generalizability across diverse user populations. In addition, integrating neuromarketing physiological techniques such as eye-tracking, galvanic skin response, or facial emotion recognition, alongside RTAP would allow for the capture of non-verbal and subconscious emotional cues, offering a more holistic and nuanced understanding of user experience in AI- mediated service interactions.

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AI-Driven Advertising: Enhancing Brand Evangelism through Coolness

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Extended abstract

Introduction

The digital age has transformed advertising, introducing new channels, shifting consumer behavior, and accelerating technology (Ciarli et al., 2021). Brands like Coca-Cola, Nike, and BMW use AI to stand out (Cui et al., 2024). Research shows consumers struggle to distinguish AI-generated from human-made ads, raising concerns about authenticity (Lee & Kim, 2024; Magni et al., 2024). Despite growing research on AI and advertising, the impact of ad creativity on brand coolness and consumer behavior remains underexplored, especially regarding brand evangelism (Warren et al., 2019; Rodrigues et al., 2023).

Grounded in schema theory, this study uses a quantitative approach to: (1) explore the link between advertising creativity and perceived coolness, and (2) examine how coolness impacts brand evangelism in AI-generated advertising. Brand evangelism describes a strong, personal bond where consumers passionately promote a brand beyond casual support (Schnebelen & Bruhn, 2018). This study builds on existing theories (Becerra & Badrinarayanan, 2013) to explore how coolness deepens engagement, and to investigate how cool AI-generated ads can turn consumers into devoted brand advocates.

Hypotheses Development

Warren et al. (2019) identified ten traits of coolness, with usefulness and originality being key. These traits relate closely to novelty and meaningfulness. Cool brands are seen as innovative and trendsetting, with novelty aligning them with cultural movements (Batra *et al*., 1996; Rosengren *et al.,* 2020). Usefulness adds to their coolness by providing practical value and clear messaging, while meaningfulness ensures ads resonate with consumers' values and aspirations (Ang *et al.,* 2007). Together, these elements shape perceptions of brand coolness, leading to our hypotheses:

H1: Ad novelty impacts ad coolness.
H2: Ad meaningfulness impacts ad coolness.

Perceived brand coolness boosts consumer affection, engagement, and brand equity (Rodrigues et al., 2024). A cool, resonant ad can transform viewers into brand advocates, deepening emotional bonds and driving brand evangelism by encouraging the sharing of positive experiences (Schnebelen & Bruhn, 2018). Thus, we propose that:

H3: Ad coolness impacts brand evangelism.

Method

To meet the study's objectives, we conducted a survey with 362 participants. Participants viewed an AI-generated advertisement – Coca-Cola's *Masterpiece* campaign – before completing a questionnaire. The survey measured advertising novelty and meaningfulness (Im et al., 2015), brand coolness (Warren et al., 2019), and brand evangelism (Mansoor & Paul, 2022), with data analyzed using SmartPLS4.

Results and Discussion

The model shows no issues with reliability, discriminant validity, or multicollinearity. Structural results confirm all hypotheses. Higher perceptions of novelty ($\beta = 0.390$, $t = 6.153$, $p < 0.001$) and meaningfulness ($\beta = 0.097$, $t = 2.071$, $p < 0.001$) enhance ad coolness. H1 aligns with prior research (Im *et al.*, 2015; Rosengren *et al.*, 2020), showing that AI-generated ads stand out when perceived as novel.

H2 confirms that meaningful ads addressing social issues, aligning with values, or telling compelling stories are perceived as cooler (Ang et al., 2007; Rosengren et al., 2020), enhancing creativity and engagement. H3 shows that cool ads drive brand evangelism, fostering loyalty, emotional connection, and shareability (Tiwari et al., 2021; Rodrigues et al., 2024).

Conclusion

This study challenges the notion that creativity is uniquely human, showing how generative AI produces original, meaningful content (Magni et al., 2023). Our findings reveal that when AI reflects brand values, it boosts authenticity, emotional appeal, and perceived coolness (Guerreiro & Loureiro, 2023). Extending prior work linking coolness to brand love and desire (Tiwari et al., 2021), this study highlights its role in driving brand evangelism, advancing theories of consumer advocacy (Becerra & Badrinarayanan, 2013; Schnebelen & Bruhn, 2018).

Despite its insights, this study has limitations. Negative perceptions may stem from fears about AI and its lack of human traits (Magni *et al*., 2023). Participants knew AI was used but not how much. Future research should clarify AI involvement.

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Exploring the intersection between eSports and Metaverse business models

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Extended Abstract

Introduction

The eSports industry has experienced rapid evolution as the number of users is expected to reach just over 770m within 2025 and have a projected market volume of US$5.9bn by 2029 (Statista, 2025). However, it's apparent that sustainable business models within the esports ecosystem remain underdeveloped (Nystrom et al., 2022), as issues such as financial precarity (Hutchinson et al., 2024) and untapped consumer revenue still exist (Mangeloja, 2019). Therefore, employing innovation towards existing esports business models is crucial as the industry can then position themselves to facilitate growth (Ji & Hanna, 2020).

With this in mind, the concept of the Metaverse provides new opportunities to change the landscape of eSports as Metaverse business models fuel value creation and monetization strategies (Visconti, 2022). However, the adoption of these models does come with risk as high entry cost (Proelss et al., 2023) and price volatility can occur (Ruggeri et al., 2024). This research will contribute to future studies by establishing a theoretical foundation on the intersection between eSports and Metaverse business models. In particular, this study aims to focus on the following two research questions:

RQ1: What are the strengths and weaknesses of existing eSports business models
RQ2: What are the opportunities and risk of implementing Metaverse business models

Methodology

A scoping review was conducted to identify and analyse literature on existing business models within eSports and entertainment and the Metaverse. The data searches were retrieved from Scopus and Web of Science. Only peer reviewed journals were selected to guarantee a consistent level of rigor and reliability in the research. The search combined several key words such as “Metaverse”, “eSports” and “business models” to narrow down the focus towards the overall question. Only publications from 2018 onwards were observed as the rapid evolution of both eSports and the Metaverse industries require the latest academic contributions. From this, a total of 319 journal articles and reviews were collected. After the removal of duplicates, 264 were screened and 216 were assessed for further eligibility following the exclusion of non- related abstracts. As a result, 74 documents were included in this scoping review.

Discussion

In the context of eSports, the industry has challenged traditional business models (Scholz, 2020), as the disruptive nature of eSports has transformed existing sports and entertainment revenue into new strategies (Roth et al., 2023). In relation to this, Table 1 provides a summary of several business models within eSports.

Table 1. Business models in eSports

Name	Type of business model	Description	Author/s
Free-to-Play (F2P)	Business to Consumer (B2C)	Free-to-Play provides a large amount of video game content to the play for free of charge but derive their income from in-game microtransactions which can enhance the in-game experience for the player.	(Alimamy *et al.*, 2023)
Live Streaming	Business to Consumer (B2C), Consumer to Consumer (C2C), Business to Business (B2B) and Consumer to Business (C2B)	Twitch, Facebook Gaming and YouTube are the most well-known streaming platforms, handing the process of transmitting video games in real-time over a live broadcast platform and allowing the interaction between those who participate in the game and those who watch and communicate with the streamer or other viewers.	**a** (Cabeza-Ramirez *et al*., 2020) and **b** (Mancini *et al*., 2020)
eSports Tournaments	Business to Business (B2B), Business to Consumer (B2C) and Consumer to Business (C2B)	eSports has incorporated a professional element online games, offering networks of teams and tournaments that gamers can either watch or compete in.	**a** (Scholz, 2020) and **b** (Micallef *et al*, 2023)
Sponsorshi	Business to Business (B2B), Consumer (B2C) brands. and Consumer to Business (C2B)	Players are often sponsored by franchises or teams, just as traditional sports, with teams sponsored by endorsement	(Lehnert *et al*., 2022)

a (original author/s of quote), b (author/s of quote used in this abstract)

Regarding the strengths and weaknesses of these business models, F2P has a low barrier of entry as games such as Fortnite succeed in building a free access digital environment while simultaneously monetising players (Sax & Ausloos, 2021). Nevertheless, this concept also creates player inequality as premium players pay for in-game advantages, whereas free players, rather have a balanced experience (Sánchez-Cartas, 2022). From a live streaming standpoint, Twitch and YouTube offer eSports strong exposure (Kelly & Van der Leij, 2020), however the concept of user donations (Mazza & Russo, 2023), can also be unpredictable as viewer engagement fluctuates. In relation to eSports tournaments, the most popular tournaments are drawing in millions of online spectators worldwide

(Ekdahl & Ravn, 2019), yet the size of these eSports stadiums do prevent teams from getting a larger income from merchandise (Mangeloia, 2019). Furthermore, sponsorship has naturally become a major revenue stream for eSports as brands target ever-younger audiences (Elasri-Ejjaberi et al., 2020), however the reliance of this revenue exposes a key financial vulnerability of the industry (Hutchinson et al., 2024).

In regard to this, the Metaverse has the potential to revolutionize industries such as gaming and entertainment (Shen et al., 2021), as the virtual environment can stimulate innovation or generate completely new business models (Cristache et al., 2024). As it pertains, Table 2 summarizes emerging Metaverse business models in eSports and entertainment.

Table 2. Metaverse business models adopted in eSports and Entertainment

Name	Type of business model	Description	Author/s
Play-to-Earn (P2E)	Business to Consumer (B2C) and Consumer to Consumer (C2C)	P2E games offer transparent and secure transactions, not to mention elevated financial inclusion. Individuals who might not have access to traditional financial systems can participate and earn income through gaming.	(Duguleană *et al.*, 2024:487)
Decentralized Autonomous Organizations (DAOs)	Business to Consumer (B2C) and Consumer to Consumer (C2C)	In a full-fledged DAO, there are no hierarchical organisational structures or centralised authority systems. Rather, all firm management and operational rules are based on cooperation and collective decision-making and encoded on tamper-resistant blockchains.	**a** (Wang *et al*., 2019) and **b** (Zhan *et al.*, 2023)
Virtual Stadiums	Business to Consumer (B2C), Consumer to Consumer (C2C) and Business to Business (B2B)	Virtual stadiums exemplify metaverse concept by allowing users to interact with each other, participate events and engage in communal activities.	(Jo & Shin, 2024)

Virtual Real Estate	Business to Consumer (B2C), Consumer to Consumer (C2C) and Business to Business (B2B)	The concept of "meta-estate" within the context of the metaverse as a virtual property that can be brought, sold, rented, or used to run a activity within one of the Metaverse's platforms.	(Ruggeri *et al.*, 2024:01)

As for the opportunities and risk of Metaverse business models, P2E offers ownership of digital assets by exchanging effort and time for entertainment (Proless et al., 2023). However, P2E awards can also become very diluted as many competitors are trying to earn an income (Delfabbro et al., 2022). In relation to DAOs, users and complementors influence platform decisions as they shift the power of balance among ecosystem participants (Tingelhoff et al., 2024). Nevertheless, DAOs can face conflict of interest as large token holders (whales) can potentially manipulate votes (Han et al, 2025). In terms of virtual stadiums, they have the potential to generate new revenue through digital merchandise sales (Cunningham & Ko, 2024). Yet, the consumer experience can be hindered by the restricted sensory input (Koohang et al., 2023), meaning the lack of physical presence of fans may reduce user spending. Additionally, the concept of virtual land allows companies to commercialise goods and services as well as create immersive experiences (Ante et al.,2023) That said, predicting the development of Metaverse platforms and which lands will increase and decrease in value is extremely challenging (Ruggeri et al., 2024). Following this, Table 3 provides further analysis on eSports and Metaverse business models' strengths, weaknesses, opportunities and risk.

Table 3. Analysis of eSports and Metaverse Business models

Name	Strengths	Weaknesses	Opportunities	Risks
Free-to-Play (F2P)	Low barrier of entry for players	Creates player inequality	Revenue from in-game purchases	Attachment to microtransactions
Live Streaming	Strong exposure via streaming platforms	Viewer donations are unpredictable	Real-time fan engagement	Dependency of specific platforms
eSports Tournaments	Global reach of online spectators	Stadium size limits merchandise revenue	Wider brand visibility via media rights	Audience disconnection
Sponsorship	Major revenue stream for teams and events	Financial vulnerability	Long-term partnerships	Overcrowding of sponsors
Play-to-Earn (P2E)	Incentive to earn rewards	Creates Pay-To-Win culture	Ownership of digital assets	Diluted players awards

Decentralized Autonomous Organizations (DAOs)	Transparency of decisions via the blockchain	Lack of voting participation from token users	Ecosystem power shifts with users	Conflict of interest from 'Whales'
Virtual Stadiums	Enhancement of fan engagement	User acceptance	Revenue from digital merchandise	Sensory restrictions limits spending
Virtual Real Estate	Digital ownership	High barrier to entry	Creates immersive experiences	Uncertainty around land value

Conclusion

In summary, this research shares critical insights into the strengths and weaknesses of existing eSports business models as well as the opportunities and risk of implementing metaverse- driven models. This study also highlights how the Metaverse can influence the future of eSports by providing a starting point for the industry's long term future. In terms of limitations, this study only uses peer reviewed journal articles as credibility was required. Along with this, further exploration of eSports and Metaverse business models is recommended as the boundaries of this abstract prevent deeper investigation.

For future research, the development and testing of a new Metaverse eSports business model will drive change, create new business opportunities, and reveal new ways to create value for customers. The collection of primary data will help validate this by providing direct insights from stakeholders within eSports and the Metaverse. This is important as expert opinions will help identify existing challenges and ensure that the proposed model aligns with the demands of the eSports and entertainment industry.

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The Netflix Experience

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Keywords: art; immersive; entertainment; film; science; technology; tourism

Extended abstract

Introduction

While immersive entertainment and technologies have received a good deal of popular press but in the case of entertainment especially, not much academic press. This extended abstract is designed to solicit feedback to lay the foundation for research on immersive entertainment using The Netflix House (USA) a 100,000 square foot facility in King of Prussia, Pennsylvania (USA) opening in late Fall, 2025.

Background

The global immersive entertainment market size is expected to reach USD 426.77 billion by 2030, growing at a compound annual growth rate (CAGR) of 23.6% from 2023 to 2030 (Grand View Research, Inc., 2023). The idea is simple: "to create simulated environments where the user experience is entirely engaging. The entertainment industry has been the biggest investor in immersive technology" (Sid, 2022). Film led the way (Recuber, 2007).

Art, music, fashion and tourism have followed. Art galleries (Weiner, 2022) are using immersive technology to enhance the customer experience and art tourism is as a result growing (USA Today, 2024). Music in an immersive environment is galactic system of art and science (Allan, 2024). Fashion immersion was on the runway at Fashion Week in the UK (Wade, 2023) and New York (National Geographic, 2024). Theme parks (Niu & Feng, 2022). Even cruises are taking the dive (Zelinski, 2023). Immersive Entertainment is clearly on the rise (McGowan, 2022).

The Netflix House

It will give the term ***stream of consciousness*** a whole new meaning. It is schedule to open this year (2025) in King of Prussia, Pennsylvania (USA). It's the Netflix House (Appendix 1). "At Netflix House, you can enjoy regularly updated immersive experiences, indulge in retail therapy, and get a taste, literally, of your favorite Netflix series and films through unique food and drink offerings," says Marian Lee, Netflix's Chief Marketing Officer. "We've launched more than 50 experiences in 25 cities, and Netflix House represents the next generation of our distinctive offerings. The venues will bring our beloved stories to life in new, ever-changing, and unexpected ways." (Goldblatt, 2024).

Features of The Netflix House

1. Immersive experiences: Visitors will be able to explore replica sets, dance like characters from Bridgerton, and compete in challenges based on shows like Squid Game
2. Food and drink: Visitors can try food inspired by Netflix shows and drink offerings
3. Shopping: Visitors can shop for exclusive merchandise
4. Sculptures and murals: Visitors can see sculptures and a mural featuring characters from popular Netflix titles

Strategic Benefits of The Netflix House (Clark, 2024)

1. Enhanced Customer Engagement
2. Strengthened Brand Loyalty
3. Creation of New Revenue Streams
4. Immersive Experiences as Marketing Tools
5. Feedback and Innovation Platform

Possible Future Research

Immersive entertainment (Legas, 2021).

1. Understanding presence and user experience
2. Creating believable characters and engaging storytelling
3. Design of novel interaction techniques
4. Improving rendering, tracking, and space understanding
5. Exploring uses for physiological sensing and biofeedback
6. Creating better social experiences
7. Safeguarding users and promoting responsible design
8. Improving and democratizing content generation

Conclusion

Many believe that "the future is immersive" with "the lines between the different types of immersive location-based entertainment blurring" (Amirsadeghi, 2020). In 2023, the next big immersive thing was the Sphere in Las Vegas (Netflix is going into Las Vegas too, Appendix 2). In 2025, it's The Netflix House in KOP (Appendix 3), both immersively (Rainer, 2025) and digestively (Bossleman, 2025). Better buckle your virtual seatbelt!

Appendix 1.

Appendix 2

Appendix 3

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How innovation potential differs: the mixed-effects models of digital transformation across regions and industries

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Type of manuscript: Extended abstract

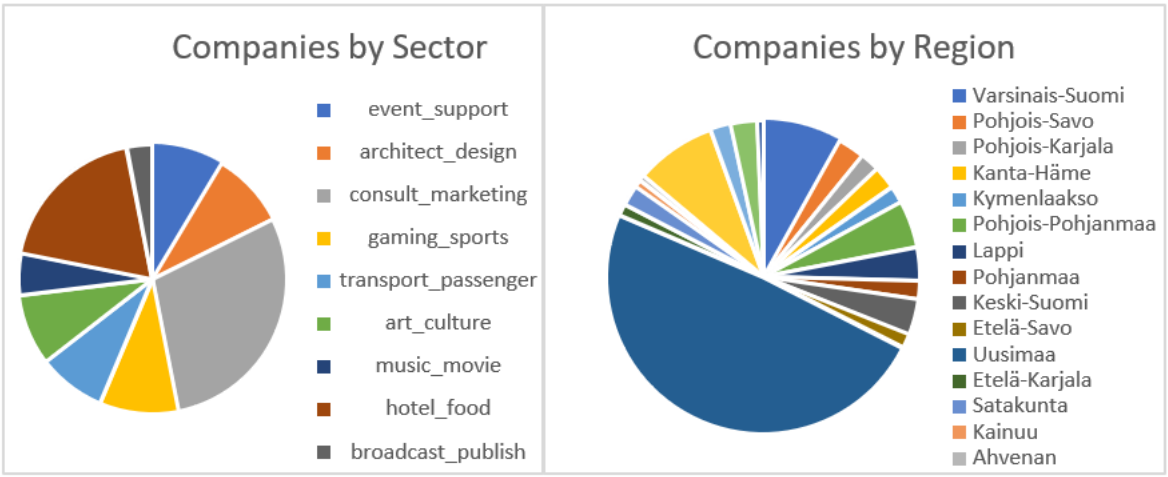
Keywords: digital transformation; innovation potential; big data

Extended Abstract

Digital transformation (DT) is a multifaceted process that requires a comprehensive understanding beyond traditional frameworks. A network perspective is crucial to understanding the full scope of DT, emphasizing the significant roles of collaboration and cooperation, which are often underexplored in literature (Kraus et al., 2022). Knowledge management and transfer are central to this perspective, as they occur within the context of networks(Ferrer-Serrano et al., 2022). Knowledge and skills do not emerge in isolation; they are shared and cultivated within interconnected systems, highlighting the importance of network structures in the diffusion of innovation and technological advancements (Borgatti & Cross, 2003; Nonaka & Takeuchi, 1995).

Furthermore, the specific configuration of networks, whether they are regional or industry- specific, plays a pivotal role in shaping the opportunities and constraints associated with DT. These networks influence the flow of information and resources, which in turn affects the capacity for innovation and competitive advantage (Powell et al., 1996). The position of entities within these networks, whether at the core or the periphery, determines their access to critical resources and information, influencing their potential to leverage DT for strategic benefits (Freeman, 1978; Granovetter, 1973).
We assume a firm's network position and contextual factors significantly mediate the translation of technological adoption into innovative outcomes. This study explores the pivotal role of network structures in shaping the outcomes of digital transformation, with a particular focus on how network positions influence the adoption and impact of digital technologies across diverse contexts. By analyzing a digital ecosystem of 10,653 companies spanning nine industry sectors and all 19 regions of Finland, we investigate how digital adoption affects innovation potential.

Figure 1. Companies by Sector and Region



Our focus on innovation potential, rather than innovation itself, stems from the recognition that digital technology is a necessary but insufficient condition for enhancing innovation capacity (Ferrer-Serrano et al., 2022). Innovation potential is measured through Simmelian brokerage. This network metric captures a firm's ability to bridge distinct network clusters, facilitating collaboration and idea exchange (Latora et al., 2013; Tasselli et al., 2025). We then employ linear mixed-effects models to disentangle the mechanisms that enable or hinder DT through exam the fixed effects of digital adoptions and random effects of sectoral and regional factors.

The Simmelian brokerage metric is defined as:

(1) $B_i=k_i-(k_i-1)E_{loc,i}$ Where:

- B_i is the Simmelian brokerage score for node *i*
- k_i is the degree of node *i*,
- $E_{loc,i}$ is the local efficiency of node*i*

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Consumer resistance to artificial intelligence-based frontline service technologies – A mixed-methods research

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Extended abstract

The world is witnessing a proliferation of artificial intelligence-based frontline service technologies (AI-based FSTs) such as robots, chatbots, and AI-based self-service technologies (SSTs), especially since the COVID-19 pandemic (Li et al., 2021). FSTs are "any combination of hardware, software, information, and/or networks that supports the co-creation of value between a service provider and a consumer at the organizational frontline" (De Keyser et al., 2019, p.158). In service industries such as tourism, retailing, healthcare, financial services, hospitality, and social services, managers attempt to address the growing demand for service by introducing AI-based FSTs (Li et al., 2021; Wang et al., 2023). For example, travelers use AI trip planners to book flights, hotels, and other travel services.

AI-based FSTs allegedly offer substantial advantages in service delivery (increased consistency, speed, and personalization) and operations (cost reductions, greater efficiency) compared to human employees due to their advanced information processing capabilities (Fernandes & Oliveira, 2021; Gursoy et al., 2019). However, the introduction of every new technology brings challenges, and AI-based FSTs are no different in that respect. Consumer resistance to innovation is an aspect of consumer behavior that is as important as acceptance and adoption (Seth et al., 2020). In its simplest form, consumer resistance may be seen as the unwillingness among consumers to try newer innovations in the market (Talwar et al., 2020), such as AI-based FSTs. Despite the availability of these innovations, many consumers are hesitant to engage with them, presenting a significant barrier to their full integration into service industries.

Even though some recent studies have explored various factors influencing the adoption, like trust (e.g., Chi et al., 2023; Gursoy et al., 2019), anthropomorphism (Cai et al., 2022; Pillai & Sivathanu, 2020), and perceived intelligence (Pillai & Sivathanu, 2020), the underlying mechanism is still unclear. This customer skepticism underscores the ongoing challenges for the hospitality and tourism industry, which has traditionally relied on human interaction and relationship-building as core elements of service delivery. Because customers may feel less intimidated when nonhumanoid and less anthropomorphic AI is placed in private service contexts (e.g., Hu & Min, 2023). Given the transformative potential role of AI-based trip planners in the tourist decision journey, empirical research from the tourist perspective on consumer acceptance and use of AI-based trip planners remains limited (Gursoy & Cai, 2024). Therefore, understanding the reasons behind consumer resistance to AI-based trip planners is beneficial for marketers seeking to promote their adoption.
To address these research gaps, this study aims to investigate the barriers that lead to consumers' resistance to using AI-based trip planners. This study asks: (1) What key barriers influence consumers'

use of AI-based trip planners? (2) Do these barriers influence consumer resistance to AI-based trip planners? To answer these research questions, this study used a mixed-methods approach, which was encouraged by a recent systematic review on consumer innovation resistance (Huang et al., 2021) to advance the seminal work in this area. The study involves two phases. Phase 1 involves conducting sentiment and content analysis of online consumer reviews to identify common perceived barriers to using AI-based trip planners. Finally, in Phase 2, we will propose hypotheses and use structural equation modeling to test the model. The results identified seven barriers to using AI-based trip planners: functional, compatibility, communication, privacy concerns, aesthetic, price, and responsiveness. Consumer resistance occurs in response to the functional and compatibility barriers, whereas communication barriers, aesthetic barriers, privacy concerns, price, and responsiveness barriers have no statistically significant effect. The study advances innovation resistance theory and hospitality literature by identifying new barriers inhibiting consumers from using AI-based trip planners. Notably, the study provides insights into enabling the faster diffusion and active adoption of AI-based trip planners in the hospitality industry. Finally, the results will provide practical guidelines for hospitality managers or app designers to extend AI-based services and enhance consumer experience

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Exploring consumer knowledge and perceptions of AI-driven marketing technologies. The case of virtual assistants

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Type of manuscript: Extended abstract

Keywords: artificial intelligence, virtual assistant, usability

Extended abstract

The contemporary global landscape is experiencing a digital information revolution, with artificial intelligence (AI) playing a pivotal role in marketing (Verma et al., 2021). Projections indicate that business investments in AI are expected to generate an economic impact of approximately $19.9 trillion by 2030. In the EU, 75% of firms are predicted to use AI or related tools, especially big ones (Figure 1). AI not only adapts to user profiles but also offers additional advantages (Table 1, Jarek & Mazurek, 2019; Pionce et al., 2022). AI has revolutionized company-client relationships, with chatbots and virtual assistants (VA) supplanting traditional customer service systems. While image recognition, text recognition and decision-making are applied quite extensively in marketing, the practical applications of voice recognition are less and developed only by the biggest tech companies such as Amazon, Google, Apple, or Microsoft on a large scale.

Given AI's deep integration into daily life and lack of empirical insight into Spanish consumer perceptions and use of VA, this exploratory study aims to evaluate general knowledge about this technology. Specific *objectives* include assessing perceptions of AI usability, concerns, security, and the impact of AI-generated advertising on shopping intentions in the case of VA.

RQ1: What are the perceptions of AI and VA by users? RQ2: How is perceived system usability of VA?

AI is defined as the development of computer systems capable of performing tasks that normally require human intervention, such as visual perception, speech recognition, decision- making, and language translation (Jarek & Mazurek 2019, p. 2; Sheikh et al., 2023). AI technology can emulate cognitive functions attributed to human reasoning, such as problem- solving and learning (Syam & Sharma, 2018). Besides, AI-enabled digital marketing is revolutionizing the way organizations create content for advertising campaigns, generate leads and manage customer experiences (Van Esch & Black, 2021). However, the rapid advancement of AI has incited intense ethical debates and other challenges, including privacy protection, less digital confidence and psychological and sociological risks (Naz and Kashif, 2025; Puntoni, 2021, UNESCO, 2023; NOTS, 2024). In response, there are regulatory proposals for AI development and usage to ensure security, transparency, and respect for fundamental rights.

Although several studies refer both to chabots and VA (Vijaykumar et al., 2024), they are different. On the one hand, chatbots enhance customer experiences on websites by reducing search time and providing tailored services (Anaya et al., 2024) and promote entertainment, creativity and social interaction (Brandtzaeg & Følstad, 2017) (see Figure 2 for perceived benefits). However, they should show human behavioral traits such as warmth and competence (Casaló et al., 2025).

On the other hand, AI-powered assistants, such as Alexa and Siri, employ natural language processing and machine learning to deliver personalized responses, better customer service, guidance akin to human agents and strengthen long-term brand loyalty (Følstad & Skjuve, 2019; Kedi et al., 2024). The proliferation of VA is attributed to shifts in user behaviour within the post-app mobile environment and key technological advancements, the popularity of messaging applications and more businesses investing in conversational AI (Pionce et al., 2022). VA can also help to enhance VR-based retail shopping experiences as avatars are a useful type of voice-enabled AI, as Bigné et al. (2024) applies in furnishing homes. In this context, usability is paramount, necessitating that VA perform tasks efficiently with minimal effort.

As for the *empirical study*, first, a pre-test was performed based on qualitative interviews with 4 colleagues and 5 students to explore RQs and derive interesting variables for a subsequent quantitative study. Second, in order to collect primary quantitative data, a convenience and snowball sampling method was employed, resulting in 106 valid online interviews by the end of 2024 (53% female users, 48% under 24 years old, and 62% university students). Likert-scale questions assessed usage frequency, perceptions of AI-generated advertising (5 items developed from previous qualitative study, alpha Cronbach>0.7), and usable and security concerns included in the System Usability Scale (SUS) (9 items based on Cordero et al., 2022 and applied to VA). IBM SPSS software was used.

The primary concern, identified by 47% of respondents, was data security and privacy, followed by concerns regarding information accuracy and an overreliance on technology (Figure 3). In terms of familiarity with AI devices, chatbots and VA are the most recognized, with 58% of the sample acknowledging them. However, only 31% possess a VA at home. Among these users, 78% utilized it at least weekly, citing speed as a significant advantage. Reasons for not having a VA are mainly low curiosity (38%) and lack of opportunity (29%) (Figure 4), while reasons for not engaging in purchases included not knowing the possibility (25%) and a preference for in-person shopping (25%) (Figure 5).

Participants assessed the SUS of VA through Likert-scale questions (Table 2). Notably, only 21% recommended AI-based shopping, while 52% felt confident using the technology. A factor analyses was performed and two dimensions found are complexity and ease and security of use (explained variance 68%) (Table 3). Reliability of each dimension was higher than 0.7 according to alpha Cronbach.

Regarding consumer perceptions of AI-driven advertising, most interviewees appreciated tailored advertisements, believed that VA understood their interests and needs, yet remained hesitant to make purchases through their devices. Concerning the preferred type of personalization, 55% of the sample consumers desired exclusive promotions, and 27% sought recommendations based on purchase history. There are also some gender statistically significant differences. More women than men have VA (χ^2 test= 0.081), use it more frequently (χ^2 test=0.07) and are willing to use it for shopping (χ^2 test=0.07).

In sum, the rapid advancement of AI presents opportunities for companies to engage with customers through VA in a more satisfactory e-retailing environment (Chen et al., 2021). Companies must understand consumer perceptions when designing their strategies and ethically integrate these tools into marketing and segmentation plans, ensuring they are usable, accessible and with personalized advertising. A *limitation* due to small convenience non- representative sample does not allow generalization of results. Moving to research on B2B contexts and/or genAI systems could be next steps for follow-up studies.

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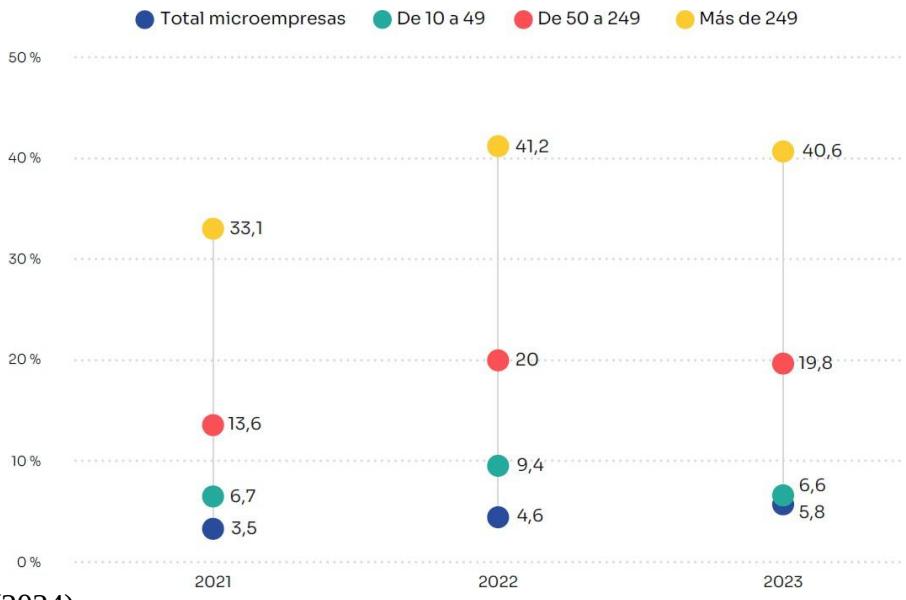
TABLES AND FIGURES

Figure 1. Spanish companies' use of AI



Source: NOTS (2024)

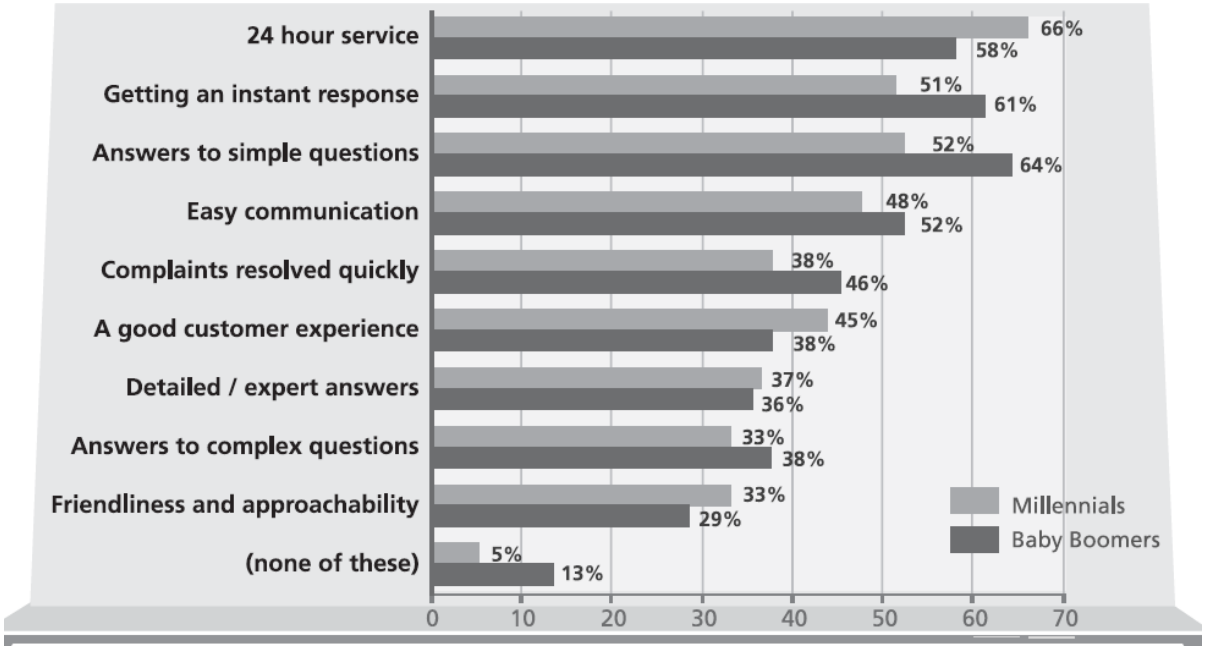
Table 1. Examples of application of AI in marketing

AI areas	Examples of application in marketing
Voice Processing technologies	• Voice purchase requests made through a device or the Amazon Alexa app. • Virtual assistants are supporting task execution (Siri, Google Home, Cortana).
Text processing technologies	• Use of a virtual assistant as a guide to walk you through a shopping centre (Alpine.AI). • A virtual assistant embedded in a mobile bank app, taking advantage of NLP, handles client requests alone by responding to their inquiries. A virtual assistant is presenting application features, options to make a purchase of bank products by oneself, and providing information about the location of bank branches and cash machines (ING Bank Śląski). • A GPS navigation system that apart from showing the route to the selected destination suggests attractions found nearby or on the way to the destination, and shows similar objects to those related to the set destination (Naver). • An analysis of statements made by clients of banks, insurance companies, and telecoms performed in order to diagnose irritating situations, which led to the elimination of negative events that might occur in the customer journey, and to modification of the customer service process (Touchpoint). • Development and launch of new beer recipes, and modification of the existing products thanks to information gathered by a chatbot (Intelligentx Brew). • Development of a marketing campaign to launch a new car model - the Toyota Mirai. Using data provided by a selected target group, computers performed an analysis of texts and videos on YouTube in order to teach the machines the preferred style of the said target group. Next, through multiple iterations, they developed the first creative advertising campaign, and the final texts for the adverts were approved by the supervising team. The result was almost a thousand of advertising spots tailored to the profiles of the ad recipients on Facebook (Toyota, Saatchi&Saatchi). • Promotion of the *Milonerzy* TV show, the Polish edition of *Who Wants to Be a Millionaire?*, on Facebook taking advantage of a conversational chatbot. Maintaining the format and the style typical of the show made it possible to offer new and unique experience (TVN).
Image Recognition and processing technology	• Face recognition as a way to make payments (KFC). • Recognising the condition of face skin, followed by an individual selection of the type of face cream based on an analysis of one's photo and data, including information about the current weather (Shiseido). • A photo as a medium to search for items online. Apart from search results in the form of identical items, the search engine offers similar or complementary items (eBay). • Using the client's face image to select colour cosmetics individually during online shopping (Estée Lauder). • Service-free bricks and mortar shop where video cameras analyse the selected products and payments are made automatically (Amazon). • Electronic mirrors in a clothing shop that match the collection to the client's appearance, style, and taste (FashionAI). • Selection of the best Christmas gift by going through twelve best suggestions. Based on the recognition of the buyer's face and emotion analysis, the programme suggested the best option to go for (eBay). • Identification of clients before the start of a video consultation by comparing the video image with a photo provided earlier by the client (BBVA). • Embedded ML mechanisms make it possible to automatically frame images according to the requirements of the brand and communication channels (Adobe Sensei). • An image finder that makes it possible to select the best photos and reject the less appealing ones (Everypixel).

Decision-makig	• Development of individual savings plan thanks to an analysis of the funds available on one's account, receipts, amount of expenses and the way one spends their money. By comparing the financial behaviour of a user and a given community, the application develops a tailor-made savings plan to match the financial capabilities of a given person (Plum). • Travel destinations matched individually based on the traveller's musical preferences. Apart from the city, the app chooses specific districts and attractions to match the user's profile (Spotify, Emirates). • A chatbot is preparing a cocktail recipe using the ingredients the consumer has at home and based on the consumer's preferences. The chatbot analyses 300 recipes and offers the best-matched solution (Diageo Simi Bartender). • Based on the user's mobile phone data (location, sun exposure time), the app indicates the right level of UV protection filter (Monteloeder). • Dynamic matching of prices to the user based on their shopping record visited websites, or the owned mobile phone (iperfumy.pl, kontigo.pl). • Matching adverts to user characteristics based on one's online history (ING Bank Śląski). • New product recommendations (Amazon, Netflix). • GO-I-PACE, an application is analysing one's driving style, route choices, and frequency of charging the car (electric car). Based on the results, the app offers suggestions on how to drive the care in a more efficient and effective manner (Jaguar I-PACE). • ZozoSuit helps customers order clothes fitted perfectly to their figure. Thanks to in-built 150 sensors, ZozoSuit makes it possible to take 150,000 measurements (Start Today, StretchSense). • A platform to manage marketing campaigns online. In the first weeks, AI learns the specificity of a given company, then, based on data analysis, comes up with recommendations concerning the campaign strategy (Albert AI, Harley Davidson). • Detecting faults and errors in product functioning and forecasting malfunction occurrences. The synchronisation of the work performed by the technical team responsible for device (lift) monitoring and repair works (if necessary) (KONE, IBM Watson IoT, Salesforce Einstein). • Creation of a consolidated customer record regardless of the products purchased and used, linking customer data from every company area (Sales Cloud Einstein, U.S. Bank). • Synchronisation of customer data from all possible points of contact with the brand (social media, website, e-mail, phone conversation). All interactions are aggregated and presented in one place in order to offer improved customer service (Salesforce, Adidas).
Autonomous Robots and vehicles	• Service-free shops (Ford & Alibaba, Amazon Go, Zaitt Brasil). • A robot used to check the stock on shop shelves and the arrangement of the products displayed. Information of shortages or incorrect arrangement is sent to the service staff, who take their time to look into the reported issues (Schnuck). • An autonomous shop is offering basic and fresh products and magazines, able to travel independently to the warehouse in order to replenish the stock. The shop was tested in Shanghai (Moby Mart).

Source: Jarek & Mazurek (2019)

Figure 2. Chatbot potential benefits



Source: State of Chatbots Report 2018, USA.

Figure 3. Main concerns when using IA

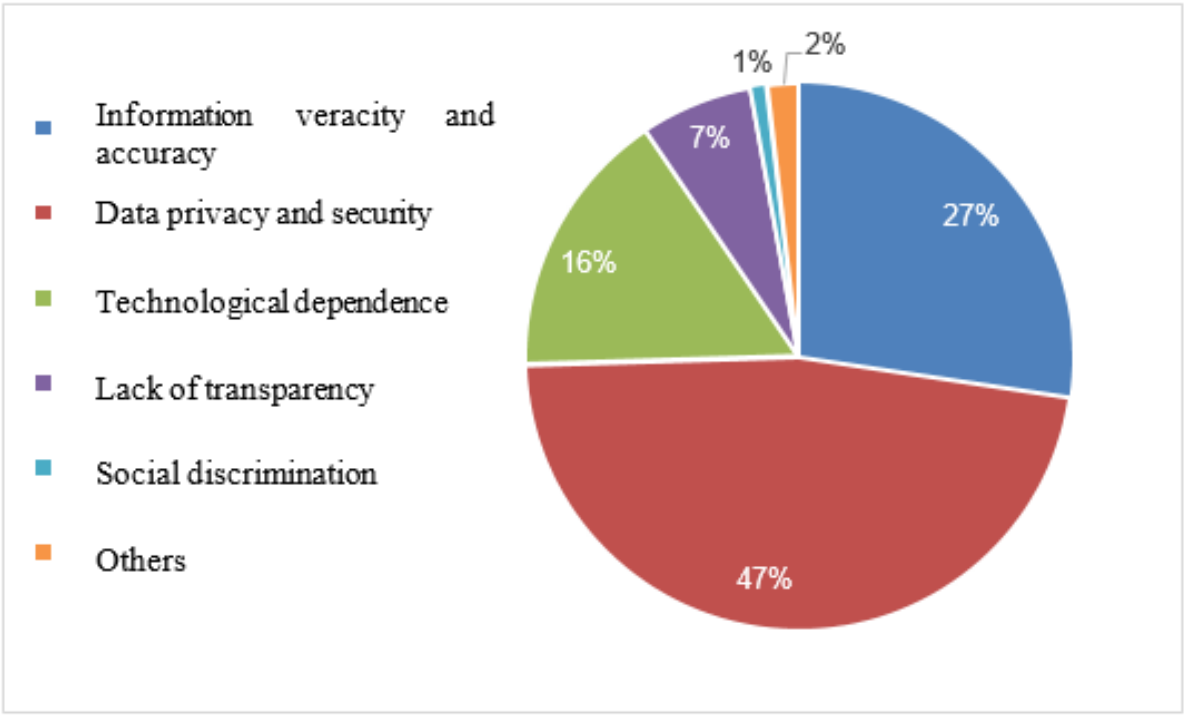


Figure 4. Motives not to have a virtual assistant

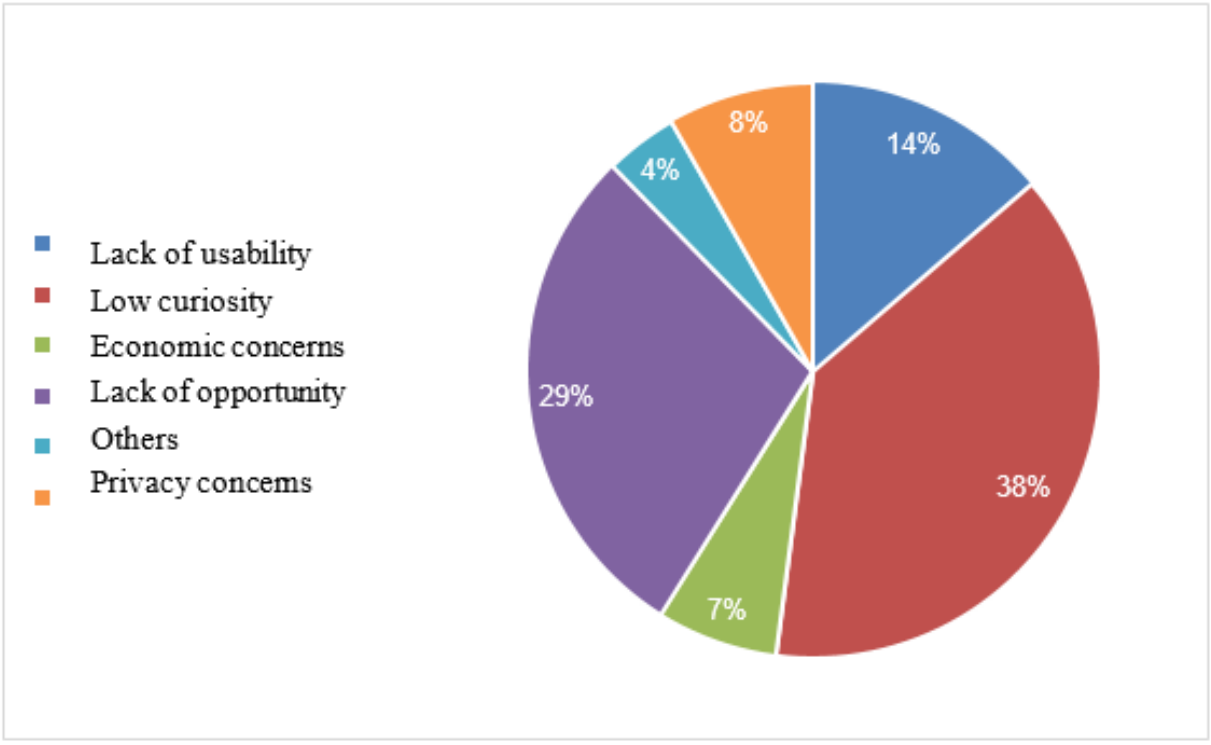


Figure 5. Motives not to buy with virtual assistant

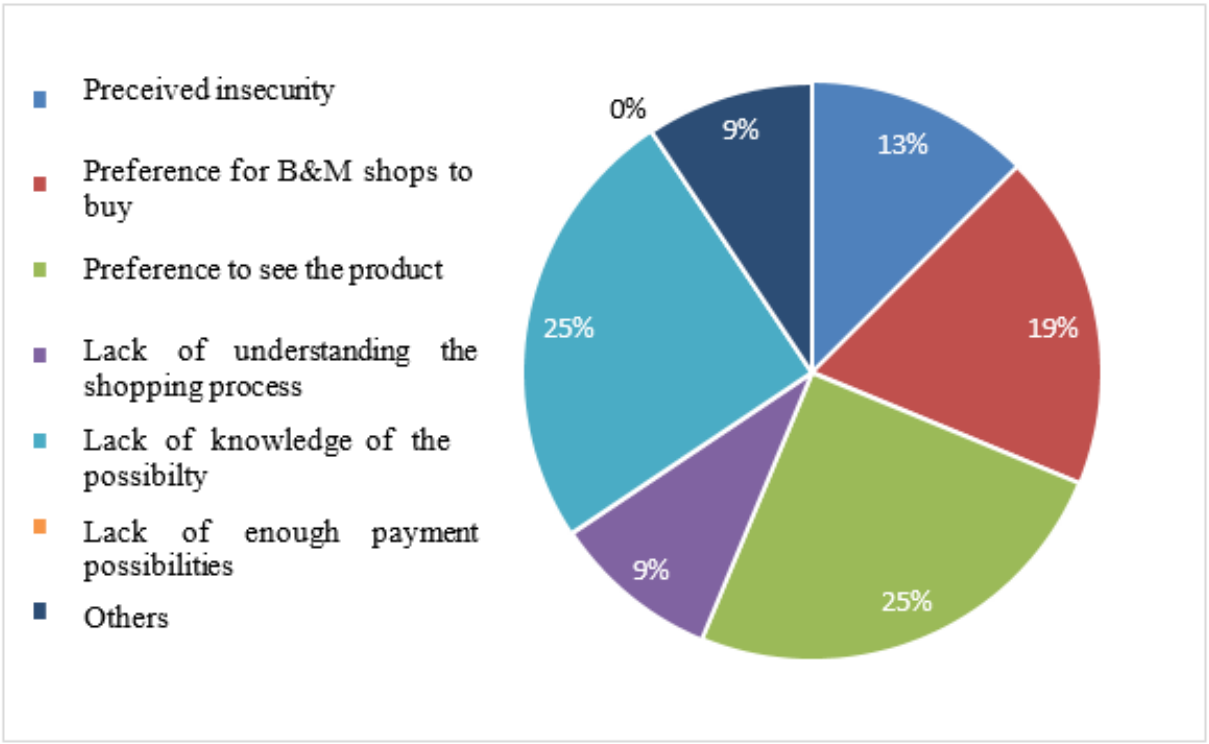


Table 2. System Usability Scale

Items	**% agree or completely agree with the item**
I need to learn a lot of things before I could get going with VA.	15%
I feel very confident using VA	52%
I find VA very cumbersome to use.	3%
I would imagine that most people would learn to use VA very quickly.	55%
I found the various functions in VA are well integrated.	42%
I think that I would need the support of a technical person to be able to use VA.	9%
I think VA are easy to use.	67%
I found VA unnecessarily complex.	12%
I would recommend using VA for shopping.	21%

Table 3. SUS scale dimensions

Ítems	**Factor 1. Complexity of use**	**Factor 2. Ease and security of use**
I need to learn a lot of things before I could get going with VA.	0.716	-
I feel very confident using VA	-	0.548
I find VA very cumbersome to use.	0.864	
I would imagine that most people would learn to use VA very quickly.	-	0.806
I found the various functions in VA are well integrated.	-	0.684
I think that I would need the support of a technical person to be able to use VA.	0.863	-
I think VA are easy to use.	-	0.835
I found VA unnecessarily complex.	0.875	-
I would recommend using VA for shopping.	-	0.484

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GenAI and deceptive design in travel booking

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Type of manuscript: Extended abstract

Keywords: generative artificial intelligence; dark patterns; travel booking; deceptive design

Extended abstract

The rapid proliferation of Generative Artificial Intelligence (GenAI) technologies is fundamentally transforming business operations, customer interactions, and decision-making processes across various sectors (Li & Lee, 2025; Dwivedi et al., 2024; Euromonitor, 2025). In travel and tourism, GenAI enables unprecedented levels of personalization and adaptive user engagement, promising more efficient and tailored customer experiences (Casaló et al., 2025). However, these advancements also raise ethical concerns, particularly regarding the potential amplification of dark patterns and manipulative design practices intended to steer users toward decisions that may not align with their best interests (Zhong et al., 2024). Unlike traditional dark patterns, GenAI-powered interfaces can dynamically adjust persuasive strategies in real time based on individual user data, making them more difficult to detect and resist. Given this shift, it is imperative to critically examine whether customers can still make autonomous, welfare-aligned decisions within AI-augmented travel booking environments. This study aims to explore the mechanisms through which GenAI can be used to amplify deceptive design in travel booking interfaces to better understand the types of dark patterns, tools utilized, implementation methods, and the associated risks for users. This is crucial for understanding the evolving dynamics of consumer choice under AI influence and informing ethical design practices in digital travel platforms.

We searched relevant records using Semantic Scholar data on the Elicit platform (Whitfield & Hofmann, 2023) using the research question "How do generative AI technologies potentially enable more sophisticated deceptive design practices in online travel booking interfaces?" as a prompt. After retrieving the 500 papers relevant to the query, the papers were screened using the following eight criteria: (i) examines GenAI applications in user interface design or describes technical aspects of AI-powered interface manipulation capabilities; (ii) the research focuses on online travel booking platforms, websites, or applications; (iii) the study analyzes dark patterns or deceptive design practices in digital interfaces; (iv) the study includes empirical measurements of user behavior or decision making in AI-enhanced interfaces; (v) the study includes technical or practical analysis of the AI system or interface design (not solely legal/ethical discussion); (vi) the publication includes empirical evidence (not an opinion piece or editorial); (vii) the study examines AI-enhanced interface design (not solely traditional, non-AI interface design); (viii) the AI application specifically related to user interface design (not other AI applications). Finally, 25 studies on AI and deceptive design in travel booking were considered for review.

Six distinct AI-driven manipulation mechanisms were identified: content generation (producing personalized text that may misinform), visual manipulation (employing GANs and deepfakes to create realistic images and videos), conversational deception (mimicking human dialogue to obscure machine origins), personalization exploitation (tailoring content based on user data), choice

architecture manipulation (dynamically altering user interface elements to guide choices), emotional manipulation (using emotionally intelligent systems to target user vulnerability). These mechanisms were associated with various GenAI tools, including ChatGPT (with GPT-3 model), BERT, Google's Duplex, and other AI-driven recommendation systems or interface designs.

The impact of these mechanisms on users is multidimensional: they influence user behavior, perceptions, and emotions through misinformation, communication blurring, vulnerability targeting, and decision steering. Overall, the impact of AI-enabled interfaces on user trust and decision-making in the travel booking context paints a complex picture, with characteristics of AI-generated content (e.g., visual realism, accuracy, and personalization) leading to varying levels of trust and preferences. However, the findings collectively suggest that AI-enabled interfaces can significantly and sometimes subtly affect user trust and decision-making in travel contexts. GenAI's capabilities to produce realistic content, personalize user experiences, and engage users in conversational interactions present opportunities for enhancing user experience and manipulating their choices. These studies demonstrate that GenAI can influence users' preferences and intentions in ways that may not be immediately apparent.

These findings suggest that the rapid development of GenAI will significantly transform the landscape of dark patterns in travel booking, presenting greater risks to users. This raises urgent questions for future research and regulation. This work in progress informs the need to focus on identifying how GenAI-enabled dark patterns influence consumer autonomy over time and developing methods to detect and mitigate manipulative practices. Future research should inform regulators to update existing frameworks to address AI-driven persuasion's dynamic and personalized nature, with clear requirements for transparency, informed consent, and ethical limits on behavioral influence. Ensuring that AI innovation aligns with consumer protection and fairness will require close collaboration across disciplines.

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The end of traditional tech support? – Reducing downtimes and increasing service efficiency with the help of personalised AI service agents

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Type of Manuscript: Extended abstract

Keywords: business-to-business; artificial intelligence; retrieval augmented generation; customer service

Extended abstract

In the field of manufacturing, customer service continues to gain more prominence. As companies shift their focus from Business-to-business (B2B) sales as their main business model to a service or subscription based model, the efficiency and effectiveness of good technical service comes to the foreground (Kowalkowski & Ulaga, 2024). As a result, there is a need to integrate applications of intelligent service systems such as agentic artificial intelligence (AI) powered by Large language models (LLM) to improve efficiency and effectivity in a personalised manner to increase customer satisfaction and loyalty (Spohrer & Maglio, 2008). Our research aims to evaluate the capabilities of these systems to reduce machine downtime and service hours within complex manufacturing environments and to provide a practical framework for decision-makers to tailor and implement this technology to meet customer-specific needs. Currently there is limited research in the field of B2B technical customer service benefitting from technologies like AI (Olujimi & Ade-Ibijola, 2023). Our research question How can artificial intelligence models reduce downtimes and service hours by delivering accurate and personalised information, while addressing challenges such as bias, hallucinations, and accuracy? aims to address this gap and advance the field.

The design of the study is based on the work by Holubiev et al. (2024) on integrating NLP solutions into Q&A systems and broader business knowledge management systems, while also integrating the personalisation aspect of conversational AI as highlighted by Ait Baha et al. (2023). A practical case study was conducted with an equipment manufacturing firm serving a diverse B2B customer base. Two models were trained using technical manuals as training data. Both models were based on different architectures, Model-1 was based on Retrieval augmented generation (RAG) with additional refinement layers, while Model-2 was based on RAG combined with knowledge graphs and refinement layers to add an additional plane of understanding of the equipment. Model-1 was assigned a polite tone, while Model-2 was assigned a direct tone. Five problem scenarios were defined for the study based on frequency analysis of the partner firm's ticketing data, serving as a basis to evaluate model performance and user preferences. The study involved 26 participants from seven different countries. Alongside the quantitative model evaluations, qualitative data was gathered through semi-structured interviews.

Three key findings were noted in terms of accuracy, hallucination rate and model preference. Both models demonstrated a high level of perceived accuracy, 96 and 97% respectively.
Model-2 showed a 0% perceived hallucination rate compared to 3% for Model-1, potentially due to knowledge graph integration restricting outputs in cases of uncertainty. Qualitative input from participants noted that a potentially lower hallucination rate could be very important for manufacturers dealing with critical equipment sensitive to user errors.

Furthermore, participants showed a statistically significant ($p<0.05$) preference for responses from Model-2 and for the direct tone. As for the possible time savings, across the five scenarios, the average time to solve without the model's assistance was 29.5 minutes, while the time to response for the models was 20 seconds. Furthermore, we found an impact of user age on tone preferences. Among participants aged 25-35, 11% preferred the polite tone, whereas 20% of those aged 35-45, and a substantial 43% of those aged 45 and above, favoured it. Additionally, participants without a university education took on average 37 minutes to solve issues, compared to just 23 minutes for those with university education. This is an important finding, since Handa et al. (2025) reported that highly educated professions tend to be the most common AI users, but the study results highlight a potentially higher benefit for those without a university education. Finally, a regression analysis showed a statistically significant correlation between years of experience and time to solve without the model, highlighting its importance in case of new hires and new product lines.

Our research contributes to theory and practice in two ways. Previously, Greven et al. (2023) provided important insights into the barriers a B2B chatbot may encounter when deployed among different stakeholder groups, such as customers and service providers. Our study specifically addresses this user-based variety (most notably, the personalization aspect in handling technical information and varied user expertise levels) to offer a more comprehensive understanding tailored to B2B technical support. Giorgio & Nicola (2021) successfully employed a knowledge-based framework for a manual-based Q&A system. In contrast, our study explores these elements in a B2B context and provides empirical evidence for the need of personalisation as well as strategic framework choice through a participant- centred approach. In terms of practical contribution, our study provides actionable insights for decision makers with relation to a strategic approach to model architectures and customization dependent on the target demographic. Our study explicitly evaluated the impact of technical knowledge, experience, education, and contextual factors defined in the EU AI Act on user model preferences.

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The Impact of Human-AI Collaboration on the Content Creation Process in Marketing Firms

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Type of manuscript: Extended abstract

Keywords: generative artificial intelligence, human AI co-creation; content marketing

Extended abstract

Throughout history, digital transformations have driven industries, including marketing, to adapt from traditional methods to innovative digital approaches. Each technological transformation has necessitated that the marketing industry adopt new tools and workflows to keep pace with an increasingly technology-driven world. Marketing innovation, a crucial factor of this transformation, involves the development and implementation of new strategies, techniques, or technologies designed to engage with target audiences in more creative and effective ways. Today, businesses are leveraging cutting-edge technologies, such as data analytics, blockchain, artificial intelligence (AI), and Internet of Things (IoT) to establish themselves as leaders in innovation. Among these, generative AI (GenAI or GAI), a subset of AI, has emerged as a crucial technology that has profoundly impacted content marketing, where it is drastically changing the way content is generated (Feuerriegel, Hartmann, Janiesch, & Zschech, 2024; Gupta, Nair, Mishra, Ibrahim, & Bhardwaj, 2024; Kshetri, Dwivedi, Davenport, & Panteli, 2024).

As GenAI becomes increasingly integrated into the content creation process, a new relationship of human-AI collaboration (Wu et al., 2021), often referred to as co-creativity, is emerging (Rezwana, 2023). This collaboration presents significant opportunities, merging the efficiency and scalability of GenAI with the distinct creative insights of content creators. However, as this collaboration evolves, important questions arise regarding the division of labour between GenAI and content creators (Chintalapati & Pandey, 2022; Wahid, Mero, & Ritala, 2023). The boundaries between tasks suited for GenAI and those requiring human creativity are becoming increasingly blurred, highlighting the need for a clear framework to balance this collaboration effectively moving forward (Amankwah-Amoah, Abdalla, Mogaji, Elbanna, & Dwivedi, 2024).

To examine the collaborative relationship between human creativity and GenAI, this study seeks to offer insights that help businesses make more informed decisions about incorporating intelligent tools into their content marketing strategies. The research addresses the following question:
How does the integration of GenAI influence the various stages and factors that shape the content creation process in marketing companies?

By investigating this question, this research seeks to contribute theoretically by advancing knowledge of the relationship between human creativity and GenAI, and by developing a new framework to capture the dynamics of this evolving collaboration. The anticipated findings will enhance theoretical models of content creation and GenAI integration, thereby enriching academic discourse and providing novel perspectives for future research.

Therefore, the primary aim of this research is to explore the impact of integrating GenAI with human creativity in the content creation process within marketing industries. To achieve this aim, the following objectives have been identified:

(1) To identify the stages and factors influenced by integrating GenAI with human creativity during the content creation process.
(2) To identify and analyse the tasks performed by GenAI, content creators, and a combination of both during the content creation process.
(3) To propose a workflow framework that guides organisations intending to integrate GenAI in their content creation processes.

These objectives collectively aim to provide a thorough understanding of how GenAI influences the content creation process, the roles and responsibilities of GenAI and human creatives, and a framework for effective integration in marketing industries.

A qualitative methodology drove the study, employing semi-structured interviews to capture in-depth insights into how GenAI influences the creative process. The research strategy followed a grounded theory approach, using purposive sampling to select 24 participants with at least one year of content marketing experience and active GenAI use. Data collection occurred online, facilitating flexible, conversational exchanges that uncovered nuanced perspectives.

The findings reveal a complex relationship between GenAI and content creators, shaped by the participants' familiarity with GenAI, generational perspectives, and the specific demands of each content creation phase. The proposed framework (Figure 1) identifies five primary phases: Task Definition, Planning, Ideation, Content Generation, and Finalising and Testing, each presenting distinct opportunities and challenges for GenAI involvement.

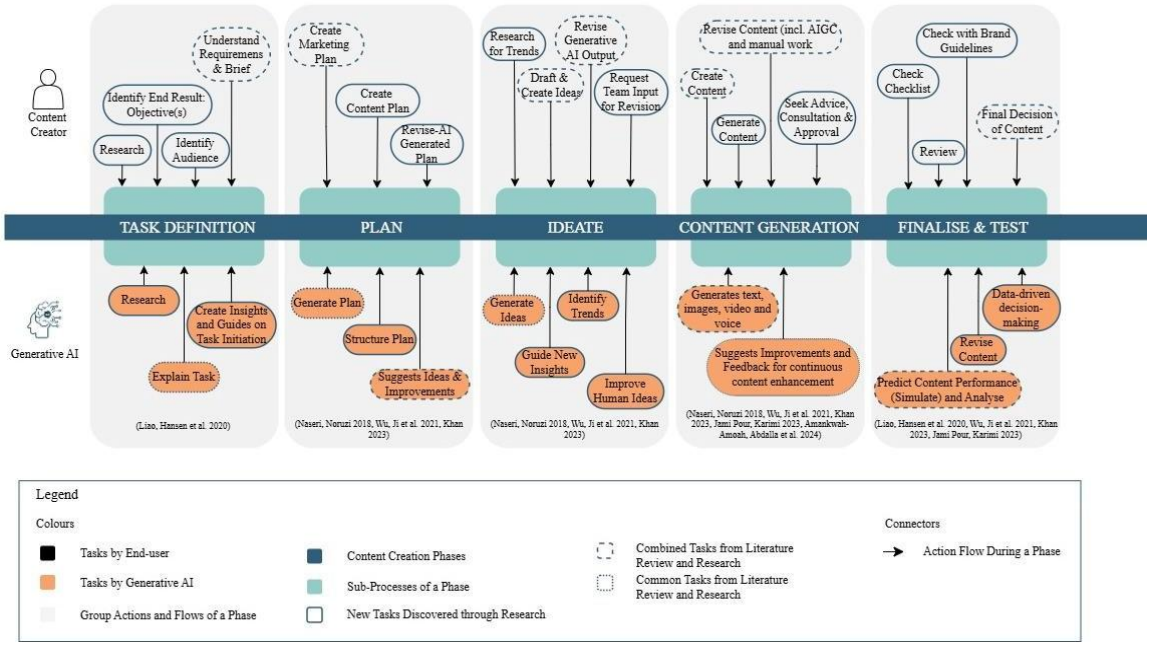
Throughout these phases, participants collaborate with GenAI using it as a complementary tool, adapting it to the evolving demands of each stage in content creation. In the Task Definition and Planning phases, GenAI aided research and organisation, while human judgment guided the foundational planning and strategic decisions to ensure alignment with brand objectives.

As the process shifted to Ideation and Content Generation, GenAI's role expanded, functioning as a creative collaborator that helped develop ideas and produce content efficiently. This collaboration showcased GenAI's potential for innovation, even as participants carefully retained control to maintain brand authenticity and resonance. Finally, in the critical Finalising and Testing phase, human judgment again took precedence, with GenAI assisting in technical refinements but leaving final approvals to the creative team. This phased approach reveals a nuanced balance, where GenAI's strengths in efficiency and ideation are maximised without overshadowing the essential human touch needed for context, emotional depth, and brand integrity.

Across these phases, the study identified key advantages of GenAI, including its speed and scalability.

However, participants consistently highlighted GenAI's limitations, including its difficulty in understanding context and conveying emotional depth. Consequently, maintaining a human element within the process emerged as essential for preserving authenticity and alignment with creative and brand objectives. Based on these findings, the study proposes a conceptual framework, as illustrated in Figure 1, that balances human and GenAI input across adaptable phases of content creation, allowing content creators to flexibly leverage GenAI's strengths without compromising core creative values.

Figure 1. Conceptual Framework for Human-AI Collaboration in the Content Creation Process



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Opportunities and Obstacles: Bridging the Metaverse and the Food Industry

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Type of manuscript: Extended abstract

Keywords: metaverse; food industry; enablers; barriers; qualitative research

Extended Abstract

The emergence of the metaverse which integrates digital and physical worlds, presents numerous possibilities to unlock the potential of various sectors, including the physically and sensory-driven food industry. While industries such as fashion, gaming and entertainment have leveraged the metaverse effectively, the food industry remains underexplored. This paper explores the dual facets—enhancers and barriers—impacting the integration of metaverse technologies in the food industry.

The primary research objective is to evaluate the potential challenges and limitations of adopting such technologies in a sensory-driven market.

The central research questions guiding this study include:

(1) What are the factors that act as barriers to businesses that inhibit this integration between the metaverse and the food industry?
(2) What are the factors that act as enablers to successful adoption and engagement of the metaverse and food industry?
(3) How can stakeholders, including entrepreneurs, marketers and policymakers, leverage the metaverse to enhance consumer engagement and operational efficiency?

Through qualitative research design, the researchers utilize the semi-structured, in-depth interviews with ten intentionally selected experts including company founders, managers, and channel partners, each possessing hands-on experience or strategic insights into metaverse applications in the food domain. Thematic analysis was conducted using Nvivo 12 to identify patterns, sentiments, and emergent themes related to the integration of metaverse into the food industry.

The key enablers such as virtual restaurants, immersive brand storytelling, interactive cooking experiences, and digital dining events offer innovative ways to engage consumers and create new revenue streams. These opportunities enable consumers with novel hedonic experiences. Along with this, significant barriers persist, such as technological accessibility, high setup costs, sensory limitations (that hinder replication of taste and aroma), consumer skepticism, and standardized rules and regulatory uncertainties in the virtual world.

The originality of this paper lies in its application of metaverse concepts—largely explored in entertainment, gaming, and fashion—to the under-researched domain of metaverse in food industry. While some literature exists on food tech and digitization, few studies holistically explore the implications of immersive virtual environments in food consumption, branding, and experiential marketing. The research bridges these gaps in the literature by incorporating real world insights and expanding the understanding of sharing food experiences virtually. This study is, to the best of researcher's knowledge, the first to explore the adaptation of metaverse in the food industry with

specific reference to QSRs and the channel partners, bridging a critical gap in literature. Also, this study unveils actionable insights into the enablers and barriers to the adoption by analyzing the insights of the experts in this field, helping in understanding the future prospects of this platform from consumer engagement, experience point of view.

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The Implementation of Sustainable Strategies in the Metaverse: A Study Focused on the Textile Industry

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Keywords: metaverse; digital; textile industry; fashion; virtual reality; circular economy

Extended abstract

Introduction

The textile industry faces many challenges as the traditional model of production and consumption is changing. Business's virtual and digital dimensions have a significant impact as the metaverse gains momentum worldwide. The last pandemic and post-pandemic scenario contributed to the need to deepen the discussion (Alexandrova & Poddubnaya, 2023).

A hyper-connected digital universe called the 'metaverse' promises to fundamentally change how consumers, brands, and firms will transact and interact in a seamlessly interconnected space of virtual realities (Giang Barrera & Shah, 2023). As the metaverse expands its possibilities, fashion and textile brands can explore new digital spaces, creating immersive and interactive experiences that go beyond the physical world. As technology continues to advance, small and medium-sized enterprises in the fashion sector must adapt and take advantage of the metaverse to remain competitive and innovative (Iqbal et al., 2024).

The modern textile industry faces incessant consumer demand for innovative applications of new technology and a constant stream of new and ever more innovative products (Shah et al., 2022). This study seeks to investigate how these can be applied to the implementation of sustainable strategies in the metaverse, in the context of the textile industry, analyzing the challenges, opportunities, and best practices that can contribute to a positive impact in both the digital and real environments in the textile industry. It is worth noting that there is a gap in the literature regarding empirical studies that explore in practice how textile industry companies implement sustainable strategies in virtual environments. Most publications focus on conceptual analyses, with little evidence of concrete results or applicable models.

Objectives

Investigate how SMEs can implement sustainable strategies in the metaverse, in the context of the textile industry. The specific objectives and research questions are present in Table 1.

Table 1 ID Research Questions

ID	ID Research Question	Objective
RQ1	What methodologies can be considered when integrating sustainable practices in developing products and experiences in the Metaverse for the textile industry?	Examine the methodologies and tools available in the current literature that support the transition of the textile industry to the Metaverse, focusing on the incorporation of sustainable practices.
RQ2	What challenges and opportunities does the Metaverse present for brands in the textile industry, particularly in terms of product development and consumer experience?	Explore the challenges and opportunities that the adoption of the Metaverse presents for the textile industry, analyzing the impact on the creation of sustainable products and consumer experiences.
RQ3	What are the main critical success factors that involve the implementation of sustainable strategies in the Metaverse, in the context of the textile industry?	Identify the key critical success factors in the implementation of sustainable strategies in the Metaverse, assessing how its unique characteristics influence sustainability in the textile industry.
RQ4	How can facilitate collaboration between the metaverse and stakeholders to promote sustainability in the textile industry?	Investigating how collaboration among various stakeholders in the Metaverse can drive sustainable practices in the textile industry and foster a more responsible digital ecosystem.

Methodology

The methodology adopted in this research is composed of a bibliometric approach. This approach to bibliography analysis is characterized by its quantitative dimension, allowing the statistical analysis of scientific publications to identify patterns, trends, and gaps in the literature.

A bibliometric analysis was conducted to better understand the scientific panorama related to the topic. Using tools such as Bibliometrix in R, graphical visualizations of citation networks, co-authorship, and keywords were generated, allowing the most influential publications and emerging themes to be identified. Based on the criteria for the selection of articles, date is an important factor, especially in this study, due to the novelty of the theme.

The second part of achieving these objectives involves a qualitative approach based on a multiple-case study approach of real and current market contexts, focusing on existing companies, to ensure that our contribution effectively addresses market challenges.

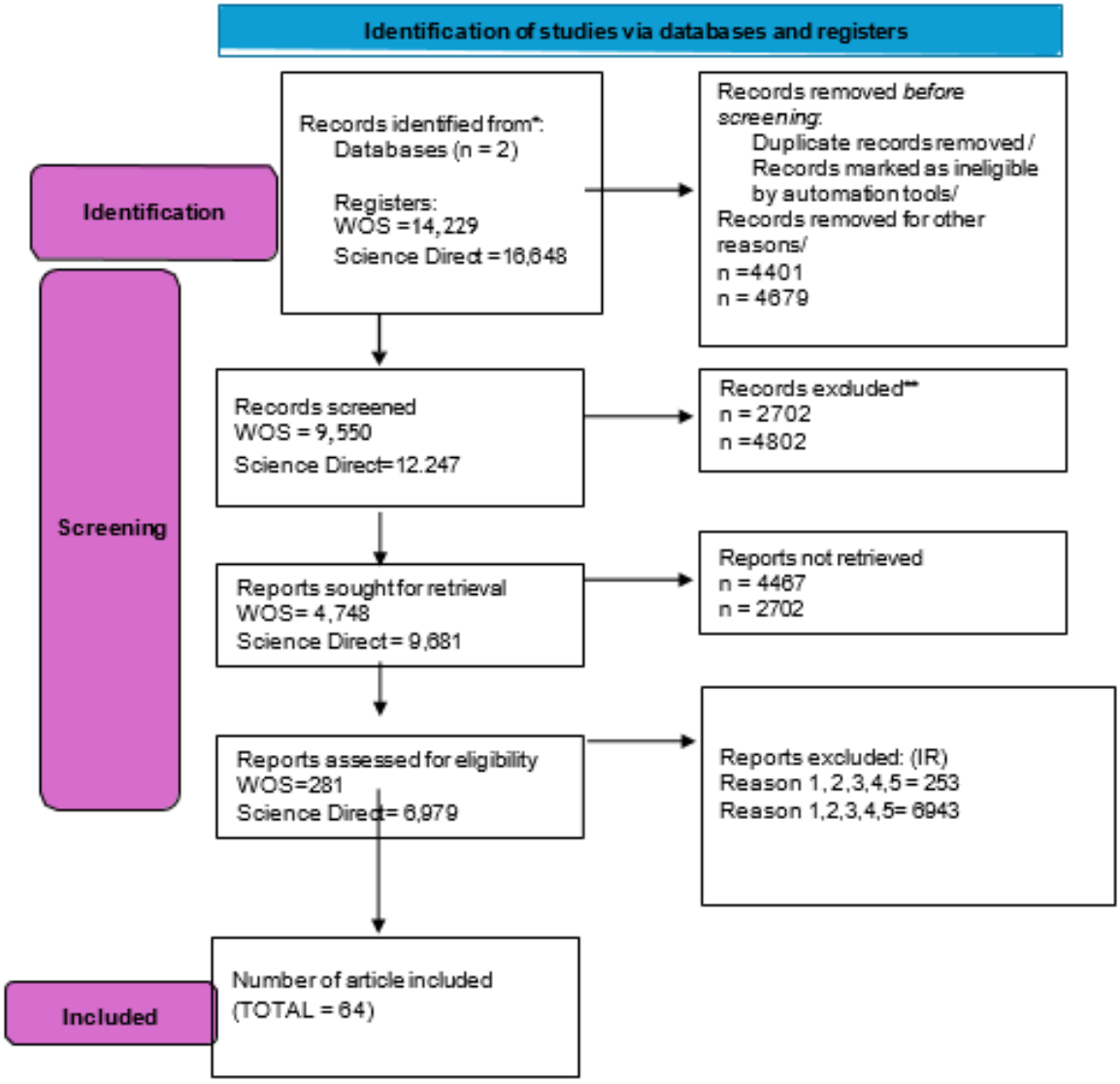
Bibliometrics Analysis

For this analysis, after defining the research objectives, some main steps were followed to obtain the selected articles. According to Latino et al.(2024) this protocol, the search database, search scheme, and inclusion and exclusion criteria need to be defined.

In this research, we employed database sources such as Web of Science and Science Direct, e the search queries to be used have been defined "*"Textile Industry OR Fashion Industry" AND "Digital Transformation OR Metaverse OR Web 3.0 OR Virtual reality" AND "Sustainability OR Sustainable"",* the search was limited to ten years, from 2021 to 2025, yielding 7260 potential articles, and the criteria for selecting or filtering articles based on López-Aguilar et al. (2022) structured as follows: The publication was written in English; The publication was peer-reviewed (to avoid grey literature); The full-text of the publication was available; The publication was published in a Q1 and Q2 journal (according to the ISI-JCR) primarily, but the publication is not limited only to these quartiles, due to the important and novelty of the topic; The publication was relevant to the subject. And in the end, these criteria were applied, resulting in 64 articles.

In the organization of the literature search, a scheme based on the prism flowchart was elaborated to conduct it, as shown in Figure 1 below.

Figure 1 Flowchart: literature search



Results and Discussion

The screening process resulted in 64 articles, which were analyzed, and the main results are illustrated in the figures below. Research shows that in the last three years the metaverse linked to various areas has grown significantly, especially in the textile industry. The volume of research launches in the area continues to rise, to this day, and the peak of production stands out in the years 2023-2024 in all continents, according to the selected research in bibliometric analysis, which can be seen in Figure 2.

Figure 2: Annual scientific production

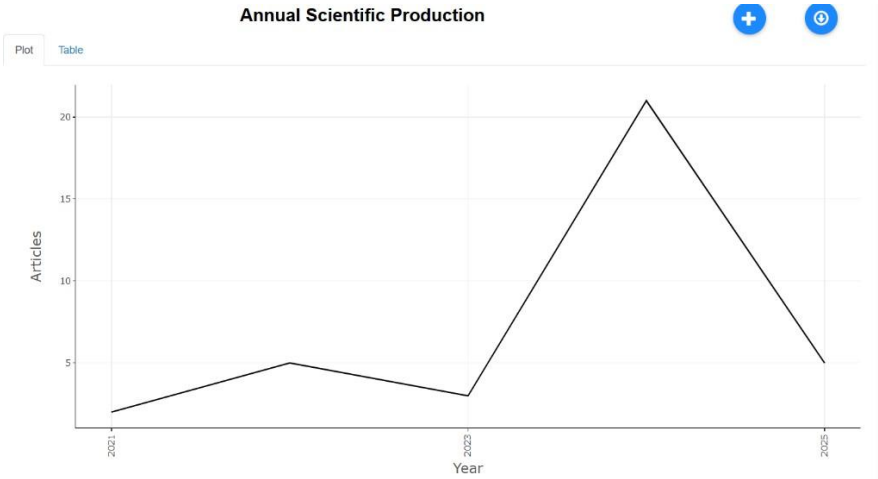
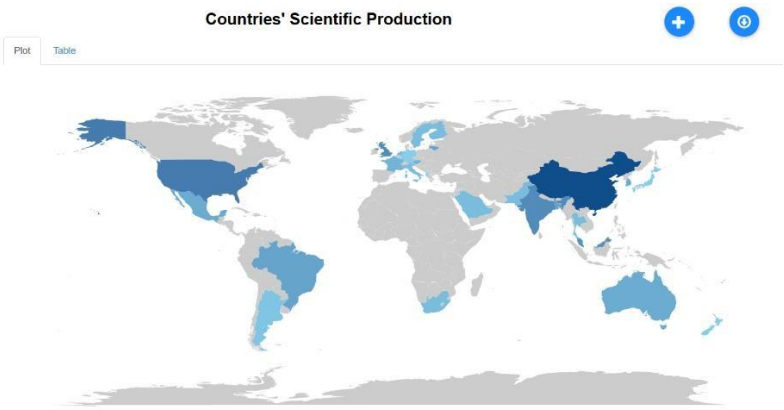


Figure 3– Word cloud

Figure 4 Countries' scientific production



The quantitative results demonstrate that research on sustainable strategies in the metaverse focused on the textile industry is on the rise, reflecting its growing importance and practice. The strong presence of international collaborations as seen in Figure 4, indicates a collective effort to address global challenges related to the topic and the need for its resolution. A word cloud seen in Figure 3 was used to highlight, in a visual way, the most recurrent terms in the data corpus, allowing quick

identification of the most relevant topics, among them, terms such as "metaverse", "sustainability", "industry 4.0", "fashion industry", but also "circular economy", “blockchain”, which were not included in the terms of the query.

Conclusion

It is understood that the theme under study is relevant since the number of articles carried out in the area is rising in various places around the world. It is understood that entry into the metaverse comes as an alternative and complementary option in the textile industry.

Limitations include the dependence on recent literature and the scarcity of empirical studies on concrete applications of the Metaverse in the textile industry. Furthermore, much of the data is still exploratory, given the emerging nature of the topic.

For future research, we suggest deepening the research through case studies and expanding the investigation to include topics such as AI and blockchain in sustainable textile practices.

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Avatar Robot Acceptance Across Demographic Segments in Japan: Insights for Strategic Service Implementation

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Keywords: avatar robot; service robot acceptance; technology acceptance model; demographic factors

Extended abstract

Introduction

This study examines socio-demographic factors influencing the acceptance of avatar robots in service settings in Japan. As aging populations and labor shortages increasingly challenge service sectors across developed nations, particularly in Japan with its rapidly aging society, innovative technological solutions are needed (Recruit Works Institute, 2023). Avatar robots, which enable remote human operators to provide services, represent a potential solution to address these challenges. Despite growing interest in avatar robot implementations, research examining how different demographic segments respond to this technology remains limited (Broadbent et al., 2009; Gnambs & Appel, 2019). This study applies the Technology Acceptance Model (TAM) to identify key demographic variables that significantly influence avatar robot acceptance in service contexts, providing insights for strategic implementation across different customer segments.

Methodology

A vignette-based survey was conducted with 1,987 Japanese participants representing diverse age groups (18.5% under 29 years, 24.2% in their 30s, 20.1% in their 40s, 20.4% in their 50s, and 16.8% aged 60+) and gender distribution (47.8% male, 52.2% female).

Three vignettes were presented, depicting service interactions at a train station. While this study primarily focuses on avatar robots as a potential solution for service automation in aging societies, we included human and humanoid robot scenarios for comparative context and to establish groundwork for further research on the progressive adoption of service technologies. Each vignette described a scenario where the respondent is making their first visit to a station, is unsure which direction to go after passing through the ticket gate, and is approached by a service provider who asks, "Which direction are you heading? I can guide you if you'd like." The vignettes varied only in the type of service provider:

Table 1. Vignette Scenarios

Vignette	Description	Illustration
Vignette 1: Human Employee	Traditional face-to-face interaction with a station attendant.	
Vignette 2: Avatar Robot	Interaction with a screen-based avatar robot operated remotely by a human employee.	
Vignette 3: Humanoid Robot	Interaction with an autonomous humanoid robot.	

Following each vignette, participants responded to Technology Acceptance Model measures on a 7-point Likert scale, adopted from van Pinxteren et al. (2019) to fit the service context of this study:

• Perceived Usefulness-Emotional (PU_emotion): "I feel this person (robot) truly has my best interests at heart"
• Perceived Usefulness-Informational (PU_info): "I think this person (robot) provides accurate information"
• Perceived Ease of Use (PEOU): "I feel it would be okay to ask this person (robot) for directions"
• Intention to Use (ITU): "Would you like to use this service?"

Multiple regression analysis using R statistical software examined the influence of demographic factors (age, income, gender, marital status, children status, and education) on avatar robot acceptance.

Results

Education level emerged as a strong positive predictor of avatar robot acceptance, with higher education consistently associated with greater acceptance. Junior college ($\beta=0.528$, $p<0.05$), university ($\beta=0.459$, $p<0.05$), and graduate school education ($\beta=0.557$, $p<0.05$) showed significant positive effects on intention to use, with graduate school education showing especially strong effects on PU_information ($\beta=0.875$, $p<0.001$). This finding aligns with previous research suggesting that educational attainment correlates with greater technological literacy and openness to innovation (Rogers, 2003; Venkatesh et al., 2012).

The absence of children demonstrated a significant negative relationship with acceptance across all measures, with strong effects on intention to use (β=-0.294, $p<0.01$) and PU_emotion (β=-0.277, $p<0.01$). This finding supports the technology-mediated parenting literature suggesting that parents may have greater exposure to and comfort with new technologies through their children (Sanders et al., 2016).

Table 2. Result of Multiple Regression: Key Demographic Factors Influencing Avatar Robot

Demographic Variable	Effect on Acceptance	Significance	Notes
Higher Education	Positive	$p<0.05$ to $p<0.001$	Strongest for graduate education
No Children	Negative	$p<0.01$ to $p<0.05$	Consistent across all measures
Age (30s vs. 60+)	Negative	$p<0.05$	30-39 age group less accepting than 60+
Female Gender	Positive	$p<0.05$	For PU_info and PEOU only
High Income (9M+ yen)	Negative	$p<0.05$	For PU_info and PEOU only

Age effects were most pronounced among those in their 30s, who showed lower acceptance compared to those aged 60+ on PU_information (β=-0.288, $p<0.05$) and PEOU (β=-0.286, $p<0.05$). This contradicts common assumptions about technology acceptance decreasing with age, a stereotype challenged by recent research showing older adults' increasing technology adoption rates (Czaja et al., 2019; Hauk et al., 2018).

Gender showed moderate effects, with females exhibiting higher acceptance than males for PU_information (β=0.154, $p<0.05$) and PEOU (β=0.169, $p<0.05$). Income level effects were primarily observed at the highest bracket (9M+ yen), which was associated with lower acceptance in certain dimensions.

The overall model fit statistics were significant for all TAM variables ($p<0.001$), though the modest R^2 values (ranging from 0.037 to 0.057) indicate that demographic factors explain a limited proportion of the total variance in avatar robot acceptance.

Discussion and Conclusion

These findings have significant implications for the strategic implementation of avatar robot technologies in Japan's service sector. The strong influence of education suggests the importance of educational initiatives when introducing new service technologies. Organizations might need to develop different approaches for customers with varying levels of educational attainment, with special attention to making the technology accessible and understandable for those with lower formal education.

The positive effect of having children indicates that parents are more receptive to technological assistance, perhaps due to greater familiarity with technology through their children or greater need for convenience-enhancing services. Service providers might consider targeting family-oriented services for initial avatar robot implementations.

The surprising finding that older adults (60+) showed higher acceptance than those in their 30s challenges stereotypes about technology resistance among older populations. This suggests that avatar robots might be particularly valuable in services targeting older adults in Japan, a significant

insight given the country's rapidly aging demographic profile. This finding contradicts the common assumption that older adults are resistant to new technologies and offers a promising avenue for addressing labor shortages in services oriented toward senior citizens.

For service providers facing labor shortages in Japan's aging society, these findings provide valuable guidance for implementing avatar robot solutions in ways that align with the demographic characteristics of their customer base. Targeted educational approaches, family-oriented implementations, and services addressing the needs of older adults might offer particularly promising avenues for introducing this transitional technology.

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Tele-serving through avatar robots: Impact on professional frontline service employees

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Keywords: avatar robot; avatar-mediated service encounter; frontline employee; frontline service technology; technology-mediated service encounter; remote service

Extended abstract

Avatar technology that mediates service interactions between frontline employees (FLE) and customers is becoming a popular research topic in the service research. An increasing number of studies demonstrate the impacts and challenges of virtual avatars adopted in the service setting (Etienne et al., 2023; Pöyry et al., 2024). In addition, avatar robot, a physically embodied avatar mediating service encounters is also gradually gaining attention. Avatar robot enables users to move around the real, remote service environment and to communicate and interact with people even physically beyond the spacio-temporal barrier (Heinonen and Strandvik, 2020; Watanabe, 2023). Moreover, avatar robot can augment the physical capability of those with physical impairment, which creates new work opportunities. For example, in an avatar robot café in Tokyo, avatar robots controlled by operators with severe physical impairment serve customers (Takeuchi et al., 2020).

Watanabe and Ho (2023) propose a concept of avatar-mediated service encounter (AMSE) as a specific type of technology-mediated service encounter (De Keyser et al., 2019; Van Doorn et al., 2017). In comparison to the interactions with other frontline service technologies, such as autonomous service robots and AI-based chatbots (De Keyser and Kunz, 2022; Xing et al., 2022), AMSE is characterized with high flexibility and interactivity in remote service interactions. Especially when FLEs use avatar robots for serving customers remotely, it is expected that the FLEs can utilize their professional skills for customers at different locations without traveling, and hence their service productivity increases. However, its empirical evidence is still limited because the application cases of avatar robots in service fields are still very few (Watanabe, 2023). To fulfill this research gap, we aimed to clarify how professional service skills of FLEs are effectively utilized for the AMSE using avatar robots. More concretely, this study addresses the following research questions: (1) Can professional service FLEs serve customers through avatar robots as they do in the face-to-face setting? (2) If not, what are the challenges and how can the FLEs overcome them?

To address these research questions, we conducted an exploratory case study of an avatar robot application in the public service. In this case, avatar robots were operated in the municipal office to guide visitors to adequate service counters for their purposes. The applied avatar robot (see Figure 1) has a screen on the pole connected to movable stand. The remotely located operator shows their face on the screen and communicates with customers verbally, seeing the customers' faces. The robots do not have hands or any other types of manipulators; however, the operator can control the robot

remotely to approach the customer to communicate. The remote guiding service started at the end of September 2024. Two operators controlled one or two robots to guide customers on each day, and in total four operators took this role. All the operators have a plenty of hospitality service experiences (at least, 8 years). We conducted semi-structured interviews with the operators. Six interview sessions were organized for two operators each, after their working shifts in October, November and December 2024. Each interview took approximately 45 minutes. The interview items include their impressions about remote service encounters, challenges they faced, and operational improvements they applied.

Figure 1. Avatar robot in the case study

Our preliminary findings from the case study indicate that general communication skills of hospitality professionals such as observing customer's situations and intentions are important to support customers in AMSE as well. Considering that the operators serve customers at the remote site, avatar robots were able to increase their work flexibility. Meanwhile, the differences of avatar robot-enabled service interactions from the face-to-face ones require some modification in their service practices. First, the different appearance of avatar robots from the one of humans makes customers difficult to aware their role as a guide. Therefore, the avatar robot operators needed to approach customers more actively rather than just wait for customers until they ask questions. This implies that the affordance of the avatar robot and customers' experience of avatar robot interactions affect the acceptance and productivity of remote hospitality services. Second, physical and sensational functions of the avatar robot affect interaction behaviors. For example, the avatar robot does not have hands to point the direction. Thus, the operator rotated the robot to show the direction to go. In addition, communication through the camera and speaker attached on the robot also requires modification in their behaviors, such as eye-contacting and talk style. Such changes in behaviors caused by the technological features are the results of the operators' bricolage.

This study highlighted several issues to be tackled for maximizing the potential of professional service FLEs for AMSE. The robot appearance (i.e., anthropomorphism) and customer experience are commonly investigated in the service robot research (Kim et al., 2023), while this study implies that the avatar robot research would require a different analytical focus on its operational strategy. Regarding this, the findings also imply the importance of employees' innovative behaviors (Wittel et al., 2017; Watanabe, 2023), which should be further investigated. Guiding customers is a general service practice in other types of service fields such as retail stores. This implies that our findings

could be valuable in the broader service context. Naturally, more studies with different conditions (e.g., larger sample sizes, customer / other stakeholder involvement, and different service fields) are anticipated. These studies will extend the potential of avatar robots for future remote services.

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Beyond Interaction: Examining Brand Social Intimacy in Human-AI Relationships

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Keywords: human-AI relationship; brand social intimacy; social companionship; social network engagement; thematic analysis

Extended abstract

Social intimacy refers to high-quality interactions and close relationships with significant others, including spouses, friends, and family members (Miller & Lefcourt, 1982). In today's digital age, social media and AI-integrated technologies are reshaping how intimacy is perceived and experienced. Increasingly, AI functions as a social agent in consumer interactions, increase brand intimacy, prompting interest in understanding how intimacy manifests in human-AI relationships (Williams & Lim, 2024).

Recent findings suggest that consumers sometimes prefer AI interactions over human ones, especially when concerns about self-presentation arise (Jin et al., 2024). Despite the growing prevalence of AI in consumer engagement, there is a lack of structured measurement tools capturing brand social intimacy in AI-human contexts. Existing literature largely emphasizes trust, adoption, and functionality of AI (Park et al., 2021), leaving a theoretical gap regarding intimacy and relational bonding with AI systems.

This study develops a conceptual and empirical framework for assessing brand social intimacy in human-AI relationships. Drawing on grounded theory and thematic analysis, it proposes a scale that integrates insights from established intimacy models while identifying novel constructs unique to AI-mediated interactions.

Social intimacy includes shared experiences, emotional closeness, and perceived understanding. Previous work has linked these features to interpersonal rapport and relationship satisfaction (Frost & LeBlanc, 2021). Miller's Social Intimacy Scale, for instance, emphasizes "time spent together" and "frequency of contact" as intimacy indicators (Hogan et al., 2021). Similarly, in consumer settings, affective engagement and social rapport with AI contribute to satisfaction and loyalty (Yim et al., 2008; Baker et al., 2020).

Methodology

A qualitative, multi-phase methodology was employed to explore brand social intimacy in human-AI interactions, given the limited theoretical grounding in this area. This approach enabled an in-depth examination of constructs not captured by existing frameworks. The study began with a review of 25 intimacy-related scales from the fields of social behavior, psychology, and management, which primarily focus on human-to-human social intimacy. From these, three scales were selected for their relevance to human-AI interactions: the Personal Assessment of Intimacy in Relationships (PAIR; Schaefer & Olson, 1981), the Miller Social Intimacy Scale (MSIS; Miller & Lefcourt, 1982), and the Customer-Firm Affection Scale (Yim et al., 2008).

These scales focus on human partner-related emotions, while AI lacks human-like emotions or artificial consciousness (Farisco et al., 2024).

To capture contemporary consumer experiences, 15 semi-structured interviews were conducted with marketing professionals across Europe, spanning various industries. The participants included 10 frequent AI users and 5 marketing experts. These participants were selected for their direct exposure to AI tools and their professional insights into evolving consumer-brand dynamics. The interviews explored emotional and social engagement with AI services. All interviews were audio-recorded, transcribed using Descript and manually corrected.

Transcription accuracy was ensured through 2-3 revisions, and the final transcripts were sent to participants for confirmation of interpretations. Thematic analysis including open, axial, and selective coding, was applied to the data. Saturation was reached with 15 participants when no new themes emerged.

Result

Qualitative analysis of the interview data revealed two emergent constructs not previously captured by existing human-AI intimacy scales: social companionship and leisure activities engagement. These findings highlight a gap in current measurement tools addressing the relational aspects of AI-human interactions. Social companionship refers to trust, emotional investment, and a sense of compatibility with AI systems. Participants described AI as emotionally supportive, particularly in moments of isolation, suggesting that its accessibility can foster a sense of security and reduce loneliness.

Leisure activities engagement involves interacting with AI in ways that extend social networks and facilitate shared experiences. Respondents reported using AI for creative or entertainment purposes, often sharing outcomes within digital communities, which in turn promoted collaboration and reinforced group belonging. These findings underscore the socially embedded nature of AI in everyday leisure contexts.

Building on existing intimacy scales, the study kept relevant items while removing those incompatible with AI's non-sentient nature. The resulting framework comprises five constructs with 27 items: social rapport (Consumer-Firm Affection Scale), interaction intensity (MSIS), social interaction (PAIR/MSIS), and the two newly identified dimensions—social bonding and social network engagement—rooted in interview insights. This revised structure reflects both theoretical alignment and empirical relevance.

Implications

This study contributes to marketing psychology by conceptualizing brand social intimacy in AI contexts, moving beyond trust and usability to include relational and social bonding. The findings indicate that AI can act as a social agent, promoting emotional comfort and community, which developers and marketers can use to enhance user engagement and loyalty.

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A redefinition of the in-store experience through the use of AI

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Extended abstract

The retail sector is going through unprecedented changes, and the difference between online and offline retailing has vanished giving space to the omnichannel continuum. The convenience offered by online retailing puts physical retailers under increasing pressure (Grewal et al., 2023) which reinforces the relevance of considering the need for physical stores to reimagine themselves (Kupfer et al., 2024). The use of in-store technology plays a crucial role in this reimagination (Alexander & Blazquez, 2020).

Following Breugelmans et al. (2023) consumers visit the physical store for reasons that go from discovery, convenience, and customization to community and entertainment which relates to hedonic and utilitarian motivations. However, the role of in-store technology relates to more utilitarian functions although the lack of a distinctive store atmosphere is a key factor associated with store closures (Kupfer et al. 2024). The physical presence offers unique opportunities to develop immersive experiences that combine both convenience and interest (Hagtvedt & Chandukala, 2023). These experiences contribute to developing a relationship between consumers and brands and promote cross-channel engagement through touchpoints in different channels.

Recent advancements in various technologies, data analytics, and the rise of artificial intelligence (AI) have significantly transformed retail (Shankar et al., 2021). The adoption of AI has been more evolutionary than revolutionary and is currently more related to convenient purposes - i.e. consumers are overwhelmed with choices and AI creates a customize offering based on their preferences (Business of Fashion, 2025). The fashion industry is a pioneer in the investment in AI and more specifically in generative AI (MGNET, 2024). An example would be Zalando with a ChatGPT-powered shopping assistant, personalised product recommendations and curated content resulting in increasing customer engagement (Business of Fashion, 2025). However, most applications of AI in fashion relate to online settings with a clear gap in the possibilities of AI to improve physical store experiences.

This research aims to get a better understanding of the dynamics of the relationship between consumers, retailers and AI technologies in physical retailing from an omnichannel perspective. In doing so, we aim to explore current and future uses of AI technologies in fashion stores and how they contribute or could contribute to creating a shopping experience. We look at the role of consumers and the impact on retailers at different levels with the objective is to develop a cohesive framework that integrates these different perspectives and establishes future research directions.

Consumers, retailers and AI technologies: an initial review

The interplay of channels, devices and technologies, creates an interesting imbalance of power between retailers and consumers. When retailers are responsible for managing retail channels and implementing in-store technologies based on information/insights they get from consumers, it is the consumers who decide how to interact with these technologies through their own mobile devices and customise this experience beyond algorithms. In this scenario, AI offers challenges and opportunities for both. AI predictive tools allow consumers to make more informed decisions and consequently, reduce fashion' environmental impact. AI also allows retailers to collect information of in-store interactions helping them to predict consumer behaviour, offering the same level of data analytics many companies already apply to e-commerce (Bain, 2025). In addition to these, more futuristic applications of AI relate to AI-powered personal assistants (Carrol, 2025) and emotional AI. Nguyen et al. (2022) refer to the use of AI for multimodal emotion recognition by employing computer vision techniques to identify facial expressions, speech and body gestures. In the fashion sector, this would include recommendation systems built on the analysis of emotions that will follow to recommending different outfits based on specific moods. However, there is a need for a cross-disciplinary effort between computer science, neuroscience and psychology to advance knowledge in this area (Assunção et al. 2022).

This research will address specific GAPs in these domains developing a cohesive research agenda and offering insights for practitioners.

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Mapping Relationship Dynamics in Marketing: A Text-Mining Approach for Human–AI Interaction Studies

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Type of manuscript: Extended abstract

Keywords: relationship dynamics; chatbot; text mining; bibliometric; co-citation analysis; co-word analysis

Extended abstract

Artificial intelligence (AI) is profoundly transforming the business landscape, economic structures, and societal interactions by redefining stakeholder and citizen experiences and relationships (Loureiro et al., 2021). In today's digital era, AI—especially through text- based chatbots—is expected to significantly reshape the job market (Letheren et al., 2020). Despite the widespread adoption of chatbots by numerous business leaders in recent years, consumer acceptance and sustained usage remain comparatively limited (Forbes, 2019). Research on artificial intelligence (AI) has emerged from various fields of study. However, progress in AI development has largely occurred in isolated domains, with limited interdisciplinary collaboration (Loureiro et al., 2021). One of the vital areas of research in the field of intelligent chatbots is examining how humans understand and form relationships with these systems.

Although relationship perspectives are increasingly acknowledged in marketing, their theoretical foundations remain underdeveloped. The field has prioritized application over conceptual clarity, and researchers who have applied interpersonal relationship theories to the study of consumer-object interactions have been notably selective in their approaches (Fournier, 1998). Temporality serves as a key factor that differentiates a relationship from a single, isolated transaction (Berscheid & Peplau, 1983). Our literature review identified a gap in relationship marketing, where relationship dynamics have been well-explored in organizational contexts but less so in human relationships, especially with customers. This research highlights the need to understand human–AI relationship dynamics. To do so, it first draws on insights from human interpersonal relationships in marketing to establish a strong conceptual foundation.

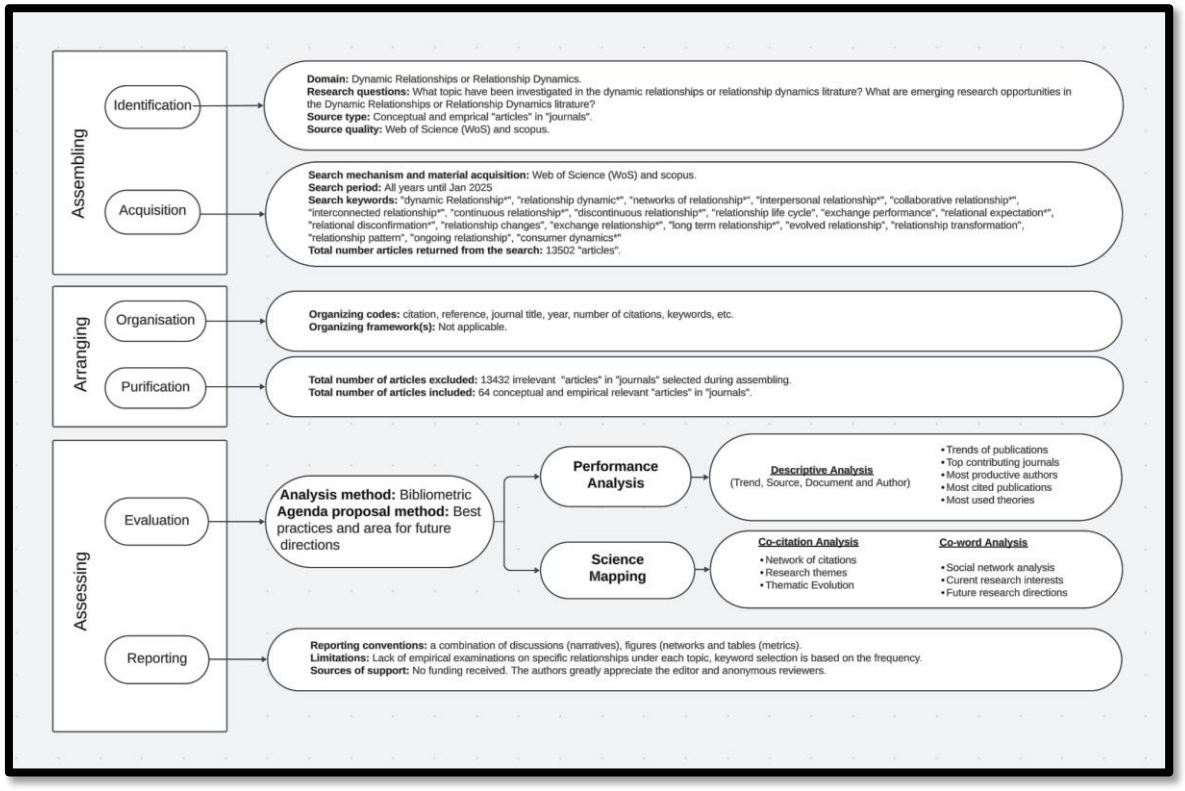
As AI technologies increasingly mediate interactions between brands and consumers— through chatbots, virtual assistants, and intelligent recommendation systems—it becomes essential to examine the nature of these evolving relationships. Therefore, understanding the dynamics between humans and artificial intelligence (AI) is not only a growing academic concern but also a practical imperative.

This study investigates the dynamics of human relationships within marketing contexts using bibliometric analysis and text-mining techniques, with the goal of generating insights that can help overcome current limitations in human–AI interaction. In this study, we seek to answer the question: How can insights from human relationship dynamics in marketing enhance human–AI interactions, especially in chatbot communication?

During our preliminary investigation, we considered AI-based methods for systematic literature reviews. Despite their potential, recent studies highlight key challenges, including integration complexity, usability issues, lack of standard evaluation frameworks, limited applicability in later review stages, and concerns about transparency and trust (Bolanos et al., 2024). We searched Scopus and Web of Science to include high- quality articles, but coordinating AI tools from these platforms was not feasible. Therefore, we adopted a widely used, established method for systematic literature reviews, ensuring a thorough review of articles to minimize the risk of missing valuable studies.

In this research, we adhered to the Scientific Procedures and Rationales for Systematic Literature Reviews (SPAR-4-SLR) protocol, as outlined by Paul et al (Paul et al., 2021). This protocol has been employed in various bibliometric studies, including those by Kumar et al. (Kumar et al., 2022), Lim et al. (Lim et al., 2022), and Chandra et al.(Chandra et al., 2022). Figure 1 shows the SPAR-4-SLR protocol, consisting of three steps: assembling, arranging, and assessing. Based on a dataset of 13,502 articles from Scopus and Web of Science, 64 high-impact marketing articles on relationship dynamics were selected after applying exclusion criteria.

Fig 1. The SPAR-4-SLR Protocol: A Framework for Data Collection and Analysis

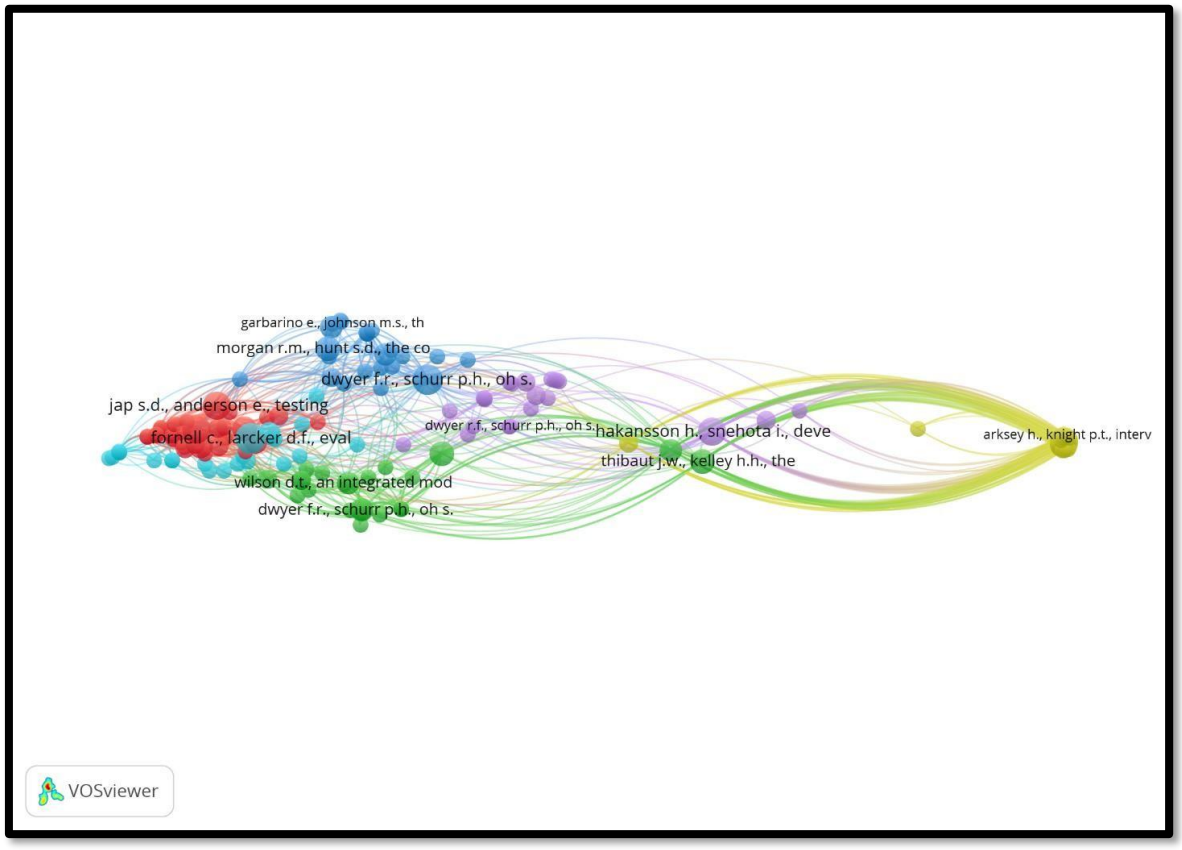


The rise of bibliometric studies in recent years is driven by greater access to bibliometric data from databases like Scopus and Web of Science, along with advanced tools such as VOSviewer and Gephi (Donthu et al., 2021). The primary tools used in bibliometric analysis are performance analysis and science mapping (Moral-Muñoz et al., 2020). Science mapping encompasses methods such as citation analysis, co-citation analysis, and co-word analysis (Donthu et al., 2021; Kraus et al., 2022). Recent studies often employ a combination of co-citation analysis and co-word analysis to identify research trends within a particular field (Khanra et al., 2021; Leung et al., 2017).

In Study 1 (Co-citation analysis), bibliometric tools such as VOSviewer and Gephi were used to explore structural patterns in the academic literature on relationship dynamics. This phase included

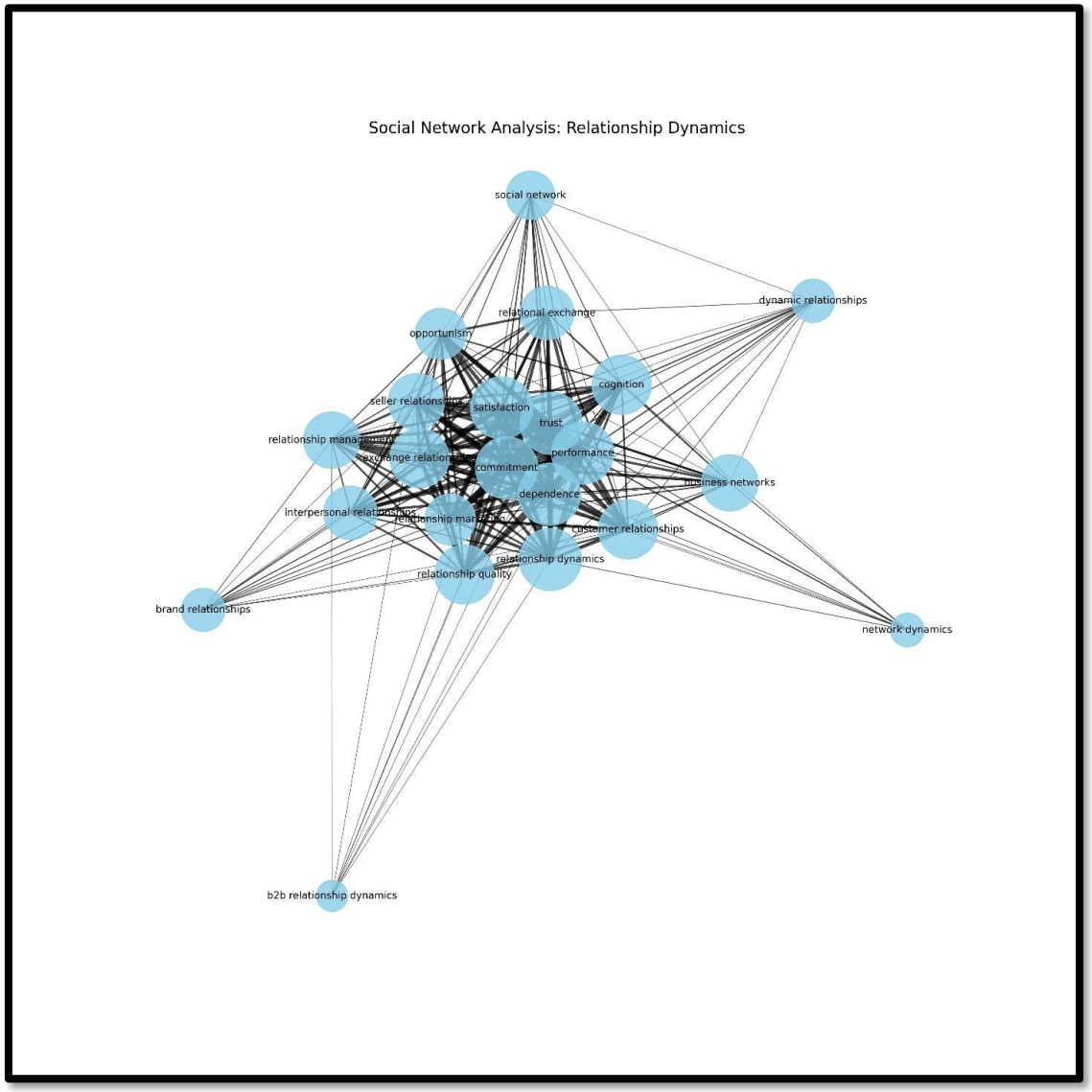
performance evaluation, cluster mapping, and keyword co-occurrence analysis to identify influential themes and conceptual trends in the field.

Fig 2. Network of popular co-citations over the entire period.



In Study 2 (Co-word analysis), text mining and social network analysis (SNA) using Python were employed to examine how concepts such as Trust, Satisfaction, Relationship Dynamics, and others are related and have evolved over time. This two-stage approach provided a comprehensive understanding of the conceptual and intellectual structures in the field of relationship dynamics in marketing, which formed the basis for recommendations aimed at fostering deeper human-AI engagement.

Fig 3. The Social Network Analysis of the Relationship Dynamics research.



The analysis revealed that foundational concepts such as "Trust," "Satisfaction," and "Commitment" play a central role in relationship dynamics, with strong interconnections to "Relationship Quality" and "Customer Relationships." These concepts were identified as critical in fostering relational governance and are particularly significant in loyalty programs and AI-mediated interactions, such as those involving chatbots. The evolving landscape of AI-driven systems necessitates an adaptation of these traditional relationship metrics to ensure trust and satisfaction in increasingly automated environments. "Relationship Dynamics" emerged as a central integrative construct, connecting diverse strands of relationship research, while peripheral themes such as "B2B Relationship Dynamics" and "Network dynamics" indicate promising avenues for future inquiry, particularly in AI-driven customer engagement contexts. The findings highlight the need
for further research to bridge the gap between traditional relational concepts and modern technologies, providing valuable insights into the future of relationship marketing and human-AI interactions.

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Influencing the Influencers: How SHEIN Harnesses UGC for Maximum Consumer Engagement on TikTok

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Type of manuscript: Extended abstract

Keywords: User-Generated Content (UGC); consumer engagement; influencer marketing; authenticity; TikTok; Persuasion Knowledge Model (PKM)

Extended abstract

User-Generated Content (UGC) has revolutionized the way brands communicate with consumers and has become an essential pillar of modern marketing strategies. This shift is largely attributed to social media and the digital economy, allowing consumers to generate and share content that significantly impacts brands on a massive scale. The global investment in influencer marketing was valued at $34.08 billion in 2023, affirming the importance of UGC in marketing. UGC has been shown to outperform Firm-Created Content (FCC) almost every time, with 93% of marketers reporting better conversion rates and 82% of consumers registering increased purchase intent when brands tap into the concept (Backlinko, 2024). This study builds upon the Persuasion Knowledge Model (PKM) (Friestad & Wright, 1994) to understand how consumers perceive and react to persuasive intent within UGC. More specifically, the study investigates estimates of authenticity (perceived authenticity and authenticity construction) as possible moderators of consumer engagement levels on TikTok influencer content.

UGC has more power over the audience compared to FCC, because of its genuineness and relevance (Shan, 2019). Added to that fact, Tanwar et al.'s (2022) proposal gives parasocial interaction – where audiences establish one-way but meaningful connections with influencers-which further legitimizes this impression of genuineness, hence making UGC look as though it is untouched by commercial intent. This unique aspect of UGC's perceived authenticity positions it as a stronger driver of consumer trust and engagement than FCC, as evidenced by Schivinski's (2022) findings that the genuine consumer nature of UGC significantly shapes positive brand perceptions and influences purchase intentions. This also aligns with recent findings by Walsh et al. (2024), who demonstrated that content creator popularity and perceived authenticity directly influence engagement with sponsored content on TikTok. However, perceived authenticity is never automatic. Consumers' ability to distinguish persuasive intent, as conceptualized by PKM, can have different interpretations of influencer content. Previous studies have been concerned mostly with Instagram and other image-based platforms, leaving a gap in the understanding of how PKM processes work within the TikTok video-driven, algorithmically influenced environment.

The core aim of this research is to perform an empirical examination of the effects of some UGC characteristics, namely influencer type (nano, micro, macro, mega), caption style (emotional vs. commercial), and sponsorship status (sponsored vs. non-sponsored), on consumer engagement on TikTok. On the other hand, the research proposes investigating the mediating effect of perceived authenticity in line with the Persuasion Knowledge Model.While most studies focused predominantly on image-centered platforms (Instagram), the present study explores how uniqueness of TikTok and the influence of content features (such as visual and audio-visual elements, captions, influencer

popularity, and sponsorship disclosure) affect consumer engagement within the context of SHEIN's UGC-driven marketing campaigns.

The present study utilized a mixed-methods approach. A census sampling was performed on almost 200 publicly available TikTok videos tagged with #sheinhaul to capture variation according to influencer size, caption tone, and how overt the sponsorship was. Metadata extraction techniques, along with transcription from speech to text through Artificial Intelligence (AI), were used: follower count, hashtags, caption sentiment, and some audio-related features. Inter-coder reliability tests were done to validate the thematic codes (Cohen's Kappa > 0.80). Sentiment analysis was implemented using NLP tools, whereas Post Interaction Rates (PIR) were used to measure engagement levels.
This study attempts to make a substantial contribution to the theoretical and practical understanding of UGC by empirically examining the unique characteristics of TikTok, specifically analysing the impact of different influencer types (nano, micro, macro and mega), caption type (emotional vs. commercial) and sponsorship status (sponsored vs. non-sponsored content) on user engagement in the real-world context of SHEIN campaigns on TikTok. This combined approach provides new, practically applicable insights, both for academic research and for professionals in the fashion and digital marketing fields. Initial observations show that content derived from nano and micro-influencers yield higher engagement rates, especially when captions are emotions-oriented. Sponsored posts with an emotional tone seem to retain a good amount of engagement, hinting at the possibility that authenticity stands to shield the ads from skepticism raised by disclosure of sponsorship. This essentially aligns with the core tenets of PKM theory.

This study contributes to the Persuasion Knowledge Model theory by applying it in the TikTok context, emphasizing the dynamics between content features (emotional tone, influencer scale, disclosure cues) and consumer persuasion knowledge on perceptions of authenticity and trust. The findings offer some practical implications for creators and fashion marketers surrounding how to optimize UGC for maximum engagement without sacrificing perceived authenticity.

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"Trust Me, I'm Virtual": The Role of Structural Assurance, Brand Trust, and Ad Value in Shaping Self-identity in the Metaverse

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Extended abstract

Introduction

The metaverse is an immersive, integrated digital environment in which users interact with avatars to engage in social, commercial, and artistic activities (Dudley *et al.*, 2023). As this online community grows, it has become increasingly significant to explore the perceptions and identities of users on these platforms. Major platform attributes such as structural assurance (safety and transparency) (Akhmedova *et al.*, 2021), brand trust (Li *et al.*, 2008), and advertising value (Ducoffe, 1995), significantly affect how users identify themselves in virtual environments. However, little research has explored how these features interact in the metaverse. To address this gap, this study uses a quantitative approach to examine how structural assurance impacts brand trust and ad value and how these attitudes affect users' current self-identity. Accordingly, the study aims to answer two research questions:

RQ_1: How does structural assurance in the metaverse impact users' current self-identity?
RQ_2: What roles do brand trust and advertising value play in mediating the relationship between structural assurance and self-identity in virtual environments?

Originality of the study

By incorporating the Stimulus-Organism-Response (SOR) model into the metaverse setting, this study makes a novel contribution by investigating the ways in which structural assurance affects users' behavioral and psychological reactions. Previous research has examined trust and perceived ad value in traditional digital platforms (Liu *et al.*, 2019); however, few studies have examined how platform-level elements influence brand trust, advertisement value, and users' self-identity in immersive virtual environments. This study is among the first when it comes to integrating these concepts into a single framework and confirming their connections through real research. Indeed, this research contributes to the knowledge of consumer-brand dynamics in the metaverse and offers strategic insights for immersive marketing design by concentrating on identity formation through trust and ad value.

Theoretical Background and Hypotheses Development

This study applies the Stimulus-Organism-Response (SOR) framework, first proposed by Mehrabian & Russell (1974), to investigate how metaverse structural components affect users' self-identity formation and brand perceptions. This approach uses structural assurance as the external stimulus (S), which refers to the platform's security, accessibility, and governance processes (McKnight & Chervany, 2002). The internal cognitive and emotional reactions (O) shaped by this stimulus, such as advertising value and brand trust, have an impact on the behavioral outcome (R), namely, the

individuals' current self-identity, which is the person's active self-concept or the way they see themselves influenced by their relationships, experiences, and online activities (Berzonsky, 1994). Based on research from online banking and e-commerce, which indicates that users' trust grows when they perceive robust platform security (McNeish, 2015; Sha, 2009), the first hypothesis suggests that structural assurance has a positive effect on brand trust. The second hypothesis proposes that structural assurance increases the perceived value of advertisements, especially when they are given in enjoyable and safe formats (Liu *et al*., 2019). The third hypothesis contends that self-brand integration and deeper psychological connections are fostered by brand trust and that these factors aid in the construction of identities in virtual worlds (Hatada *et al*., 2024). Lastly, the fourth hypothesis suggests that high-value advertising also reinforces users' sense of self when it is viewed as interactive, powerful, and relevant (Sharma *et al*., 2024). By extending the SOR paradigm into the fields of digital marketing, these connections collectively show how a safe and welcoming metaverse may support users' meaningful engagement and identity expression.

Methodology

This study adopted a quantitative survey approach to investigate how individuals view self-identity, advertising value, brand trust, and structural assurance in the metaverse. Through Qualtrics, 540 metaverse users were recruited. Constructs were examined on a 7-point Likert scale using established multi-item measures. Moreover, pilot testing and factor analysis using SPSS and LISREL were used to validate face and discriminant validity.

Results

After validating the data using EFA and CFA, as hypothesized, metaverse platform structural assurance had a direct positive impact on brand trust (H1: $\beta = .780$, $p < .001$) and the metaverse ad value (H2: $\beta = .849$, $p < .001$). In consequence, brand trust (H3: $\beta = .668$, $p < .001$) and metaverse ad value (H4: $\beta = .332$, $p < .001$) had a direct positive influence on individuals' current self-identity, indicating that both brand trust and ad value serve as mediators between structural assurance in the metaverse and self-brand integration.

Discussion and implications

The results support the SOR model in the metaverse by demonstrating that structural assurance has a major influence on advertising value and brand trust, both of which influence users' self-identity. This provides a novel viewpoint on digital consumer research by highlighting the psychological depth of customer interaction in immersive environments (Hatada *et al*., 2024).

The study has some significant theoretical and practical implications. From a scholarly perspective, this study expands the SOR concept to virtual settings and highlights identity as a crucial consequence of trust and perception. The managerial implications are also sizable. The study emphasizes how crucial it is for managers to create inclusive, safe, and structurally sound metaverse platforms in order to promote stronger customer-brand interactions. Additionally, brands should create believable, approachable, and captivating ads to improve identity integration, user trust, and sustained engagement in the dynamic metaverse environment.

Conclusion, limitations, and future research lines

In conclusion, this study suggests that structural assurance in the metaverse has a significant effect on brand trust and advertising value, which in turn influences users' self-identity. These findings support the SOR model's suitability for use in immersive virtual worlds. However, the study has some limitations. In fact, the cross-sectional approach limits its scope. Future studies should use longitudinal approaches to investigate demographic or cultural variations in metaverse engagement as well as identity formation over time. In conclusion, further understanding of virtual consumer

behavior might be possible by extending the model to incorporate variables such as social interaction or emotional attachment.

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Reducing Food Waste in Restaurants Through Augmented Reality (AR)- Based E-Menus: The Central Role of the Sustainable AR-Enhanced Dining Experience

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Extended abstract

Introduction

Dining out is pleasurable but also poses serious environmental challenges. Across Europe, out- of-home catering services generate over 10.5 million tons of food waste annually (Feedback EU, 2022). Although EU policy promotes food waste reduction, compliance at the restaurant level remains limited (Filimonau et al., 2020). This waste not only intensifies greenhouse gas emissions (Meier et al., 2021), but also undermines food security efforts (Mejjad et al., 2023; Sousa et al., 2021). A central driver of this problem is portion-size misalignment. Research shows that consumers struggle to perceive portion size accurately before ordering (Ordabayeva & Chandon, 2016) and tend to underestimate intake when portions are large (Petit et al., 2017). Consequently, plate waste becomes common (Xu et al., 2020). To address this, augmented reality (AR) offers promising solutions by enabling consumers to preview meals in immersive 3D before ordering (Seetharam et al., 2023; Rollo et al., 2017).

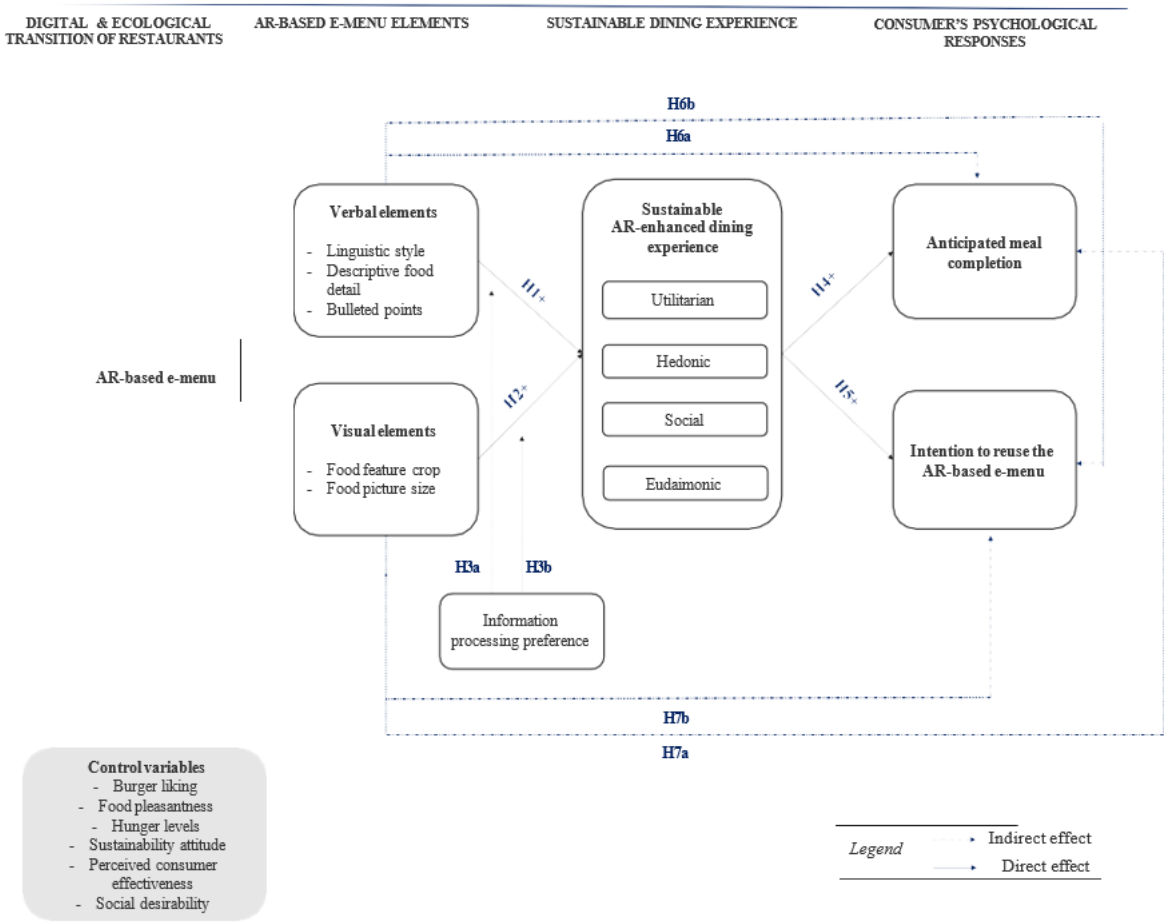
Beyond functionality, AR also enriches the dining experience (Batat, 2021). Similarly, the design of digital interfaces—especially their verbal and visual elements—shapes experiences and influences consumer behavior (Bleier et al., 2019). In restaurants, well-designed electronic menus (e-menus) have been shown to improve food quality perceptions and increase behavioral intentions (Lin et al., 2023). As restaurants adopt immersive technologies like AR, e-menu design becomes key to enhancing dining and shaping experiences that can drive sustainable behavior.

To understand how these experiences are constructed within restaurant settings, this research builds on the AR-enhanced experience (AR-EX) framework (Ali, 2022), outlining utilitarian, hedonic, and social dimensions. Prior studies have shown that AR can stimulate appetite and food desirability (Fritz et al., 2023), a response often attributed to enhanced visual realism (Shaheen et al., 2024). While this may improve portion perception and reduce food waste, it may also increase food appeal and risk overconsumption—making it essential to disentangle these opposing effects. Despite these behavioral implications, AR's role in promoting sustainable behaviors remains underexplored (Moscoso et al., 2024). Therefore, we propose adding a fourth dimension—eudaimonic experience. Eudaimonia is a form of psychological wellbeing that emphasizes personal meaning and self-reflection (Lengieza et al., 2019) driving sustainable behavior (Ünal et al., 2017; Steg et al., 2016). Together, these four dimensions form a sustainable AR-enhanced dining experience, where AR interactions promote practicality, enjoyment, social connection, and personal meaning that can support sustainable behavior—such as reducing food waste.

Grounded in the Online Customer Experience (OCE) framework (Bleier et al., 2019) and the AR-EX model (Ali, 2022), we examine how verbal (e.g., linguistic style, descriptive food detail, bulleted points) and visual (e.g., food feature crop and picture size) elements of AR- based e-menus influence

these experiential dimensions, and how these, in turn, affect two key outcomes: anticipated meal completion—defined as the expectation to finish the entire meal and used as a proxy for perceived food waste—and reuse intention of the AR-based e-menu. Additionally, consumers' information processing preferences (Mayer & Massa, 2003) are considered a key moderating factor between AR-based e-menu elements and perceptions of the sustainable AR-enhanced dining experience. Figure 1 presents the research model.

Figure 1. A model of the sustainable AR-enhanced dining experience.



Methodology

This study adopts a mixed-method research design to examine how AR-based e-menus influence anticipated meal completion and intention to reuse through experiential mechanisms. The qualitative phase will involve in-depth interviews with 15 English-speaking European participants with prior AR exposure. Interviews will explore portion perception, AR-based e- menu design's role, and factors influencing food waste reduction, including eudaimonic experiences. Data will be thematically analyzed.

The quantitative phase includes a pre-study and a main study, both conducted as online experiments. The pre-study will validate the AR-based e-menu prototype's quality, developed on Wix and integrated with Echo3D to display 3D previews of vegetarian, chicken, and beef burgers. A sample of 100 European participants, VR headset owners will evaluate the e-menu on realism, attractiveness, interactivity, engagement, immersion, imagination, and credibility. The main study will use the validated prototype to test the research model (Figure 1) through a between-subject design. A sample of 250 participants with the same profile will be randomly assigned to either a standard or customized

portion condition. After interacting with the AR- based e-menu, participants will complete an online survey measuring all variables in the research model. Data will be analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM).

Theoretical implications

This study will extend the AR-enhanced experience (AR-EX) model applied to restaurant settings by introducing a eudaimonic dimension relevant to sustainability. If supported, this will align with findings that eudaimonia predicts sustainable behavior (Shin et al., 2022) and that immersive technologies can elicit such experiences when tied to sustainability goals (Cole & Gillies, 2019). Additionally, AR-based e-menus will be expected to act as gentle interventions that reduce portion-size ambiguity (Trivedi et al., 2023; Souverein et al., 2011) through meal previews (Seetharam et al., 2023) and promote moderation when paired with verbal (Dekhili & Ertz, 2024) and visual elements (Fritz et al., 2023).

Managerial implications

This study is expected to offer practical guidance for restaurants by showing how AR-based e- menus with customizable portion previews can reduce food waste. The solution can be cost- effectively integrated into existing digital systems, scaled gradually, and made accessible through enhanced design. Additionally, framing AR tools around waste reduction and regulation compliance can enhance brand image and support marketing and policy alignment.

Limitations and future research

This study's limitations include the use of a simulated AR setting, calling for real-world validation. Future research should explore eudaimonia in other sustainability areas and examine ethical risks like overconsumption linked to AR's persuasive power.

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Metaverse Adoption in Hotels: A TOE Framework Perspective

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Extended Abstract

The tourism and hospitality industry is one of the driving forces of the global economy. Since the adoption of cutting-edge technologies in this industry has spread over the past few years, how services are offered and received has fundamentally changed (Nam et al., 2021). The most innovative technologies adopted in this industry included robots and AI applications, Virtual Reality (VR) and Augmented Reality (AR) (Nam, 2021; Abdelhakim et al., 2023). These technologies have influenced travel experiences and led to more complex innovative technology; the metaverse (Gursoy, Malodia, & Dhir, 2022; Buhalis, Lin, & Leung, 2022). The Metaverse or the "Third space" is defined as "… the post-reality universe, a perpetual and persistent multiuser environment merging physical reality with digital virtuality" (Mystakidis, 2022: p 486).

There are numerous possibilities provided by the metaverse for the hospitality and tourism industry (Buhalis, Leung, & Lin, 2023). Using virtual reality tours, hotels can provide potential guests with access to virtual rooms, hold meetings, and tour the hotel facilities using avatars. Expected guests can use this platform to compare service offerings and engage with hotels (Gursoy, et al., 2022). As well as providing virtual hotel experiences for upcoming guests, hotels can take advantage of the metaverse for marketing and advertising purposes (Gursoy, et al., 2022; Buhalis, et al., 2023).
Despite affecting tourists' satisfaction and loyalty of customers (Abou-Shouk, et al., 2024), the adoption of new technologies (i.e., the metaverse) should consider different factors. These factors were widely studied based on technology adoption models and theories, including TAM, TOE, TPB. This study adopts the Technological, Organizational, and Environmental (TOE) model since it provides a comprehensive overview of adoption factors, user adoption processes, and implementation; the foreseeing challenges; the technology's impact on the value chain and post-adoption diffusion; and the development of hotels' capability (Cobos, et al., 2016; Ezzaouia & Bulchand-Gidumal, 2020; Pizam et al., 2022).

Therefore, this study is attempts to answering this question: What are the technological, organizational, and environmental antecedents influence the Metaverse adoption in hotel industry? It aims to empirically explore the determinant factors affecting the metaverse adoption in hotel industry in the Egyptian five and four-star hotels as these hotels have the capability (i.e., financial, and technical) to adopt the metaverse.
Design/methodology/approach

Based on the TOE model as the theoretical base (Tornatzky, & Fleischer, 1990), which is widely used in adopting new technologies in hotel industry (e.g., Yadegaridehkordi, et al., 2018; Pizam et al., 2022). This study adopts the mixed method approach through the sequential research design: QUAN-QUAL. The quantitative approach to test the proposed research framework. Survey data will be collected from a convenient sample of the managerial levels of three types of Hotels: Standalone Property, Local Independent Chain, and Global chain hotels. The managerial levels include general managers, marketing managers, sales managers, reservation managers, and IT managers. Structural equation modelling (SEM), the advanced multivariate technique, will be used for data analysis and hypotheses-testing. Qualitative approach will be used to analyse qualitative data collected from a convenient sample of hotel managers through interviews. Qualitative research will be integrated with the quantitative results for more in-depth understanding of the factors affecting hotel adoption of metaverse.

Contributions

This study is expected to present a better understanding of hotel managers about the metaverse adoption. It will explore the influence of technological, organisational, and environmental factors that potentially affect the adoption decision by hotels in Egypt. It uses mixed-method approach for better understanding the adoption decision in three types of hotels: Standalone Property, Local Independent Chain, and Global chain hotels.

Originality/value

This study is expected to be among the first known mixed method research to examine Metaverse adoption intention in hotel industry in Egypt. It offers a better insight in understanding incentives behind hotels' decisions to adopt metaverse.

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Generative AI-Powered Personalized Content and Its Impact on Intention to Hotel Room Booking: The Mediating Role of User-generated Testimonials

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Type of manuscript: Extended abstract

Keywords: generative AI; artificial intelligence; AI-powered personalized content; hotel booking; user-generated testimonials

Extended abstract
This study examines the effect of AI-generated personalized content on online hotel bookings in Malaysia's hospitality industry. As digital transformation advances, hotels are increasingly leveraging AI to analyze user data, including cookie acceptance, and deliver tailored ads and recommendations focused on price, location, amenities, or urgency (e.g., "book now, rooms are filling fast"). The success of this content hinges on its informativeness and potential irritation. Additionally, the research examines how user-generated testimonials serve as social proof, influencing the persuasive power of AI-generated content. Data is gathered through a quantitative survey of Malaysian consumers who recently booked hotels online to assess their perceptions and responses to AI-generated content. The findings will provide valuable insights for hospitality marketers to refine their AI personalization strategies, thereby enhancing customer experience and conversion rates in a competitive digital environment.

Introduction
The digital transformation of the hospitality industry has fundamentally altered how customers engage with hotel booking platforms (Campione, 2021). Modern hotel websites now utilize artificial intelligence (AI) to generate personalized content tailored to individual preferences and needs (Saxena, Gupta, & Kumar, 2024). When users visit hotel websites and accept cookies, they inadvertently provide substantial data that AI algorithms can analyze to deliver customized content (Hardcastle, Vorster, & Brown, 2025). This phenomenon represents a critical touchpoint in the customer journey that merits detailed investigation to understand its influence on booking decisions. Cookie acceptance is a critical turning point in hotel online booking. Once accepted, the predefined Acceptance Criteria enable AI systems to combine a user's data collection, such as visited websites, performed searches, and other previous engagements, through the use of cookies. Generative AI then creates tailored ads that highlight the user's valued features, like competitive prices and attractive locations with trendy amenities, while also instilling urgency with phrases about limited-time offers. These efforts ensure that content served to potential guests is relevant, helping them make informed choices.

The effectiveness of AI-generated content hinges significantly on two key factors: informativeness and potential irritation. As conceptualized by (Ducoffe, 1995); Ducoffe (1996)Informative content conveys relevant details about hotel offerings and benefits, thereby addressing customer inquiries and

potentially resolving challenges encountered during the booking process. A study by Du, Zhang, and Ge (2023) explored that when AI-generated content successfully delivers high informative value, it enhances its perceived value and positively influences consumer engagement. Conversely, when personalized advertisements are perceived as intrusive or overwhelming (Truong & Simmons, 2010), they may generate irritation, negatively impacting attention and willingness to engage with booking options.

The mediating effect of user-generated testimonials is rooted in Social Cognitive Theory (Bandura, 2001), which suggests that peer reviews influence cognition and behavior. Schwartz (1994) suggests that UGC satisfies both functional (informational) and emotional (trust, community) needs, which are essential in high-involvement decisions, such as hotel bookings. User-generated reviews serve as a form of social validation, significantly influencing potential customers' decision-making processes (Jia, Chi, & Chi, 2025; Neirotti, Raguseo, & Paolucci, 2016). When AI-powered systems strategically incorporate relevant testimonials alongside personalized recommendations, they leverage the persuasive power of social proof. According to Banerjee, Bhattacharyya, and Bose (2017), consumers trust online reviews as much as personal recommendations, highlighting the substantial mediating effect that testimonials have on converting interest into actual booking behavior.

The relationship between these elements aligns with established theoretical frameworks, particularly the ELM (Elaboration Likelihood Model) (J. Kitchen, Kerr, E. Schultz, McColl, & Pals, 2014) and the AIDA (Attention, Interest, Desire, Action) model (Kapoor, Kumar, & Vashisht, 2024). Through the lens of ELM, AI-generated content can influence consumer decisions through either central route processing (careful evaluation of information) or peripheral route processing (reliance on visual stimuli and emotional appeals) (Filieri, McLeay, Tsui, & Lin, 2018). Similarly, the AIDA model provides a framework for understanding how personalized content progresses potential customers from initial awareness to final action, completing a hotel booking (Pramita & Manafe, 2022). User-generated testimonials serve as a mediating mechanism by which AI-generated personalized content influences booking intentions. Drawing on the literature, UGC, such as testimonials, enhances perceived trust and credibility, which are critical in high-involvement decisions like hotel bookings (Werenowska & Jaska, 2025). When consumers encounter AI-personalized content accompanied by authentic testimonials, they are more likely to perceive the information as trustworthy and relevant, thus increasing their engagement and intention to book (Zahrah, Ruzain, Sengorou, & Mat Salleh, 2024). This mediating effect is supported by empirical findings that show UGC can bridge the gap between marketing content and consumer action by fostering trust and emotional validation. This research study examines how generative AI content, taking into account informativity and potential irritation, affects attention and booking decisions, with testimonials serving as a mediating variable. The results will deepen understanding of AI's role in optimizing the customer journey for online hotel room bookings in Malaysia's hospitality sector.

Methods

This study employs a quantitative approach to examine the impact of AI-generated personalized content on hotel booking decisions among Malaysian consumers. It utilizes a structured, cross-sectional survey methodology to collect data on online hotel booking experiences, aligning with previous research in digital marketing and consumer behavior, and enabling the statistical analysis of key variables. The target population includes Malaysian consumers aged 18 and above who have booked hotels online in the past 12 months and have encountered AI-generated content. Participants are recruited through purposive and snowball sampling to ensure demographic representation, including age, gender, income, and geographical location. The sample size of 384 respondents was determined through a power analysis to achieve statistical significance with a 95% confidence level

and a ±5% margin of error. The survey included five sections measuring key constructs with established or adapted scales: Perceived Informativeness (4-item scale from Ducoffe, 1995, 1996), Perceived Irritation (3 items from Truong & Simmons, 2010), User-Generated Testimonials (Social Proof, 4 items from Banerjee et al., 2017), and Booking Intention (3-item scale from Pramita & Manafe, 2022).

Data collection is currently underway via an online survey platform, where respondents provide feedback on their experiences with hotel websites, cookie acceptance, perceptions of AI-generated content, and booking decisions. To ensure validity, the survey instrument underwent expert pretesting and a pilot study involving 30 respondents, leading to refinements for clarity and relevance. Data collection began in March 2025 and will continue until July 2025, with interim analyses conducted to monitor response patterns and quality. As of this writing, data collection is ongoing, and the full analysis of the study has not yet been completed. The final manuscript will present detailed empirical findings, including the results of structural equation modeling and subgroup analyses, to rigorously test the proposed relationships and hypotheses.

Analysis will use structural equation modeling (SEM) to explore relationships between AI-generated content characteristics (informativeness and irritation), the mediating role of testimonials, and booking decisions. Testimonials are treated as a latent construct, measured by four items adapted from Banerjee et al. (2017), such as "Reading other guests' testimonials increased my confidence in booking" and "Testimonials made the hotel seem more trustworthy." Direct paths go from AI-generated content characteristics (informativeness and irritation) to testimonials, and from testimonials to booking intention. Direct effects from AI-generated content to booking intention are also included. Mediation is tested by evaluating the significance of the indirect effects (AI-generated content → testimonials → booking intention). Multi-group analysis will assess differences across demographic segments and preferences, providing insight into how generative AI influences online hotel booking in Malaysia.

Potential Contribution

This study makes a significant contribution to AI-driven hospitality marketing, encompassing theoretical, methodological, and practical aspects. It enhances Ducoffe's advertising value framework with the Elaboration Likelihood Model (ELM) and the AIDA model, analyzing how AI-generated content affects customer decisions through informativeness, irritation, and testimonials. It clarifies the role of user-generated testimonials in converting personalized content into bookings, enriching literature on social proof in digital environments. Methodologically, the research employs quantitative cross-sectional surveys to rigorously track customer journeys from pre-purchase intent to post-purchase advocacy. Practically, it offers hotel marketers valuable insights to optimize AI-generated content by striking a balance between personalization and privacy, leveraging testimonials to establish trust, and designing urgency-driven campaigns that align with Malaysian consumer preferences. For policymakers, the findings underscore the importance of transparent data practices and the responsible use of AI in cookie-based advertising. Regionally, it addresses the Malaysian hospitality market, proposing culturally relevant strategies for AI adoption in Southeast Asia's digitizing tourism sector. The findings reveal how AI-generated personalized content and user-generated testimonials affect hotel booking intentions. The contribution depends on empirical results, which will be analyzed before publication. By considering ethical issues and consumer perceptions of data privacy, the study provides a holistic understanding of challenges and opportunities in AI-powered hotel marketing, offering actionable guidance on balancing personalization with ethical responsibility.

Conclusion

This research examines the impact of AI-driven personalized content on online hotel booking behavior in Malaysia. Using Ducoffe's advertising value framework, the Elaboration Likelihood Model (ELM), and the AIDA model, it is demonstrated that tailored AI content and cookie data influence booking intentions by striking a balance between informativeness and irritation, with testimonials serving as a key mediator. Personalized strategies, such as dynamically priced urgency indicators and highlighted amenities, enhance customer attention and trust when paired with credible testimonials. The study contributes to hospitality research through a quantitative approach, utilizing structural equation modeling (SEM) to assess the effect of AI-generated content on booking intentions. Data analysis is ongoing, making conclusions preliminary. Findings contribute to the ethical AI debate by showing personalization efficacy depends on both technical accuracy and consumer trust. Future research should investigate how transparent data practices, such as opt-in consent for cookie tracking, reduce irritation and foster long-term loyalty in the hospitality industry. The final version will discuss empirical findings, their theoretical implications, and practical applications. Further research and industry practice should address the ethical implications of AI-driven personalization, ensuring commitments to data privacy, transparency, and consumer trust in digital marketing advancements.

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Standardized Travel, Altered Cultures: GAI's Role in Destination Acculturation

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Extended Abstract

Generative Artificial Intelligence (GAI) has transformed the services industry, including tourism (Dwivedi et al., 2023; Ooi et al., 2023). GAI is now extensively used in the tourism sector in every aspect of the tourist journey to provide customized experiences to tourists (Dogru et al., 2025; Dwivedi et al., 2024). It has revolutionized how tourists increasingly rely on the GAI to create travel plans and personalized itineraries (Wong et al., 2023). However, despite its increasing popularity, tourists still face a challenge in accepting such GAI-generated itineraries or travel plans (Seyfi et al., 2025). It raises another concern if GAI platforms recommend similar or very generic experiences to different tourists (Stahl & Eke, 2024). While it seems to have great potential in providing personalized experiences, there is a risk if it suggests similar experiences at every destination or suggests only a few popular destinations. It would diminish the uniqueness factor, which is often the priority of tourists when they plan such trips. Also, the unique cultural aspects that distinguish destinations will be homogenized by AI-crafted experiences. This raises concerns and challenges regarding maintaining the cultural authenticity and diversity of the destination tourists visit. It can pose a risk to the acculturation of these destinations. Therefore, this study explores how tourism services using GAI platforms can foster responsible innovations that promote destinations in such a way that they enhance the unique cultural identities of destinations rather than eroding them. This study explores: (RQ1) differences in itineraries across GAI platforms, (RQ2) differences between GAI- and human-generated itineraries, (RQ3) tourists' acceptance of AI- versus human- generated itineraries, and (RQ4) whether overreliance on GAI for travel planning contributes to accelerated acculturation.

The present research uses two theories to investigate GAI's influence on acculturation. First, Cultural Consumption Theory (CCT) helps to interpret how cultural meanings are constructed, distributed, and consumed, including the technological mediation in cultural consumption. Acculturation Theory helps assess how repetitive exposure to similar destinations shapes cultural change in tourists and host communities.

This research includes three studies: two experimental and one questionnaire-based survey. Study-1 considered two different GAI platforms (ChatGPT and Gemini) and human participants for generating itineraries. 120 participants were selected for this study who were familiar with the chosen destinations (Uttar Pradesh, Tamil Nadu, Andhra Pradesh, Karnataka, Gujarat and Delhi) and have used GAI. The findings of study-1 highlight that travel itineraries generated using two different GAI platforms were quite similar, while they were notably different from the itineraries generated by humans. Unaware of whether GAI or humans prepared the itineraries, Study-2 participants tended to accept the itineraries generated either by humans or GAI with little or no change. For Study-2 a total of 195 respondents were selected. Study-3 is a survey of the 325 local residents of the destinations popularly recommended by GAI and those not frequently visited, using an acculturation scale. Study-3 further indicated that residents of frequently recommended destinations perceived a significantly

faster rate of acculturation compared to those in less-visited areas. These findings suggest that overreliance on GAI for itinerary generation may homogenize travel experiences by suggesting similar destinations. This has the potential to intensify cultural change in certain destinations, threatening their authenticity and diminishing the diversity of tourist experiences. In the long term, such trends may deter experience-seeking travelers, resulting in potential adverse economic implications for affected destinations.

Study highlights how GAI itineraries by promoting similar tourist behaviors accelerate acculturation. It advances theory by linking AI use with cultural transformation, offers practical guidelines for ethical AI deployment in tourism, and provides policy implications for culturally sensitive destination management and sustainability.

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Intelligent ERP Systems in Management: Mapping Acceptance through Bibliometric Analysis

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Keywords: ERP systems; artificial intelligence; intelligent ERP; technology acceptance; bibliometric analysis

Extended abstract

The integration of Artificial Intelligence (AI) into Enterprise Resource Planning (ERP) systems is part of a broader trend of AI-enhanced information systems transforming various sectors. AI integration within information systems has experienced widespread adoption across different fields beyond management, which highlights its extensive applicability and transformative capabilities. AI-driven solutions, for instance, are increasingly used in the medical field to accelerate healthcare processes. The multitude of information systems that are either enabled or enhanced by AI only show how it is versatile and covers diverse disciplines.

In the specific context of Enterprise Resource Planning (ERP) systems, they have long been instrumental in managing organizational processes and improving operational efficiency, among other benefits. With the emergence of Artificial Intelligence (AI) technologies in information systems' world, a new generation of ERPs has surfaced, offering advanced functionalities.

The integration of Artificial Intelligence (AI) into Enterprise Resource Planning (ERP) systems, often referred to as Intelligent ERPs or AI-enabled ERPs, has emerged as a transformative phenomenon within today's organizational management.

Intelligent ERPs' expanded analytical skills, predictive features, and automation promise major improvements in decision-making processes, operational efficiency, and competitiveness. However, despite the possible benefits, there remains a noticeable lack of consolidated understanding regarding their actual acceptance and use in managerial environments. Existing research is dispersed across contexts and models, making it difficult to draw general conclusions or identify consistent adoption patterns. This research addresses this gap by methodically studying the existing literature through a bibliometric study, to explore the trends, and future paths regarding the subject.

The primary research objectives of this study are to systematically map the current structure of existing research related to the acceptance and adoption of Intelligent ERP systems within management contexts. Through bibliometric analysis, this research examines trends in author keywords, sources, countries, co-citation networks, and bibliographic coupling between documents and journals. The study also synthesizes the most frequently used theoretical models, tracks the evolution of academic interest. As this will help identifying the common methodological trends of how the subject have been addressed thus far. Ultimately, this study will help highlighting gaps that persist within current academic discussions and propose areas for future research.

Accordingly, to address these research objectives, the study is guided by the following research questions:

- Q1: What is the current state of research on acceptance and adoption of Intelligent ERPs within management fields?

- Q2: What theoretical models and frameworks have been utilized to examine the organizations and users' acceptance and behavior towards Intelligent ERP systems?
- Q3: What are the empirical approaches and methodologies that have been adopted in research addressing the acceptance of Intelligent ERP systems in management contexts?

The methodological approach applied in this study is based on a comprehensive bibliometric using Scopus database, covering articles published within the decades. The search strategy combined keywords related to AI such as "AI-enabled" and "machine learning", ERP systems, and acceptance constructs such as "adoption intention" and "user perception". The inclusion criteria were: peer-reviewed journal articles published in English between 2000 and 2024. The analysis is conducted using VOSviewer bibliometric tool that will help perform our quantitative analyses, co-citation networks, and other indicators and measures that describe the dynamics of current research related to our subject. This approach helps identify the visualization and interpretation of relationships among studies, key themes, and significant works. Although only Scopus was used, future work may integrate Web of Science to enhance coverage.

Preliminary results from the co-occurrence map for example reveal that "ERP", "machine learning", "digital transformation", and "AI" are dominant themes, often clustered with concepts such as "cloud computing", "UTAUT", and "Industry 4.0". Bibliographic coupling maps show limited interlinkage between some key papers, while a few foundational works (e.g., Themistocleous 2001, Koh 2006) anchor the intellectual base. However, many newer studies remain disconnected, indicating fragmentation and a need for theoretical consolidation. The in-depth analysis indicates that the literature on Intelligent ERP systems is continuously expanding, as interest in the topic keeps increasing, particularly in the last five years, which alone account for over 60% of the total publications retrieved between 2000 and 2024.

Several research papers show that a variety of theories are used to explore the acceptance and adoption of such systems. Among them, the technology acceptance models (TAM), including the unified theory of acceptance and use of technology (UTAUT), and diffusion of innovation theory (DOI). These theories help explore how new technologies are perceived and adopted within organizations by exploring both the adoption process and the factors that influence users' willingness and intention to use them. Additional frameworks that are less commonly used, but not less relevant, are the Technology-Task Fit Theory, that addresses the alignment between the technology's capabilities and the task to be performed. The theory of Bounded Rationality, further enrich the studies by addressing factors like cognitive limits and capacities, and how the knowledge is shared. Some studies point to existing gaps in exploring contextual managerial factors, more business-related research, and empirically validating of theoretical models in different organizational settings.

This research contributes to the field by offering a new perspective through the bibliometric technique of analysis, to synthesize and to enhance the understanding of the literature surrounding Intelligent ERP systems' acceptance and adoption in management contexts, a topic that remains less covered from a bibliometric perspective. The study intends to offer useful insights for academia and professionals, that can foster acceptance and support adoption of Intelligent ERP systems in various management domains.

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Adopting the Metaverse in Travel Agency Marketing: A Dual Perspective on Opportunities and Challenges

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Keywords: metaverse; opportunities; challenges; marketing; performance; SME travel agencies

Extended Abstract

Metaverse is growing rapidly, turning into one of the hottest trends nowadays. Many studies have been applied to the metaverse in various fields. Such as education, health sector, defense industry, tourism, aviation, etc (i.e., Uçgun, 2024). However, few have focused on tourism marketing, despite the importance of applying the metaverse to the tourism sector and the benefits it can bring. It can combat seasonal fluctuations, help design travel packages and options that suit travellers' needs, permit them to combine business and pleasure, and enjoy benefits unavailable through traditional real-world channels. As, Metaverse technology holds enormous potentialities for varied applications in small and medium-sized enterprises (i.e., SME travel agencies). Its competences include process automation, novel customer engagement avenues, cost investment, and improved returns on asset. Therefore, embracing metaverse converts essential for SMEs to preserve competitiveness within the dynamic landscape of technology driven businesses (Hasani & Mohammadi, 2024).

Despite the opportunities brought by metaverse to tourism sector and stakeholders, there are some challenges that minimizes the potentials of that technology including technological investment, cost concerns, and privacy concerns (Chi, et al., 2024; Ledesma-Chaves, et al., 2024; Yawised & Apasrawirote, 2025). This study, therefore, aims to explore the opportunities and challenges of using metaverse in marketing travel packages by SME travel agencies. The study will offer a more comprehensive understanding of metaverse technology's role in shaping the travel companies' performance. To achieve the aim of the study, two variables are included to predict the future using of metaverse in travel marketing by SME travel agencies: the opportunities of using metaverse (i.e., to what extent are travel agencies benefiting from the use of the metaverse in marketing), the challenges of using metaverse (i.e., what are the challenges affecting the use of the metaverse in travel agencies).

Research Hypotheses

There are three main hypotheses as follows:

H1. Opportunities of using metaverse positively influence the metaverse adoption in travel marketing of SME travel agencies.
H2. Challenges of using metaverse negatively influence the metaverse adoption in travel marketing of SME travel agencies.
H3. The metaverse adoption in travel marketing by SME travel agencies positively influences the marketing performance of SMEs travel agencies.

Research Methodology

This study will adopt the deductive approach that is based on quantitative method to investigate the opportunities and challenges that face metaverse in travel marketing and its impact on SME travel agencies in Egypt. A questionnaire will be used for data collection purposes from a convenient sample of travel agencies in Egypt. Structural equation modelling (PLS-SEM) will be used to test the research model relationships between the variables.

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Young Adults' Perceptions of Accessibility in Metaverse Tourism

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Introduction

The metaverse, a collective digital space integrating technologies like virtual and augmented reality—collectively referred to as extended reality (XR) (Constantin et al., 2023), is transforming how people interact, socialize, and increasingly, how they travel (Gursoy et al., 2022; Lau, 2023). With a projected market volume of US$507.8 billion by 2030 (Statista, 2023) and growing adoption, the metaverse presents significant opportunities for international tourism, allowing users to virtually access otherwise unreachable destinations, reduce costs, and minimize their environmental footprint (Meta, 2023; Qahoush & Rihani, 2023).

The tourism sector is rapidly embracing these innovations. Virtual tourism alone is expected to reach US$24.1 billion by 2027 (López, 2024), driven by Gen Z's high engagement and interest in immersive travel experiences (Statista Research Department, 2024). Consumers show enthusiasm for exploring remote locations, while businesses recognize the metaverse's transformative potential (Accenture, 2022).

In this context, accessibility in tourism—commonly understood as enabling equal travel opportunities for all, including but not limited to people with disabilities (European Commission, n.d.) takes on new meaning.

Although research on the metaverse is expanding, studies on metaverse tourism remain relatively few and largely focus on user experience, mental health, and sustainability (e.g., Adnan et al., 2024; Buhalis, Lin, et al., 2023; Din & Almogren, 2023). Meanwhile, accessibility in tourism is often limited to physical or environmental access (e.g., Darcy et al., 2020; Sisto et al., 2022). To date, no studies have examined how the metaverse reshapes the perception of accessibility in international tourism.

The main aim of this study is to explore the potential connections between the metaverse and accessibility in tourism for young adults. The research question defined for this study is: How does the metaverse affect the perception of accessibility of tourism destinations?

Background

This study adopts Behavioral Reasoning Theory (BRT) as its guiding framework. Introduced by Westaby (2005), BRT emphasizes the importance of context-specific reasons, both for and against, in shaping intentions and behaviors. The literature suggests several reasons for and against metaverse tourism, as summarized in Table 1. This study argues that the metaverse's potential to increase destination accessibility should be considered a "reason for" metaverse tourism.

Table 1. Summary of the contributions in the literature regarding reasons for and against metaverse tourism

Reasons for using metaverse tourism	Immersion	Immersion increases metaverse authenticity and enhances user experiences	Gursoy et al. (2025); Petr and Caudan (2024); Shamin et al. (2024)
	Inspiration and travel planning	Metaverse tourism helps travelers with their decision-making process, allowing experimentation before their trip and offering inspiration for future trips.	Behera et al. (2024); Buhalis, Leung, et al. (2023); Kiliçarslan et al. (2024); Shamin et al. (2024); Zaman et al. (2024)
	Revisiting experiences	The metaverse enables tourists to re-live their past experiences and share them with loved ones.	Buhalis, Leung, et al. (2023); Lee et al. (2024); Zaman et al. (2024)
	Limitations of real-world travel	The metaverse allows travelers to overcome traveling limitations (e.g., time, crowds, cost, distance) from the comfort of their homes.	Lee (2022)
	Inclusivity	The metaverse can be transformative for people with physical, geographical, financial, or health-related limitations.	Kiliçarslan et al. (2024); Mahmoud et al. (2024); Uçgun and Sahin (2024)
Reasons against using metaverse tourism	Lack of presence	The lack of depth and quality visuals create resistance to adopting metaverse tourism.	Baker et al. (2023); Dutta et al. (2023); Mahmoud et al. (2024); Shamin et al. (2024); Zaman et al. (2024)
	Ethical and legal challenges	User anonymity creates challenges surrounding harassment, cyberbullying, and aggressive behavior in virtual environments	Buhalis, Leung, et al. (2023); Gómez-Quintero et al. (2024); Mihalic (2024)
	Health and safety concerns	Using the metaverse could lead to feelings of dizziness and nausea or ocular, postural, or muscular health issues as well as digital privacy risks, potential addiction, and increased screen time	Baker et al. (2023); Dutta et al. (2023); Mihalic (2024); Petr and Caudan (2024); Saleh (2024); Uçgun and Sahin (2024); Yang and Wang (2023); Zaman et al. (2024)

Method

In order to explore the potential connections between the metaverse and accessibility in tourism for young adults, this study adopted a mixed-method approach, comprising an exploratory qualitative study and a subsequent quantitative study. This abstract focuses on the first study.

This study adopted a qualitative approach consisting of focus groups involving 33 participants, with an average age range of 21–24. Participants varied in gender, age, occupation, and educational background, with most holding a bachelor's degree and being employed. All the participants were Portuguese. The majority had traveled internationally within the past year, and several had prior experience with virtual reality (VR) technology or demonstrated general technological familiarity.

The focus groups provided a space for open discussion, allowing for a deeper understanding of participants' views on accessibility in metaverse tourism, while revealing diverse perspectives within a group setting. The data were analyzed using content analysis, combining both theory-driven and data-driven approaches, and processed with NVivo software.

This first study will help shape the quantitative study by providing key insights into participants' expectations and concerns regarding metaverse tourism. Through these discussions, recurring themes and patterns will be identified to ensure that the quantitative part of this research analyses the most appropriate and important variables. The quantitative study will have wider diversity regarding age groups.

Main Findings

In line with existing literature, participants identified several reasons for using metaverse tourism. These include its value as a pre-travel planning tool, allowing users to explore destinations and make informed decisions, and its potential to increase inclusivity for individuals facing financial, physical, or time constraints. Other advantages included convenience, immersion, and the ability to revisit past trips. Participants also viewed the metaverse as a means to access otherwise unreachable or overcrowded destinations. Conversely, key concerns centered around the lack of full sensory and emotional immersion, particularly the inability to engage all five senses, which was seen as diminishing the authenticity of the experience. Some also felt that religious, cultural, and social tourism requires real-world presence, making them unsuitable for virtual replication.

Additionally, this study contributed to the conceptualization of accessibility in metaverse tourism as a multidimensional construct (see Table 2). While prior research, such as Gillovic and McIntosh (2020) and Sisto et al. (2022), has largely focused on physical accessibility for people with disabilities, the current findings highlight that accessibility extends beyond the physical realm. This aligns with Rahmafitria et al. (2023), who emphasize both physical and non-physical dimensions of accessibility. Our findings suggest that these broader dimensions are essential to understanding a wider population of tourists and their motivations within the context of metaverse tourism.

Table 2. Metaverse tourism accessibility – summary of findings

Accessibility Dimensions	Description	Mentions
Financial Accessibility	Accessibility for those who don't have the financial means to travel	24
Physical Accessibility	The ease of access to tourist destinations, accommodations, and attractions for people with physical disabilities or reduced mobility	32
Geographical Accessibility	The convenience of reaching a distant and/or remote destination	51
Psychological Accessibility	The comfort and inclusivity of tourism experiences, ensuring travelers feel safe, welcomed, and culturally respected	19
Political Accessibility	The ease of obtaining visas, travel permits, and navigating regulations that impact travel freedom	13
Temporal Accessibility	The ability to visit virtual destinations anytime, unrestricted by real-world time zones or operating hours	18
Cultural Accessibility	The ability for individuals to experience cultural sites, heritage, and traditions without barriers related to physical presence, social norms, language, or personal identity ensures a more inclusive and comfortable exploration of global cultures.	5
Safety Accessibility	Addresses barriers related to travel risks, political instability, or personal safety concerns	16

Familiarity with technology was identified as a necessary condition for having pleasurable and engaging experiences with metaverse tourism, which might exclude several segments of the population, especially the older. Additionally, participants saw the metaverse as favorable for those facing physical, financial, or time limitations, particularly individuals who don't travel often and may otherwise lack access to tourism experiences. While those who travel a lot might use the metaverse to enhance planning or explore more destinations, our findings suggest that they would be less curious or satisfied with virtual experiences, hence prioritizing their use for planning purposes.

Implications and Future Research Directions

This study contributes to the literature by conceptualizing accessibility in metaverse tourism, suggesting that it is a relevant determinant of usage intentions. The study broadens the concept of

accessibility in tourism by identifying its multiple dimensions. These findings assist further research, namely of a quantitative nature, that aims to explore the determinants of metaverse tourism adoption.

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Exploring Quality of Virtual Destination Experience: A Dual-Process Theory Perspective

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Extended abstract

Introduction

Virtual Reality (VR) is transforming how prospective tourists plan their trips and seek destination information (Lee et al., 2020). A high-quality virtual environment can captivate visitors' senses, evoke emotions, and create a lasting impression, all without spatial or temporal limitations – a distinct advantage over traditional media marketing. Research has documented that VR quality assessment shapes people's attitudes and behavioral intentions (Oh et al., 2019). Despite its widespread application in consumer research (Hadinejad et al., 2022), the dual-process model has been rarely used in VR tourism studies. Recent studies primarily focus on a subset of the aspects of VR technology quality (e.g., interactivity, vividness, immersion, ease of use), leaving the concept of VR technology quality ill-defined. Consequently, little is known about how people perceive destination content quality in virtual tours. To understand the effects of VR experiences on behavioral intentions, both VR technology quality and destination content quality must be considered. Extending dual-process theory, this study proposes the following research questions: 1) Which dimensions and sub-dimensions of VR technology quality are vital in shaping users' destination attitudes and decision-making? 2) Which dimensions and sub-dimensions of destination content quality influence users' destination attitudes and decision-making?

Theoretical Foundation

Dual-process theory provides a framework for understanding the impact of various persuasion variables. The fundamental assumptions of dual-process theory are: 1) there are two information processing modes: the heuristic or peripheral mode, and the systematic or central mode; and 2) each processing mode can positively influence persuasion and attitude. According to the elaboration likelihood model, people who are motivated to process information take the central route, spending time and providing a rational response, while people who are less motivated take the peripheral route and make simple inferences about the message's merits (Petty & Cacioppo, 1986). Most empirical research on tourism marketing has focused on VR execution-related responses. Content quality is a particularly important factor in influencing tourists' intentions to visit a destination (Lee et al., 2020). However, what remains unclear is which dimensions of content quality are processed through the systematic mode in a VR experience. Furthermore, no studies have extended dual-process theory to the context of VR tourism marketing to develop a comprehensive understanding of how technology quality and content quality are processed. To address these research gaps, this study adopts dual-process theory as a theoretical foundation to explain how tourists process quality through heuristic and systematic modes in VR experiences.

Method

The virtual tour of Dubai was selected as the research context based on; an existing virtual destination tour, a globally well-known but remote destination among U.S. citizens, and a tour that incorporates

most of the common VR features present in other virtual tourism experiences. Respondents were recruited from the online platform Prolific. The coding process consisted of three phases: open coding, axial coding, and selective coding. In the open coding phase, key concepts and categories were identified. As a result, 964 VR technology quality open codes and 1,134 destination content quality open codes were selected. In the axial coding phase, 62 axial codes for destination content quality and 65 axial codes for VR technology quality were identified.

Results

Respondents' demographic profiles are presented in Table 3. Among the 349 respondents, gender distribution was nearly equal, with 49.3% identifying as male and 49.3% as female. A total of 1,134 open codes were assessed, leading to the generation of 61 axial codes for destination content quality. These axial codes were further consolidated into six conceptual codes. VR technology quality refers to the positive characteristics of VR device services available to users (Lee et al., 2020). To explore VR technology quality in virtual destination experiences, a total of seven conceptual codes were derived from 65 axial codes: visual quality (20.33%), informativity (18.05%), functionality (16.29%), experiential quality (15.03%), usability (11.72%), system performance (10.06%), and immersive quality (8.51%). Destination content quality represents the quality of the destination information provided through the VR experience (Lee et al., 2020). A total of 1,134 open codes were assessed, leading to the generation of 62 axial codes. These axial codes were further consolidated into six conceptual codes: destination atmosphere, scenic beauty, tourist activity appeal, accommodation appeal, natural appeal, and architectural appeal

Conclusion

This study extends the tourism marketing literature by constructing a quality model from a dual-process theory perspective, which further improves our understanding of VR quality characteristics. Second, this study provides a more comprehensive understanding of VR technology quality in VR tourism marketing. Lastly, previous VR tourism research has focused on VR technology quality, yet this study highlights the need to consider destination content quality in VR destination marketing.

The findings highlight the tangible benefits of VR for destination marketing. It suggests VR designers and managers should develop VR technology quality evaluation criteria and identify the categories that need improvement. By refining these elements, VR designers can create an emotionally engaging virtual tour that strengthens users' connection to the destination. This study also provides specific guidelines for tourism marketers to effectively engage potential tourists through seven categories of destination content quality. These themes and text characteristics can help in understanding travel planners' needs and newly emerging attributes, thereby enhancing destination content design and utilization.

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From Content to Context: Why Some Brands Succeed in Smart Retailing and Others Don't?

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Extended abstract

Introduction

The current paper addresses the uneven success of smart retail initiatives, arguing that technology alone does not determine customer experience outcomes (Hagberg et al., 2016; Vial, 2019; Verhoef, et al., 2019). It highlights the importance of the interplay between "content" (innovative technologies) and "context" (organizational, strategic, and environmental factors) in shaping customer perceptions. Drawing on Service-Dominant logic and critical realism, the paper proposes a shift in focus from technological adoption to understanding the deeper value-generating mechanisms at the intersection of content and context (Vargo & Lusch, 2004).

Methodology

Using a critical realist framework, the study explores generative mechanisms that explain customer perceptions in smart retail (Bygstad, 2010; Gebre-Mariam and Bygstad, 2019; Rieder et al., 2021). The research employed qualitative methods, including 20 customer interviews in an automated restaurant and three expert focus groups (n=40). Events (customer perceptions) were extracted through thematic analysis, and mechanisms were identified using retroduction—a theory-driven inferential approach. Triangulation and empirical corroboration were used to ensure the validity of the mechanisms derived from both literature and empirical data.

Findings

The study identifies six novel customer perceptions (e.g., respect, warmth, harmony) and five generative mechanisms that explain how these perceptions are triggered: emotional match with shopping goals, cognitive fit with tasks, cognitive-emotional fit with retail social environments, cognitive consonance with societal norms, and dynamic cognitive-emotional interactions. These mechanisms reveal how smart retail technologies and their surrounding context interact to shape diverse customer experiences.

Contributions

This research makes theoretical and practical contributions by shifting the focus in smart retail from isolated technological adoption to the contextual mechanisms that generate customer value. It introduces a novel mechanism-perception matrix and expands the understanding of emotional and cognitive alignment in retail technology design. Practically, it offers insights for aligning smart retail initiatives with customer needs, social norms, and shopping contexts to enhance engagement and avoid failure.

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Goal congruence as a way to invite employees to delegate tasks to GenAI.

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Extended abstract

As companies can implement generative AI (GenAI) tools in their organization, employees have the opportunity to delegate some tasks to GenAI with benefits in terms of quality of the outputs and time management (Dell'Acqua *et al.,* 2023, 2025). However, employees can be resistant to use these tools, as previous studies show that people are reluctant to delegate and automate tasks that are relevant to their identity (Leung *et al.,* 2018; Puntoni *et al.,* 2021) and that the implementation of GenAI tools can be perceived as a threat by employees (SimanTov-Nachlieli, 2024). Therefore, understanding how employees can be more willing to delegate tasks to GenAI can be relevant for companies and employees as well.

According to previous literature, goal congruence is a relevant aspect that can lead managers to delegate tasks to an employee (Leana, 1986; Youkl & Fu, 1999). As humans can replicate social schemas in their interaction with technology (e.g., Nass & Moon, 2000), we argue that:

H1. Employees are more willing to delegate a task to GenAI if they feel that the GenAI tool goals are aligned with theirs (i.e., they perceive high goal congruence).

For a company it is also important to understand how goal congruence with GenAI can be elicited in a way managers can control. As research has emphasized the relevance of social influence (White *et al.,* 2019), we argue that the manager that invites the employee to use GenAI can have a relevant role. Indeed, literature about human-object relationships says that people can extend their features and abilities to objects (Belk, 1988; Hoffman & Novak, 2018). Therefore, we argue that if employees feel that their manager has the same vision and goals as them, when the manager invites the employee to use GenAI, this goal congruence can be extended to the GenAI tool. In particular:

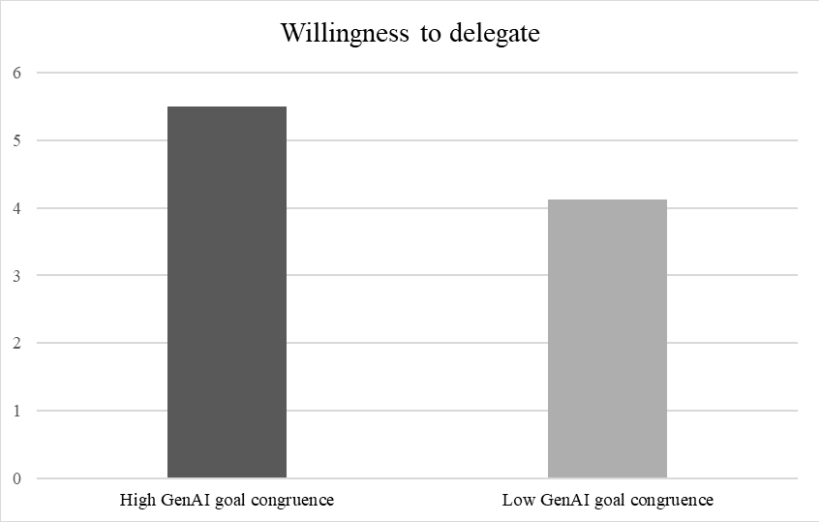
H2. Employees that feel that their manager has the same vision and goals as them (i.e., high goal congruence) will perceive high levels of goal congruence also with the GenAI tool the manager is inviting them to use. This process will eventually lead employees to be more willing to delegate a task to GenAI.

Two survey-based studies were conducted to test the hypotheses. Both studies involved US respondents recruited through Prolific (Study 1: 90 respondents, M_{age} = 39.46, SD_{age} = 13.92, 54.4% women, 2.2% non-binary; Study 2: 87 respondents, M_{age} = 38.76, SD_{age} = 12.06, 44.8% women, 1.1% non-binary). In Study 1, respondents were exposed to a written scenario in which they were asked to imagine to be an employee of a business company that receives an email from their manager telling them to complete a task (find and summarize information) and to use a new AI tool similar to

ChatGPT to do it. The procedure was the same for Study 2, in which we also added to the scenario additional pieces of information about the superior manager and their role.

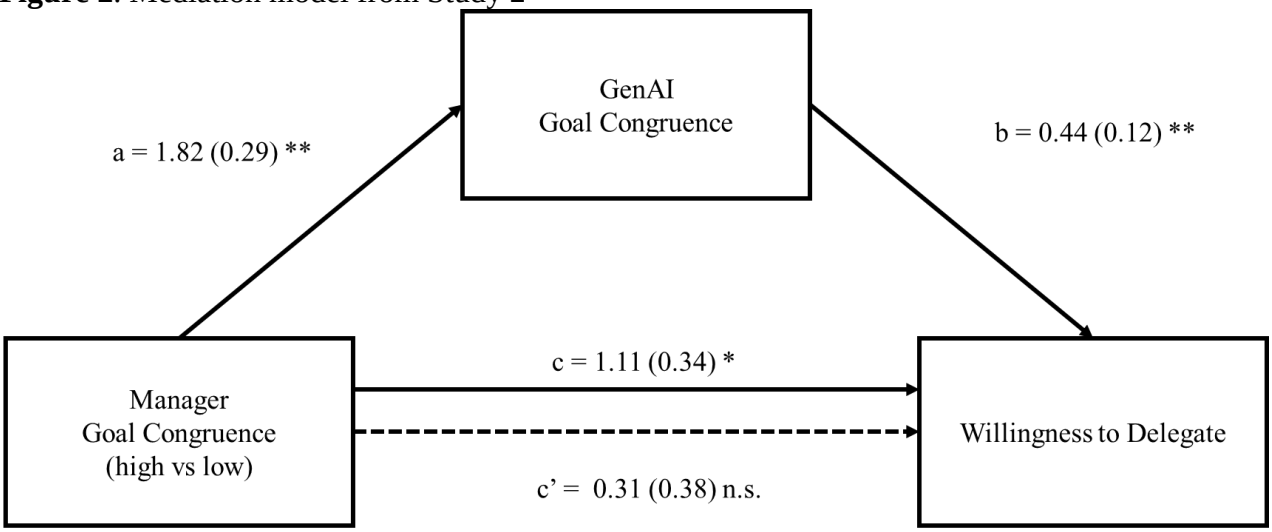
Study 1 had the purpose of testing H1. We calculated the median of a goal congruence scale (De Clerq *et al.,* 2014; α = 0.92; Median = 4.00) that measured the extent to which respondents perceived that the GenAI tool mentioned in the scenario shared their goals. We then conducted a median split and divided the dataset into two conditions: "High GenAI goal congruence" corresponds to a mean value higher than 4 (n = 43); "Low GenAI goal congruence" corresponds to a mean value equal or less than 4 (n=47). We also measured the willingness to delegate the task mentioned in the scenario to the GenAI tool through four items (Mari *et al.*,2024; Noy & Zhang, 2023; α = .95). An independent-sample t-test showed that people that perceived high goal congruence with the GenAI tool were more willing to delegate the task to the tool itself ($M_{\text{high GenAI goal congruence}}$ = 5.50, $SD_{\text{high GenAI goal congruence}}$ = 1.37; $M_{\text{low GenAI goal congruence}}$ = 4.12, $SD_{\text{low GenAI goal congruence}}$ = 1.78; $t(85.68) = -4.15$, $p < .001$), thus supporting H1.

Figure 1. Results of Study 1



Study 2 has the purpose of testing H2. Similarly to Study 1, we measured the extent to which respondents perceived the manager mentioned in the scenario to have the same goals as them (De Clerq *et al.,* 2014; α=.97), and calculated the median (Median = 5.00) to conduct a median split and divide the dataset into two conditions: "High manager goal congruence" (n= 36) and "Low manager goal congruence" (n=51). To test H2 we conducted a mediation analysis using PROCESS (Hayes, 2017) with the manager goal congruence conditions as independent variable (high vs. low), the willingness to delegate the task to GenAI (Mari *et al.*,2024; Noy & Zhang, 2023; α =.92) as the dependent variable, and GenAI goal congruence as a mediator (De Clerq *et al.*, 2014; α=.93). Results show a significant and positive total effect of manager goal congruence on willingness to delegate (c = 1.11; SE = 0.34; $t(85) = 3.32$; $p < .05$) and a positive and significant indirect effect through GenAI goal congruence (IE = 0.80, 95% bootstrap confidence interval [0.28, 1.40]). As the direct effect is not significant, the results suggest a full mediation. H2 is, therefore, supported. The results are illustrated in detail in figure 2.

Figure 2. Mediation model from Study 2



* $p < 0.05$
** $p < 0.001$
n.s. = non significant

This research gives relevant insights for companies that aim to implement GenAI tools in their organization. Indeed, the results suggest that carefully choosing the person that invites employees to use GenAI can result in employees being more willing to delegate tasks to the tool.

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From promises to practice: unraveling users' mental models about the role and implications of large language models (LLMs) for individuals and society

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Type of manuscript: Extended abstract

Keywords: Large Language Models (LLMs); mental models; AI-enabled services; societal impact; Critical Incident Technique (CIT)

Extended abstract

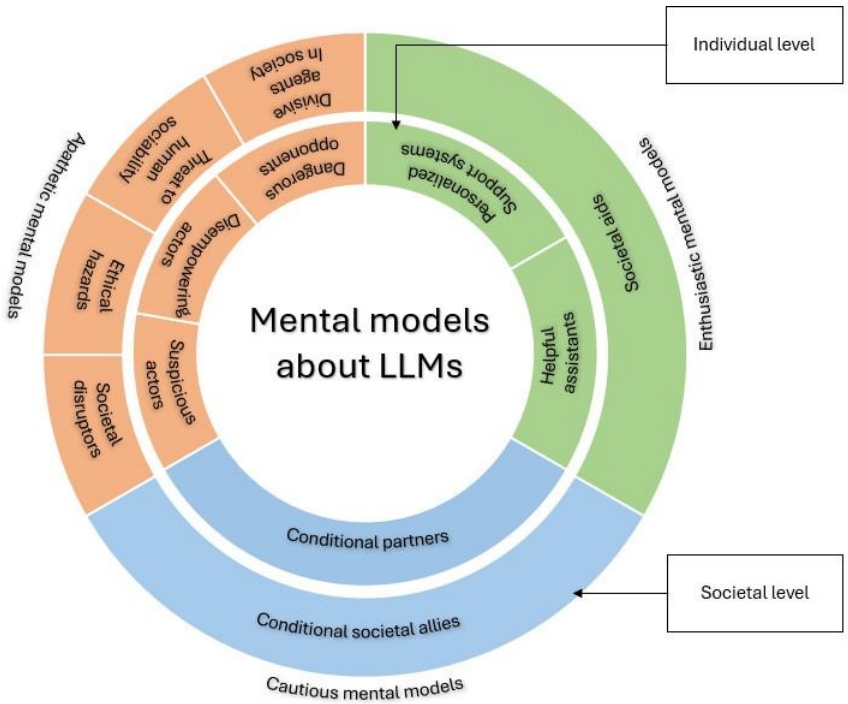
Artificial intelligence (AI) has rapidly evolved with the emergence of Generative AI (Gen AI), especially following the release of ChatGPT (Lim *et al*., 2023). Gen AI systems generate content across various formats without direct human intervention (Mondal *et al*., 2023), with large language models (LLMs) like ChatGPT, Google Gemini, and Microsoft Copilot standing out for their ability to produce human-like text (Van Dis *et al*., 2023). Surpassing previous AI capabilities (Maslej *et al*., 2023) and disrupting both human-technology interactions and business operations (Messner *et al*., 2025), these models have captured the interest of early adopters and are being explored across sectors to enhance user engagement and organizational efficiency (Alita, 2025; Dwivedi *et al*., 2023a, 2023b). Academic research, so far, has largely focused on LLMs' capacity for coherent text generation (Omizo, 2024), their role in fields like education and business (Celiktutan *et al*., 2024), and their applications in decision-making, research data generation and data analysis (e.g., Arora et al., 2025; Imschloss *et al*., 2025; Wong *et al*., 2023).

Despite these developments, there is a notable lack of empirical research on the underlying mental models – users' beliefs and assumptions – about LLMs (Blocker & Barrios, 2015; Davenport *et al*., 2020; Zeithaml *et al*., 2020). These cognitive frameworks significantly influence user behavior and interactions (Argyris & Schon, 1992; Vink *et al*., 2019), yet remain underexplored. Ignoring these mental models may result in misaligned AI systems, ethical issues, and reduced satisfaction due to a lack of user-centered design (Garibay et al., 2023; Williamson & Prybutok, 2024). Moreover, understanding how interactions with LLMs (re)shape these mental models is critical, given the growing societal integration of AI technologies (Chiarello *et al*., 2024; Korneeva *et al*., 2023). Such insights can also enhance technology adoption research by revealing the cognitive and motivational factors shaping user attitudes – dimensions often overlooked in existing models (Camilleri, 2024; Mogaji *et al*., 2024).

This research addresses this gap by examining users' mental models of LLMs to better understand their psychological and behavioral responses to AI. It contributes to the literature in several ways: by advancing our understanding of how mental models shape user perceptions and behaviors, thusby revealing how AI interactions influence autonomy and self-concept (Puntoni & Wertenbroch, 2024), by offering a psychological lens to theorize AI adoption, and by informing both organizational strategies and policy frameworks in a context where regulation struggles to keep pace with innovation (Camilleri, 2024).

To examine this phenomenon, this study employs a qualitative research design using the critical incident technique (CIT) with participants from the UK. Based on responses to an open-ended questionnaire administered via Prolific, the findings reveal that users' mental models of LLMs are deeply ambivalent and multifaceted. The analysis of users' mental models reveals a multidimensional understanding of LLMs, highlighting the complexity and ambivalence that characterizes their integration in everyday life. Moving beyond a simple dichotomy of positive versus negative perceptions, this study categorizes, as shown in Figure 1, users' mental models into three overarching dimensions: enthusiastic mental models, conditional mental models, and apathetic mental models, providing a more granular view of conditional mental models, and apathetic mental models, providing a more granular view of how individuals interpret the role and implications of LLMs. At the individual level, enthusiastic mental models reflect users' mental models who view LLMs as *helpful assistants* that save time, streamline tasks, enhance productivity, and inspire creativity, as well as *personalized support systems* that provide personalized, emotionally engaging, and human- like interactions.

Figure 1: Mental models about roles and implications of LLMs



Note: The inner circle represents mental models linked to individuals and the outer circle mental models linked to society

represents enthusiastic mental models | represents cautious mental models | represents apathetic mental models

Conditional mental models include users' mental models who recognize the utility of LLMs but with caveats – seeing them as *conditional partners* whose effectiveness is dependent on user intervention, mindfulness, and context-specific relevance. Apathetic mental models represent users' mental models who approach LLMs with skepticism, concern, or resistance. These include comprehension of LLMs as *suspicious actors* (e.g., raising trust and privacy concerns), *disempowering actors* (e.g., diminishing users' sense of authenticity and skill), and *dangerous opponents* (e.g., generating fear of misuse, overdependence, dehumanization, and job displacement). At the societal level, enthusiastic mental models depict LLMs as *societal aids*, contributing to enhanced productivity, knowledge dissemination, and broader societal relevance and empowerment. Conditional mental models capture views of LLMs as *conditional societal allies*, offering societal benefits that are perceived to come with trade-offs or contextual limitations. Apathetic mental models frame LLMs as

societal disruptors, *ethical hazards*, *threats to human sociability*, and *divisive agents in society*, with concerns ranging from increasing inequality and diminishing human connection to ethical misuse and destabilization of social norms.

By adopting this tripartite lens, the study offers a more comprehensive understanding of how users conceptualize LLMs across personal and societal spheres. It highlights that users do not simply embrace or reject these technologies; rather, their mental models reflect varying degrees of enthusiasm, conditional acceptance, and detachment shaped by their experiences, values, and expectations. This multidimensional perspective contributes to a deeper theoretical grounding of users' relationships with AI-enabled initiatives and calls for AI development and policy frameworks that are sensitive to these nuanced interpretations.

This study advances understanding of LLMs by exploring users' mental models of their individual and societal implications – an area often overlooked in prior research focused on capabilities and adoption intentions (e.g., Arora *et al*., 2025; Camilleri, 2024; Li *et al*., 2024). By centering user perspectives, the study contributes to marketing's theoretical development and addresses calls for practical relevance in research (Hollmann, 2023; Zeithaml et al., 2020). It also provides rare empirical insight into how users cognitively and emotionally navigate the dual-use nature of LLMs, balancing perceived opportunities and risks (Grinbaum & Adomaitis, 2024). This helps ground abstract ethical debates in users' lived experiences. Furthermore, the study adds to growing calls for incorporating diverse stakeholder voices in AI discourse (Sartori & Theodorou, 2022), enriching the human- centered AI literature by showing how users' interpretations reflect or challenge dominant narratives (Garibay et al., 2023). It challenges traditional technology adoption models by revealing that user engagement with LLMs goes beyond functional concerns to include broader psychological and societal dimensions (Mogaji et al., 2024). In doing so, it positions mental models as a more nuanced and context-sensitive lens. Finally, the research contributes to discussions on the ethical design of AI by showing how users evaluate whether AI initiatives align with or undermine societal values (Williamson & Prybutok, 2024).

This study provides practical implications for managers and policymakers seeking to ensure the responsible development and integration of LLMs. For managers, understanding users' diverse mental models offers a pathway to better align AI design, communication, and governance with user expectations and concerns. Enthusiastic mental models, such as viewing LLMs as helpful assistants or companions, suggest that enhancing features like task support, creativity, personalization, and transparency can foster trust and improve user experiences. Conversely, cautious or apathetic mental models point to the need for clear communication around limitations, privacy, and control, alongside greater user empowerment through customizable settings. On a broader scale, societal-level mental models highlight opportunities for inclusive innovation while emphasizing the importance of fairness, explainability, and AI literacy to mitigate concerns around exclusion, bias, or disempowerment. For policymakers, the findings underline the urgency of creating regulatory frameworks that promote algorithmic transparency, accountability, and ethical standards in line with United Nations Sustainable Development Goals (UN SDGs). Addressing risks such as job displacement, inequality, and data misuse requires interventions like retraining programs, ethical AI incentives, and stronger data protection laws. Such actions can help ensure that the societal benefits of LLMs are distributed fairly, while protecting citizens from potential harms.

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Can AI (vs. Human) Retail Assistants Effectively Reduce Consumer Discomfort and Purchase Abandonment? An Experimental Approach Using Generative Adversarial Networks

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Type of manuscript: Extended abstract

Keywords: AI service robots; discomfort; purchase abandonment; smiling

Extended abstract

As the retail landscape continues to evolve from exclusively physical formats to hybrid online–offline models, increasing attention has been directed toward interactive in-store technologies as a strategic response to intensifying digital disruption (Alexander & Kent, 2022). For instance, brick-and-mortar retailers have integrated innovations such as virtual try- on systems and smart fitting rooms to elevate product interaction, enabling customers to engage with merchandise without the need for physical trials. While these technologies enhance convenience and product engagement, they remain largely product-centric and offer limited advancement in the service dimension of the in-store experience—a critical determinant of customer satisfaction and purchase behavior.

The emergence of AI Retail Assistants (AIRAs) represents the next frontier in retail technology, with the potential to directly address this longstanding service gap. AIRAs have already demonstrated value in service-intensive sectors such as tourism and hospitality (Steins & Becker, 2024), their adoption in retail environments remains surprisingly limited—a notable oversight given the increasing importance of service in differentiating the in-store experience. This underutilization invites a timely and important question: *Can AIRAs offer a significant service advantage over traditional human retail assistants (HRAs) in the retail sector?*

Although HRAs are intended to provide meaningful service by assisting and guiding shoppers, their presence can sometimes have unintended negative effects. For example, behaviors such as hovering nearby to offer help or silently observing shoppers—while intended to be supportive—can inadvertently cause discomfort for some customers (Cyn BehindMind, 2023). This discomfort can lead to shoppers abandoning their purchases or even leaving the store, resulting in missed sales opportunities. Such negative reactions to HRAs are particularly pronounced in emotionally sensitive *fashion retail environments*, where consumers often seek a private and pressure-free browsing experience (BritChick Paris, 2011).

In contrast, AIRAs offer a non-intrusive, on-demand approach to assistance, allowing customers to seek help autonomously and without pressure. This technological service delivery may alleviate the emotional discomfort often associated with human interactions, raising a more focused research question: *Can AIRAs more effectively reduce consumers' discomfort— and consequently, lower the likelihood of purchase abandonment—compared to HRAs?*

This study explores this question through the lens of the transactional theory of stress and coping (Lazarus, 1984). According to the theory, stress does not arise solely from external circumstances but from individuals' cognitive appraisal of those circumstances. This appraisal process occurs in two stages: (1) In the *primary appraisal*, individuals 'evaluate' whether a given situation is personally relevant and potentially 'stressful.' (2) If the situation is appraised as stressful, a *secondary appraisal* follows, wherein individuals 'assess' their capacity to 'cope.' Based on this evaluation, they may engage in either *problem-focused* coping strategies (e.g., directly addressing the stressor) or *emotion-focused* coping strategies (e.g., avoiding the situation to reduce emotional discomfort).

Applying this theory to the fashion retail context, we posit that consumers are likely to appraise their interactions with HRAs as more uncomfortable compared to AIRAs in physical stores. This discomfort triggers an emotional coping response, where consumers are more inclined to avoid the stressful situation—such as by abandoning their purchase and leaving the store—rather than confronting it. Based on this theoretical premise, we propose the following hypotheses:
H1 (Direct Effect): The type of retail assistant consumers interact with (HRA vs. AIRA) affects their likelihood of abandoning a purchase, with interactions involving HRAs leading to higher rates of purchase abandonment than those involving AIRAs.
H2 (Mediation Effect): The effect of retail assistant type (HRA vs. AIRA) on purchase abandonment is mediated by consumers' experienced discomfort, with HRAs eliciting greater discomfort, which in turn increases the likelihood of purchase abandonment compared to AIRAs.

Furthermore, to alleviate consumers' negative emotions during in-store interactions with retail assistants, retailers may implement a retailer-driven coping strategy—specifically, the use of smiling behavior by retail assistants. Prior research identifies smiling as an effective emotion-regulation mechanism in retail contexts, as it conveys warmth, facilitates psychological closeness, and fosters social ease (Stokburger-Sauer & Hofmann, 2023), thereby reducing consumers' perceived stress (Bogodistov & Dost, 2017). Building on this literature, we propose the following hypothesis:
H3 (Moderated Mediation Effect): The retail assistant's smiling behavior (no smile vs. smile) moderates the indirect effect proposed in H2, such that the effect is attenuated when the assistant displays a smile compared to when they do not.

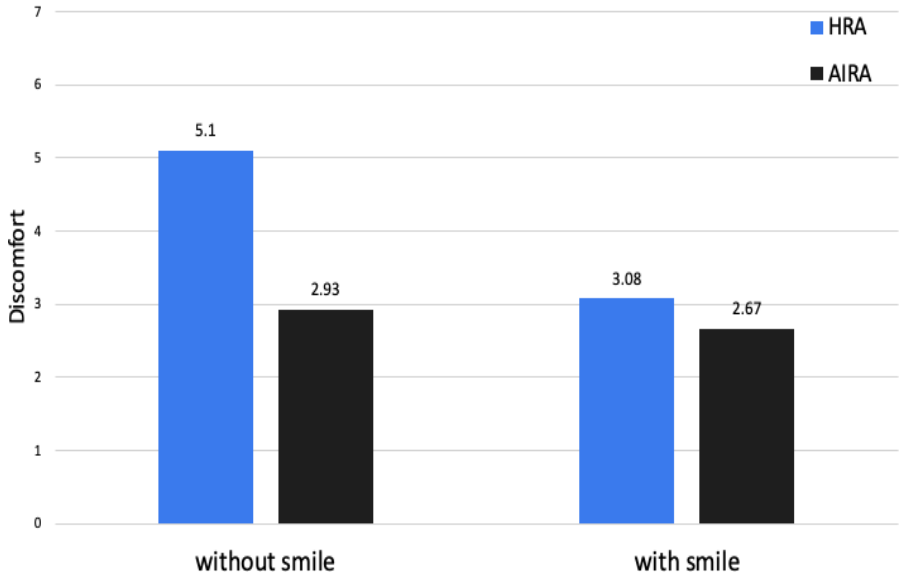
We conducted two online experiments to test our hypotheses, using realistic visual stimuli generated with state-of-the-art generative AI tools—specifically, StyleGAN2 and Face- Swap GAN. Study 1 employed a one-way between-subjects design (Retail Assistant Type: HRA vs. AIRA) to examine H1 and H2. The study included 153 female participants aged 18– 45 from the United States, recruited via Dynata. A one-way ANOVA revealed a significant direct effect of retail assistant type (HRA = 0, AIRA = 1) on purchase abandonment ($F[1, 151] = 68.75$, $p < .001$), supporting H1. To further assess this effect and test the proposed mediation, we conducted a PROCESS Model 4 analysis. The direct effect remained significant (β = -.60, 95% CI = [-1.08, -.12]). The mediating effect of consumer discomfort was also significant (β = -1.21, 95% CI = [-1.68, -.81]), indicating that interactions with an AIRA (compared to an HRA) reduced discomfort, which in turn lowered purchase abandonment—thus supporting H2.

Study 2 employed a 2 (Retail Assistant Type: HRA vs. AIRA) × 2 (Smiling effect: No Smile vs. Smile) between-subjects experimental design to test the robustness of H1 and H2 and to examine H3. As in Study 1, we employed StyleGAN2 and Face-Swap GAN to synthesize and refine facial smiling features, ensuring seamless and naturalistic visual stimuli. The sampling criteria and data collection platform were consistent with Study 1, resulting in a final sample of 325 valid responses. The direct effect of assistant type on purchase abandonment remained significant in both the ANOVA ($F[1, 323] = 61.64$, $p < .001$) and the PROCESS analysis (β = -.42, 95% CI = [-.69, -.15]), providing further

support for H1. The mediation analysis also revealed a significant indirect effect (β = -.93, 95% CI = [-1.20, -.67]), supporting H2 and reinforcing the robustness of the original findings.

To test H3, we conducted a moderated mediation analysis using PROCESS macro Model 7. The results indicated that smiling significantly moderated the indirect effect of assistant type on purchase abandonment via discomfort (index of moderated mediation: β = 1.22, 95% CI = [.27, 1.67]), providing support for H3. To further explore the interaction effect on discomfort itself, we performed a two-way ANOVA. As shown in Figure 1, consumers reported similarly low levels of discomfort when interacting with an AIRA, regardless of facial expression (smile: M = 2.67; no smile: M = 2.93). In contrast, smiling had a pronounced effect in the HRA condition: participants reported significantly greater discomfort with the non- smiling HRA (M = 5.10) compared to the smiling HRA (M = 3.08).

Figure 1. ANOVA Results



Our study makes several significant contributions to the retail technology literature. First, we demonstrate that retail technology can extend its role beyond enhancing product offerings to improving in-store service aspects. Specifically, we provide empirical evidence showing that AIRA services are particularly effective in reducing consumer purchase abandonment compared to HRA services—not only in service-intensive sectors such as tourism and hospitality but also in emotionally sensitive settings like fashion retail.

More importantly, our findings offer valuable insights by identifying the specific mechanisms through which AIRAs exert their effectiveness in this unique retail context. We demonstrate that AIRAs outperform HRAs in reducing purchase abandonment by alleviating consumer discomfort. These findings support the application of the transactional theory of stress and coping. In fashion retail, consumers often experience stress, manifesting as discomfort, when interacting with HRAs despite their intended positive effect. Furthermore, our results indicate that consumers tend to use emotion-focused coping strategies—rather than problem-focused ones—to alleviate this stressful in-store encounter.

Finally, our study is meaningful because it identifies practical strategies that retailers can employ to help mitigate consumers' negative emotional responses and encourage purchase decisions. We specifically explored the moderating role of smiling in interactions with HRAs. Our results indicate that while AIRAs consistently reduce consumer discomfort, regardless of whether the assistant is

smiling, smiling significantly alleviates discomfort in the HRA condition. This suggests that, while AIRAs inherently offer emotional advantages, smiling remains a crucial emotional-regulation strategy for HRAs.

Our study opens up important discussions for future research. While our findings suggest that AIRAs offer clear advantages in reducing consumer discomfort and purchase abandonment, we acknowledge that HRAs, especially when trained to smile, can alleviate discomfort to some extent. This leads to important future research about the cost-effectiveness of investing in AI solutions versus training human employees to achieve similar emotional- regulation outcomes. Future research should aim to provide a clearer understanding of the specific conditions under which AIRAs can truly outperform HRAs, as well as scenarios where human interactions remain indispensable. By exploring these dynamics, researchers can offer valuable insights into optimizing the balance between AIRAs and HRAs in retail environments.

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How AI Shapes Public Sentiment on Agency, Parametric Reductionism and Digital Expression

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Extended abstract

Artificial Intelligence (AI) has traditionally enabled data-driven decisions in different industries. Recently, have begun to incorporate intuitive and emphatic function, shifting from a business tool into a mainstream consumer technology (Flavián & Casaló, 2021; Huang & Rust 2018). To guide this investigation, we pose the following research questions: (1) How are societal constraints imposed by AI represented in public discourse, drawing from Valenzuela et al.'s (2024) AI Constraints Framework? (2) How do sentiment and topic patterns reflect concerns around agency, reductionism, and digital expression?

Data was gathered via the Google Developer API by extracting user-generated comments from 300 videos related to "Artificial Intelligence." Over 200,000 comments were collected, along with metadata such as geolocation, titles, descriptions, publication dates, and engagement metrics. Following linguistic standardization and text analysis best practices (Berger et al., 2019; Humphreys & Wang, 2017), the Natural Language Toolkit (NLTK) in Python was used.

Preprocessing involved removing URLs, special characters, and non-textual elements while converting emojis into descriptive text to retain sentiment cues. Text was tokenized into individual words, followed by stop-word removal and lemmatization to standardize words. Only English-language comments from January 1, 2010, to December 2024, were retained. Comments with fewer than five words or from videos with zero views were excluded. The final dataset included 220,554 comments spanning 15 years.

Sentiment analysis employed the pre-trained BERT model (Sanh et al, 2019), which classifies text into 1 to 5-star ratings based on multilingual review data. Following previous applications, ratings were binarized, with 4–5 stars classified as “positive” and 1–2 stars as “negative.” The model achieves approximately 88–91% accuracy on multilingual product review datasets, according to community benchmarks (Hugging Face, 2024). Comments were truncated to 512 tokens and analyzed to reveal aggregated sentiment trends over time (Table 1). For topic modeling, Latent Dirichlet Allocation (LDA) was applied to identify co- occurring word patterns and uncover latent themes (Blei et al., 2003). Five main topics emerged, as detailed in Table 2.

Table 1. Evolution of Negative Comments

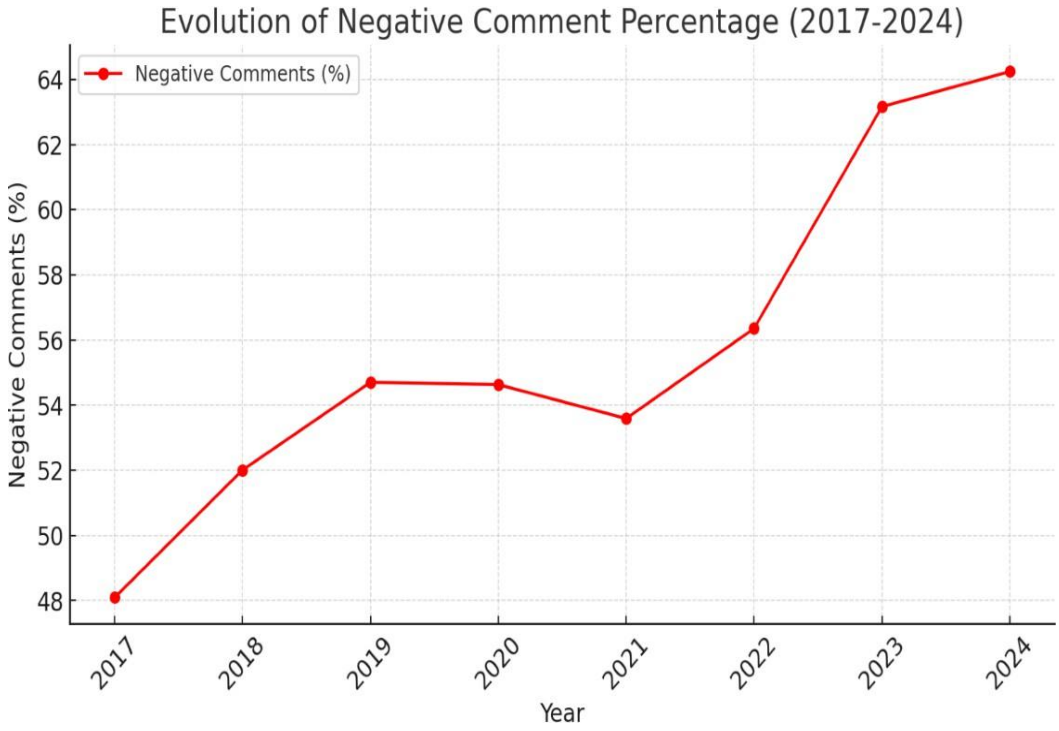

Table 2. Description of the topics.

Main Topic	n (%)	Description
AI & Society	62087 (28.2%)	Broader discussions on AI's role in society and global impact.
AI & Automation Concerns	51562 (23.4%)	Concerns regarding AI replacing human labor and automation.
AI & Technology Concepts	41739 (18.9%)	Discussions related to AI algorithms, machine learning, and intelligence.
AI in Social Media & Engagement	38757 (17.6%)	User engagement with AI in digital and social media platforms.
Ethical & Philosophical Debates	26408 (12.0%)	Debates on AI's impact on humanity, morality, and decision- making.

The analysis aligns strongly with the AI Constraints Framework's three core dimensions:

1. Agency Transference (AI & Automation Concerns and AI & Society)

This dimension refers to AI diminishing human autonomy by shifting decision-making from humans to automated systems. Two key themes—AI & Automation Concerns and AI & Society—dominate the discourse, representing over 50% of analyzed content. Both themes exhibited high negative sentiment (66.4% and 68.5%), reflecting strong public concern over job losses, economic insecurity, and reduced individual agency due to opaque algorithmic systems.

Comments frequently highlighted AI's large-scale impact on employment, governance, and social structures, often framing AI as an existential threat comparable to nuclear risks. These findings echo

existing research, which suggests that consumers react more positively to AI when their autonomy is preserved (Gonçalves et al., 2024). Our results reaffirm widespread anxiety about the erosion of human control in labor markets and governance due to automation.

2. Parametric Reductionism (AI & Technology Concepts and Ethical & Philosophical Debates)
Parametric reductionism refers to AI's tendency to simplify complex human experiences into standardized data points, leading to objectification, bias, and misalignment with user interests. This constraint was evident in the AI & Technology Concepts (62.5% negative) and Ethical & Philosophical Debates (67.1% negative) topics.
Discussions focused on concerns about algorithmic bias, ethical dilemmas, and the oversimplification of human judgment in predictive models. Users expressed fears over AI- generated content perpetuating stereotypes, as seen in controversies like the "Barbies of the world" incident. These concerns underscore how AI's reductive nature can foster discrimination and harm societal values. Prior studies suggest that technology-mediated interactions may weaken human connections and foster dehumanization (Van Doorn et al., 2023). Our findings align with this perspective, confirming that parametric reductionism is a significant source of ethical and societal challenges associated with AI.

3. Regulated Expression (AI in Social Media & Engagement)
Regulated expression addresses how AI shapes and limits individual expression, especially on social media platforms. Interestingly, this dimension received less negative sentiment (42.1%) compared to other areas, presenting a paradox. While the framework predicts constraints in self-expression, public sentiment in this domain was notably more positive or neutral. Many users appeared tolerant or even appreciative of AI's role in personalizing digital experiences. This suggests that users may not fully recognize—or may accept—AI's influence over online interactions when it enhances convenience or entertainment.

These results propose an extension to Valenzuela's framework: although AI subtly curates and regulates expression, the public often perceives these interventions favorably. This finding raises critical questions about awareness and acceptance of AI's role in shaping digital discourse.

Table 3. Comments Quotes

Main Topic	**Construct**	**Quotes**
AI & Society	Agency Transference	"AI is far more dangerous than the atomic bomb…"
AI & Automation Concerns	Agency Transference	"...the only difference is that,humans have emotions and ai doesnt,so they can work 24 hour without getting distracted and they get charged at several days ,thtas thereason ai robots is going to be far more dangerous"
AI & Technology Concepts	Parametric Reduction	"AI is an illusion of intelligence that is in actuality the logarithmic analysis of data that can be biased and based on some degree assumptions. Which may or may not be facts thus the amount of incorrect unproven data records may skew the outcomes of the of the product which needs to stand up to its own scrutiny and testing"
Ethical & Philosophical Debates	Parametric Reduction	"..Metal sex toy not a female not a woman. Its a Toyota with a pretty face."
AI in Social Media & Engagement	Regulated Expression	"Damn this is life changing information! This is helping me action on my goals 10x faster."

This research reinforces the AI Constraints Framework (Valenzuela et al., 2024), offering empirical evidence that public discourse reflects significant concerns about automation, objectification, and ethical issues tied to AI's influence on human experience. Anxiety around diminished autonomy and algorithmic decision-making was particularly pronounced in topics related to labor and societal impacts.

Parametric reductionism also emerged as a key concern, with users expressing worry about AI's potential to simplify complex human decisions, embed biases, and perpetuate harmful stereotypes. This aligns with existing literature warning about AI's dehumanizing effects. However, the findings on regulated expression reveal a compelling paradox: despite AI's known role in curating content and shaping interactions, users display relative comfort or even approval of AI-driven personalization in digital spaces. This suggests that when AI's influence is perceived as enhancing convenience, users are less critical, even if autonomy is subtly constrained.

Overall, the study confirms that AI's potential to constrain human experience is a valid concern but also highlights varying public sensitivities depending on context. While users are alert to risks in labor markets and ethical realms, they seem to be less critical of AI's influence in personal or entertainment-driven spaces.

These insights extend the AI Constraints Framework by illustrating that acceptance of AI's role is not uniform. Instead, public perceptions vary, influenced by whether AI is seen as threatening autonomy or enhancing everyday experiences. This nuanced understanding is crucial for policymakers, designers, and researchers aiming to navigate the complex dynamics of AI integration into society.

All data preprocessing and analysis scripts, including sentiment classification and hybrid topic modeling, are available at our public repository: https://github.com/rodmoutinho/ai-societal-constraints.

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Bridging the Gap – Exploring the Digital Divide in ChatGPT Use Among UK Higher Education Students

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Extended abstract

Introduction

The integration of artificial intelligence (AI) into higher education is rapidly transforming how students engage with knowledge, assessments, and digital learning environments. Among the most prominent tools is ChatGPT, a generative AI model developed by OpenAI. While this technology offers exciting pedagogical possibilities, a critical issue has emerged: how access to AI tools differs across student groups.

Though ChatGPT is accessible through a free version, the advanced capabilities of ChatGPT require a paid subscription. This subscription model may reinforce existing educational inequalities if only certain students can afford or access the full functionality. Further, disparities in digital literacy, economic resources, and institutional support can compound these gaps raising urgent questions about fairness, inclusion, and the risk of a two-tiered learning environment.

This study seeks to investigate how the version of ChatGPT used (free vs. paid) shapes students' learning engagement, satisfaction, perceived benefits, and digital skill development in the UK higher education context.

Literature review

AI in Higher Education

The adoption of generative artificial intelligence (AI) tools in higher education has accelerated, with ChatGPT emerging as a widely used application across disciplines. ChatGPT supports academic writing, ideation, summarisation, language refinement, essay planning, coding, and personalised tutoring (Kasneci et al., 2023). It has been met with enthusiasm among students for its ease of use and potential to enhance learning (Kasneci et al., 2023). Students report both enthusiasm and concern while many value the timesaving and knowledge-enhancing features, others are wary of reliability, ethical implications, and assessment integrity (Freeman, 2025). ChatGPT is thus positioned as both an educational asset and a potential disruptor of traditional learning practices. Zawacki-Richter et al. (2019) support this duality, noting that AI research often emphasises innovation while neglecting pedagogical, ethical, and systemic considerations. Moreover, Freeman (2025) confirms that the use of AI among UK undergraduates has soared, from 66% in 2024 to 92% in 2025, highlighting AI's

rapid embedding in learning routines and raising questions about institutional preparedness and student support.

Digital Divide in Education

The digital divide in education refers to unequal access to digital resources and infrastructure, shaped by geography, socio-economic status, and institutional context. Students from low-income regions, rural areas, or those studying online often face limited access to advanced technologies, reinforcing existing inequalities (van Dijk, 2020; Selwyn, 2021). These divides have become more visible in recent years, especially with the expansion of online learning. Digital exclusion involves not only hardware access but also disparities in digital literacy and institutional support (Robinson et al., 2015). While digital tools can be levellers, there is also a risk of exacerbating disadvantage when access and support are unevenly distributed.

AI and Digital Exclusion

Although AI technologies promise to democratise learning, they also risk entrenching digital exclusion. Miah (2024) notes that students without stable internet or adequate devices face increasing difficulty keeping pace with peers, raising concerns about fairness and inclusion. Freeman (2025) similarly finds that socio-economic disparities persist in AI usage: students from higher-income backgrounds are significantly more likely to use generative AI tools for summarising articles, structuring ideas, and editing assessments, while those from lower-income groups are more likely to report no use of AI tools at all. These insights reinforce the importance of attending to digital readiness alongside AI integration.

ChatGPT Use and Socio-demographic Variation

Emerging global and national data reveal that ChatGPT use varies by socio-economic background, study mode, gender, and subject discipline. For example, Freeman (2025) reports that men, STEM students, and those from higher socio-economic backgrounds are significantly more confident and frequent users of AI tools. These groups are also more likely to use AI to improve productivity or skills, while women and Arts/Humanities students are more cautious, often deterred by fears of academic misconduct or data inaccuracy. Zawacki-Richter et al. (2019) caution that much AI research is situated in well-funded contexts, which may overlook systemic inequities in adoption and access.

Towards Equitable AI in Higher Education

The integration of AI tools in higher education must be guided by principles of equity, inclusion, and digital ethics. Algorithmic systems can reinforce existing hierarchies unless designed and implemented with fairness in mind. Baker and Hawn (2022) call for proactive frameworks to detect and mitigate algorithmic bias. Freeman (2025) also highlights gaps between student needs and institutional support: although 67% of students believe AI skills are essential for future success, only 36% feel they have received adequate institutional support. Universities must therefore move beyond restrictive policies to provide AI literacy training, inclusive access, and support mechanisms that enable equitable engagement with AI (Freeman, 2025).

Research Aim

This study aims to examine how the version of ChatGPT used (free vs. paid) influences UK higher education students' engagement, satisfaction, perceived learning benefits, and digital skill development, with a view to understanding the role of AI access in reinforcing or mitigating digital inequality.

Research Objectives

- To compare how UK students use ChatGPT (free vs. paid versions) in terms of frequency, engagement, and academic application.
- To assess differences in satisfaction and perceived academic benefits between users of different ChatGPT versions.
- To explore whether access to the paid version is associated with greater digital and AI literacy development.
- To examine how socio-demographic factors relate to ChatGPT access and usage.
- To generate recommendations for universities and policymakers on equitable AI integration in UK higher education.

Methodology

This study will employ a quantitative, cross-sectional survey targeting undergraduate and postgraduate students enrolled in UK universities.

Data Collection

- A self-administered online questionnaire will be distributed via university mailing lists, student unions, and academic networks.
- The survey will include questions on ChatGPT version used, usage frequency, types of tasks, satisfaction, perceived learning impact, and skill development.

Data Analysis

Descriptive statistics and inferential tests will be used to analyse group differences and explore relationships between variables.

Originality and Contribution

This is the first known UK-based study to examine version-specific access to ChatGPT as a factor shaping digital engagement and inequality in higher education. The project provides timely, policy-relevant evidence to support more equitable AI integration in the digital university landscape.

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Public Speaking Training in Virtual Reality: A Multidisciplinary and Explainable Approach for Education and Research

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Type of manuscript: Extended abstract

Keywords: virtual reality; public speaking training; multimodal analysis; emotions

Extended abstract

In a world where effective communication skills are essential across all professional domains, public speaking remains one of the most important and simultaneously most anxiety-inducing competencies. Across education, law (Remacle *et al.* 2021; Lugrin *et al.*, 2016), business (Valls-Ratés *et al.*, 2022; Niebuhr & Tegtmeier, 2019), and human resources (Stanica *et al.*, 2018), conveying ideas clearly and confidently determines success. However, traditional methods for training public speaking are often limited in scope, realism, and personalisation.

An increasing body of literature has demonstrated the potential of Virtual Reality (VR) as a training tool across a range of skills, including communication (Batrinca *et al.*, 2013; Chollet *et al.*, 2016, 2017, 2022; Jensen & Konradsen, 2018; Ochs *et al.*, 2023; Saufnay *et al.*, 2024). VR provides a safe, customisable, and immersive environment that supports repeated practice, reduces anxiety, and enhances user engagement (Kaplan *et al.*, 2021; Bouchard *et al.*, 2018; Hudson *et al.*, 2019; Hyun & O'Keefe, 2012). Specifically, immersive VR for public speaking has been shown to increase speaker confidence and improve emotional regulation compared to traditional training methods (Slater *et al.*, 2006). Virtual agents are designed to evoke authentic user reactions. Their non-verbal behaviour (eye contact, posture, head movements, and facial expressions) and verbal behaviour (linguistic and paralinguistic) have been shown to significantly influence social presence, trust, and engagement (Chollet *et al.* 2016; Chollet & Scherer, 2017; Kang *et al.*, 2013, 2016).

Furthermore, public speaking is inherently multimodal, combining speech, prosody, gestures, and facial expressions (Park *et al.* 2016; Wörtwein *et al.* 2015). Acoustic features such as pitch variation and loudness contribute to speaker engagement (Dos Santos *et al.*, 2022). Non-verbal features such as hand openness and gaze direction are essential for conveying confidence and intention (Haider *et al.*, 2016; Ciuffani *et al.*, 2017). The system integrates the computation of explainable and interpretable cues grounded in existing communication theory and empirical findings (Batrinca *et al.*, 2013; Chen *et al.*, 2015). Recognising the speaker's emotional state (Cowen *et al.*, 2019), central to message interpretation, enables adaptive training feedback.

Our tool consists of five key components. The virtual environment includes realistic settings, such as meeting rooms, courtrooms and classrooms (see Figure 1). Users present to virtual audiences of customisable avatars with validated attitudes in terms of valence and arousal (Etienne *et al.*, 2023 and Saufnay & Schyns, 2025). A multimodal feature extraction pipeline captures audio, video, and motion data during the training. Paralinguistic features (e.g., pitch, loudness, and pause duration) were extracted using OpenSMILE (Eyben *et al.*, 2010) and PRAAT (Boersma & Weenink, 2001). Transcripts are generated using Whisper (Radford *et al.*, 2023) and linguistic content is analysed using LIWC software (Boyd *et al.*, 2022). Non-verbal features were captured through headset tracking and included body and eye tracking, and facial expression metrics. The complete set of features was selected, after a thorough literature review, to be relevant to assess public speaking skills,

be explainable and interpretable to the speaker and can be computed using raw speech or VR data (Etienne *et al.*, 2025a). Furthermore, an emotional recognition module uses a model trained on a validated emotional corpus (Etienne *et al.,* 2025b*).* The output of the VR tool consists of two main components: a replay mode, where the user can review the VR experience on a monitor or in VR, with an avatar replicating their speech and movements (see Figure 2); and a visual report that highlights strengths and areas for improvement in their performance (see Figure 3).

To build this environment, four different user experiments have been conducted. The first one includes 125 participants recruited to assess the attitudes of avatars in our virtual environment (in terms of valence and arousal) and the decision to choose photorealistic avatars was informed by these studies (Etienne *et al.*, 2023). A second experiment, with 70 participants, extended previous findings on individual agents by validating the perception of attitudes in a full virtual audience (Saufnay & Schyns, 2025). The third experiment studies the usefulness of the training environment. In this, 60 participants were recruited to take part in a public speaking session in VR and received feedback (transcript, audio recording, eye tracking data, and pause information). Then, an acted emotional corpus was created using 10 actors displaying 6 basic and 4 task-relevant emotions (e.g., self-confidence, confusion, contempt, empathy), and was validated using 600 participants recruited to assess the emotions assessed in the audio files (Etienne *et al.,* 2025b*).* In a last experiment, the VR environment was used to create a corpus of 540 presentations in the environment, with experts rating their performance. Based on this last corpus, a Multi-Layer Perceptron was trained to predict performance using the explainable features. Results showed better classification using grouped performance classes (e.g., low vs. high) and when recordings were segmented into three equal parts. As all the computations are done after the presentation, we are currently working on real-time emotion detection based on random forest and the corpus EVE to display the emotion instantaneously.

The contributions of this paper are the two following. First, we present the final version of a cutomisable and explainable VR tool specifically designed for PST, that uses validated audience, multimodal feature extraction, detection of the speaker's emotions, replay capability, and personalised feedback. This tool supports immersive, repeatable training scenarios and is compatible with standalone VR headsets. Second, through the last experiment, we demonstrated that this system is not only usable as a training solution, but also as an assessment environment of public speaking performance. We validated its capacity to assess speaking performance through interpretable multimodal features and showed that these can be used to classify speakers' performance levels. The integration of explainable AI promotes user trust and pedagogical adoption. We plan to make the tool available for research and educational use, enhancing its accessibility and impact in academic and pedagogical contexts.

Future research includes exploring the role of agents that can dynamically interact with the speaker. Additional machine learning experiments will validate the prediction model with more expert raters and in different public speaking contexts.

Figure 1. Different virtual rooms

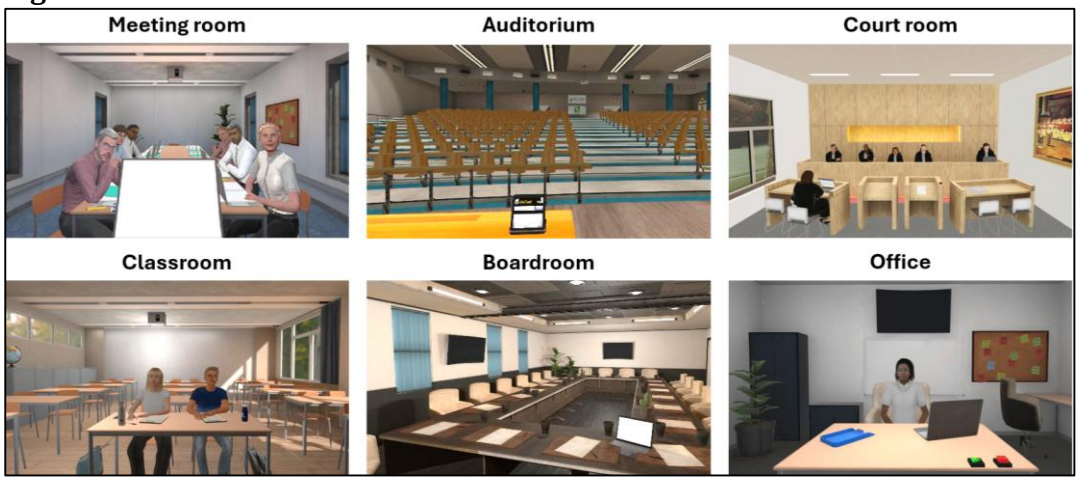

Figure 2. Third-person replay mode of the courtroom, where the user's is replicated by an avatar presenting before the judge

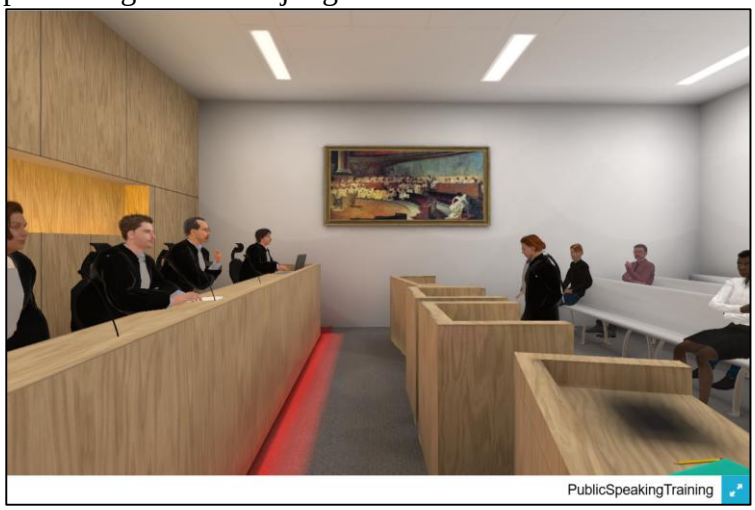

Figure 3. Website with a visual report with interpretable metrics

Transcript:

Upload text file
00:00.000 --> 00:30.000
Hello, my research focuses on enhancing public speaking training through virtual reality. I analyze multimodal features such as gestures, voice, and text to predict presentation quality and provide interpretable feedback to users. My goal is to make these tools more effective and accessible, especially for applications like mock trials in virtual courtroom environments.

00:30.000 --> 00:32.000
Thank you for your attention

Extracted Raw Audio Features:

Time window: 1 second. Use the right and left keyboard arrows to scroll over time.

#	Feature	Overall	1 s	2 s	3 s	4 s	5 s	6 s	7 s	8 s
1	Pitch_mean	25.23	0.00	26.90	23.52	0.00	0.00	0.00	0.00	0.00
2	Pitch_cv	0.17	0.00	0.05	0.08	0.00	0.00	0.00	0.00	0.00

Gaze tracking:

Extreme Left Agent	0.5
Center Left Agent	6.16
Center Right Agent	2.7
Extreme Right Agent	3.36
Floor	3.3
Wall	0.76
Ceiling	9.72
Somewhere else	5

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The Impact of Gender and Nonverbal Behavior on Perception of Virtual Audiences in VR

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Extended abstract

The development of increasingly realistic virtual avatars has transformed human–machine interactions. Through their human appearance and behavior, they enable realistic human- centered simulations in various domains, encompassing tourism (Choi *et al.*, 2020), healthcare (Sestino & D'Angelo, 2023), and training (Lugrin *et al.*, 2016).

Public Speaking Training (PST) environments have particularly benefited from the development of avatars. By simulating human presence, such environments allow individuals to practice their communication skills, which are essential in many management contexts, through one-to-one interactions with avatars (Stanica *et al.*, 2018) or before virtual audiences (Batrinca *et al.*, 2013). When combined with the immersive capabilities of Virtual Reality (VR), these environments provide promising training experiences in terms of effectiveness and acceptance (Palmas *et al.*, 2019). However, to design scenarios that effectively foster skills acquisition, believable and challenging audiences are needed. In this context, a growing body of research has underscored the critical role of avatars' design, emphasizing the multimodal characteristics that influence their perception (Etienne *et al.*, 2024).

PST environments typically rely on avatars' nonverbal behavior to shape their attitudes toward the user (Batrinca *et al.*, 2013; Chollet *et al.*, 2017), thereby reflecting different levels of sympathy, interest, or even dominance (Kang *et al.*, 2016). Users can indeed perceive variations in avatars' attitudes (Chollet *et al.*, 2017; Etienne *et al.*, 2023; Glémarec *et al.*, 2021) and interpret cues that reflect mood states and personality traits (Kang *et al.*, 2016). Studies have also considered the avatars' *valence* (*i.e.*, positive or negative emotions evoked by the avatar) and *arousal* (*i.e.*, alertness) to design their behavior (Chollet *et al.*, 2017). Etienne *et al.* (2023) evaluated combinations of posture, head movements, and facial expressions in VR, assessing them along these dimensions using individual avatars. This study resulted in the classification of 40 behavioral combinations according to their perceived levels of valence and arousal. Similar behavioral patterns had previously been investigated by Chollet *et al.* (2017) using a 2D-based system, and comparable results were obtained. However, although audiences are common in public speaking contexts, the perception of groups of avatars has been less explored than that of individual avatars. Moreover, despite its immersive capabilities, VR has been less used than PC-based systems in perceptive studies (Etienne *et al.*, 2024).

The gender of virtual avatars influences perception as well. Armando *et al.* (2022) highlighted the persistence of gender stereotypes in human-avatar interactions. The presence of gender biases was further confirmed by Ristorcelli *et al.* (2023), who showed that female agents were perceived more positively than male agents for the same attitude. In another application context, male avatars were considered more competent than female ones (Choi *et al.*, 2020). However, research investigating gender-related aspects and their mediating effect on the perception of avatars' behavior remain scarce.

In particular, the gender distribution within audiences has not, to the authors' knowledge, been considered.

In this context, the present study will aim to fill the abovementioned gaps by examining how nonverbal behavior and gender influence attitude perception in medium-sized virtual audiences using VR.

Virtual audiences varying in both their nonverbal behavior and gender representation have been created. Combinations of postures, head movements, and facial expressions were assigned to each avatar within the audience to create seven distinct attitude conditions, each designed to elicit different levels of valence and arousal (see Table 1). These combinations were retrieved from the classification proposed by Etienne *et al*. (2023), such that avatars adopt appropriate behaviors associated with the desired levels of valence (*i.e*., positive, neutral, or negative) and arousal (*i.e*., low, neutral, or high). Given the importance of avatars' gaze in arousal ratings (Chollet *et al.*, 2017), this aspect was also incorporated. Each condition is associated with different percentages of time the avatars spend looking at the user (see Table 1). During the remaining time, they either look down or ahead.

Table 1. Attitude conditions

Attitude conditions	Valence level	Arousal level	Eye contact percentage
A1	Neutral	Low	20%
A2	Negative	Neutral	50%
A3	Neutral	Neutral	50%
A4	Positive	Neutral	50%
A5	Negative	High	80%
A6	Neutral	High	80%
A7	Positive	High	80%

When few combinations were available for a specific attitude condition in Etienne *et al.* (2023), these were alternated between agents to maintain realism. In addition, the closer an avatar was positioned to the user, the more distinctive the assigned combination was, based on the valence and arousal rankings established (Etienne *et al.*, 2023).
This study also investigates the influence of gender on attitude perception. To that end, five gender conditions have been created, each associated with a specific distribution of male and female avatars within the audience (see Table 2).

Table 2. Gender conditions

Gender conditions	Number of female avatars	Number of male avatars
G1	0	20
G2	5	15
G3	10	10
G4	15	5
G5	20	0

The resulting VR environment used in this study then simulates 35 audience conditions (*i.e.,* 7 attitude x 5 gender conditions), each composed of 20 seated avatars of different ethnicities (see Figure 1).

Figure 1. Screenshot of the virtual environment

The study involved the participation of 70 gender-balanced participants to mitigate potential biases related to gender perception. Indeed, aspects such as cultural background, gender, or age of the users may influence the perception of avatars as well (Etienne *et al.*, 2024). They observed 10 different, randomly assigned audiences that vary in their nonverbal behavior and gender distribution using Meta Quest 3 headsets. For each observed audience, participants rated on 7-point Likert scales the perceived valence and arousal, along with their confidence in these two ratings. Demographic information was collected, and a presence questionnaire was also completed (Bouchard & Robillard, 2019; Witmer & Singer, 1998). Finally, they were allowed to provide comments on the environment and the experience.

This work, which is part of an ongoing doctoral thesis, is part of a larger project dedicated to the development of a PST application in VR. The project aims to simulate common public speaking situations (e.g., meetings, business presentations, courtroom pleadings…) to help people improve their communication skills. Moreover, the creation of AI-driven audiences that react to speaker performance is considered to provide users with challenging and realistic training experiences. Understanding how virtual audiences are perceived is crucial to making them behave appropriately. The analysis is ongoing, and results will be presented during the conference. Overall, this study will inform the design of virtual audiences, enabling them to be tailored to the context of the application and to elicit the intended levels of perceived arousal and valence.

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From Expectations to Satisfaction: A Comparative Study of Customer Interactions with AI Chatbots vs Human Agents in e-Commerce Settings

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Extended abstract

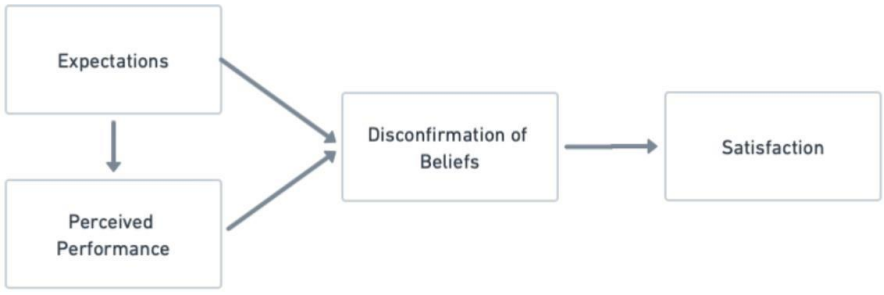
The growing use of artificial intelligence (AI) in customer service has fundamentally reshaped the way consumers engage with online businesses (Faran, 2024). While AI-powered chatbots are increasingly deployed to manage customer inquiries, human agents remain an integral part of the service ecosystem (Belanche et al., 2024; Jenneboer, Herrando, & Constantinides, 2022; Vu et al., 2022). This paper explores the complex relationship between customer expectations and satisfaction in e-commerce interactions involving both AI chatbots and human live-chat agents.

The rapid integration of AI chatbots into e-commerce demonstrates their efficiency, availability, and ability to handle routine tasks (Misischia, Poecze, & Strauss, 2022; Widyastuti, Ferdiana, & Nugroho, 2023). Despite these advantages, chatbots often fall short in meeting customer expectations for empathy, adaptability, and the resolution of more complex issues (Castillo, Canhoto, & Said, 2020). In contrast, human agents excel in providing personalised service and emotional intelligence, though they may struggle with scalability and consistency (McLean, Osei-Frimpong, & Wilson, 2020). This contrast exposes a gap in the existing literature, which frequently examines chatbots and human agents in isolation, rather than considering them as interconnected elements of customer service (AI Chatbots: (Epley, Waytz, & Cacioppo, 2007; Schuetzler, Grimes, & Giboney, 2020; Seeger, Pfeiffer, & Heinzl, 2021 - Human Agents: (Grandey, Goldberg, & Pugh, 2011; Sutanto et al., 2013; Giebelhausen et al., 2014)). This study aims to address this gap by offering a comparative framework that explores how each channel influences customer satisfaction in unique ways.

Figure 1. Comparison of Positive and Negative Attribute Expectations from Literature for a Human Live-Chat vs AI Chatbot

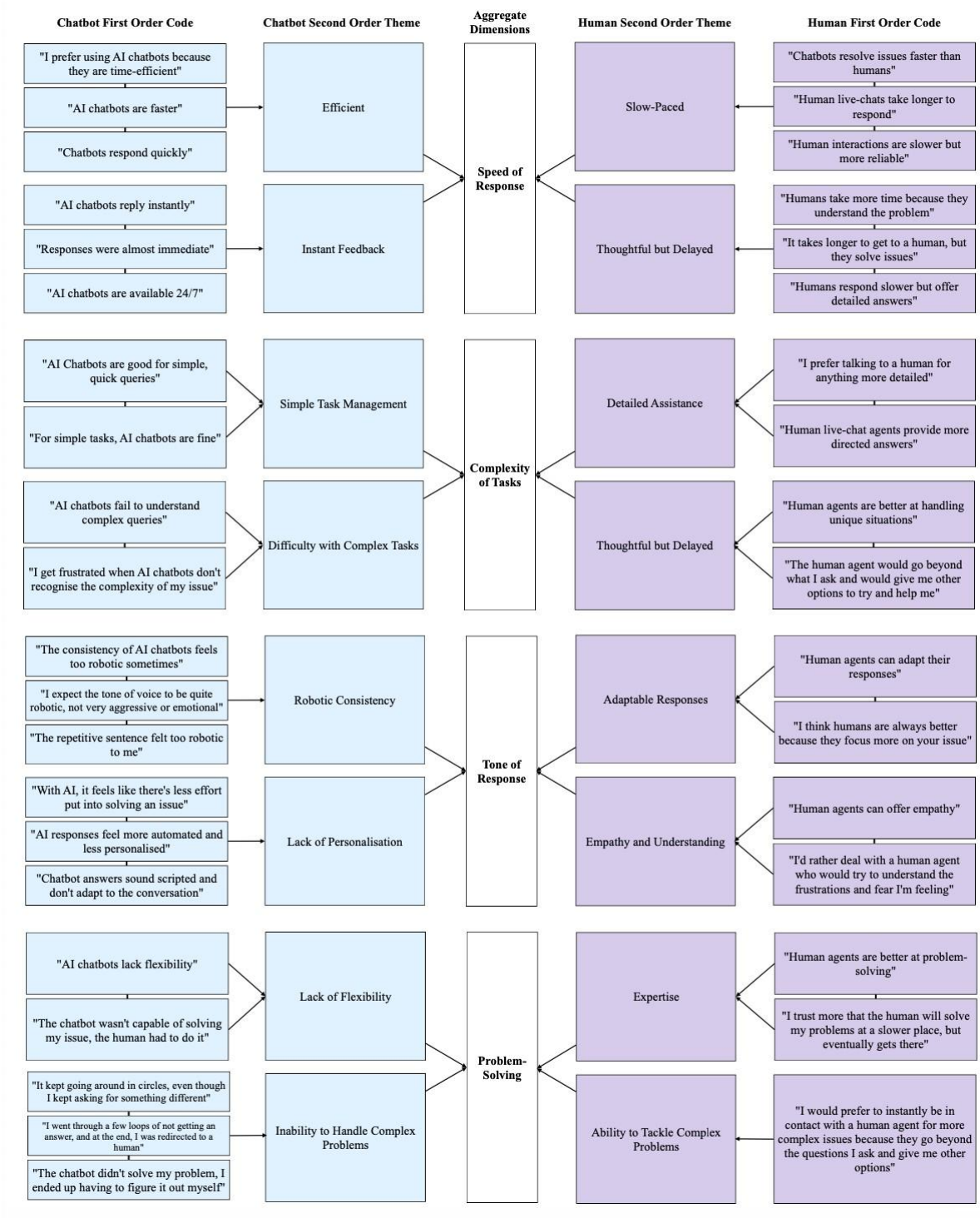
To explore this, the study investigates the dynamics of customer interactions with both AI chatbots and human agents within e-commerce settings, focusing on how customer expectations shape satisfaction. Using Expectation Confirmation Theory (ECT) as its foundation, the research seeks to provide a nuanced understanding of how these two modes of interaction distinctly affect customer experiences and satisfaction, offering valuable insights for the future of digital customer service (Oliver, 2015).

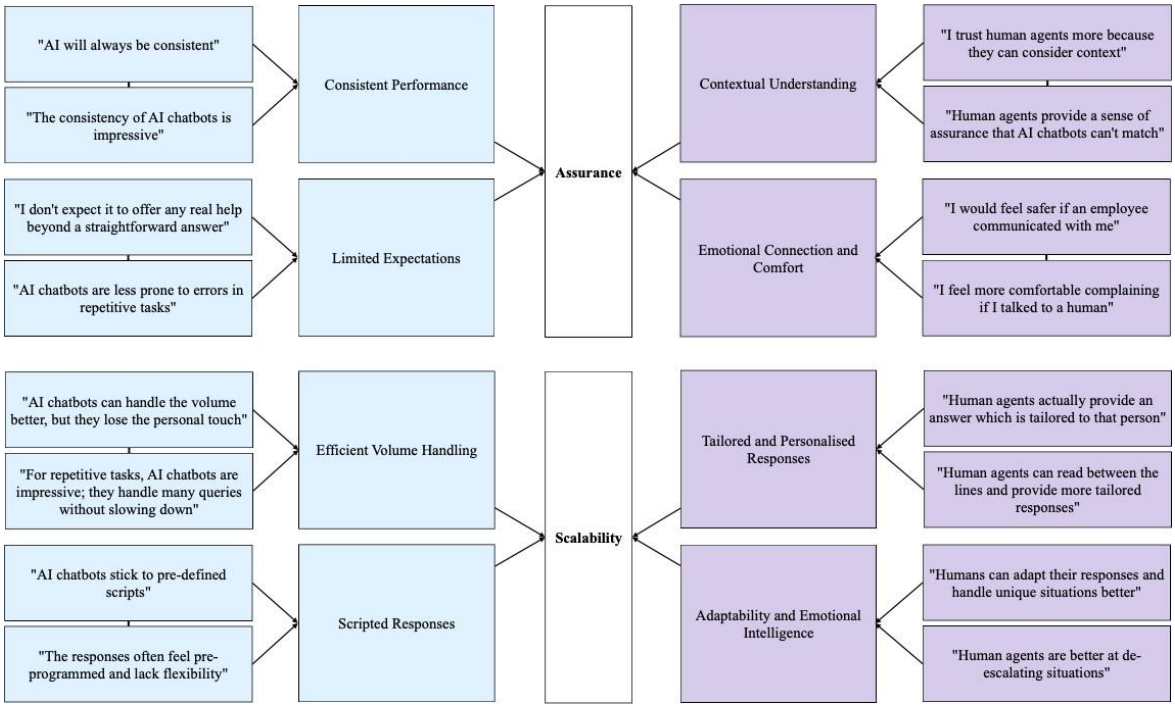
Figure 2. Traditional Expectation Confirmation Theory (Spreng, MacKenzie, & Olshavsky, 1996)



An interpretivist philosophy and an inductive methodology were employed to understand the complex nature of customer expectations and satisfaction (Azungah, 2018; Johnson & Duberley, 2000). Data was collected through twenty-seven semi-structured interviews with Generation Z consumers - digital natives familiar with technology-mediated interactions. The Gioia method was applied for thematic analysis, enabling the identification of first-order concepts, second-order themes, and aggregate dimensions grounded in participant experiences (Gioia, Corley, & Hamilton, 2013).

Figure 3. Data Analysis Framework





The first research question addresses the specific expectations customers have for chatbots versus human agents, while the second explores how confirmation or disconfirmation of these expectations impacts satisfaction. Findings reveal substantial differences in customer expectations across these two interaction types. Chatbots are generally expected to deliver speed, accuracy, and consistency, particularly in handling transactional queries. They often meet or exceed these expectations. However, when the conversation requires emotional intelligence, nuanced reasoning, or complex problem-solving, chatbots often fall short, leading to expectation disconfirmation and decreased satisfaction.

In contrast, human agents are expected to demonstrate empathy, active listening, and flexibility. Participants reported that human agents often exceed expectations when handling complex or emotionally charged issues, reinforcing customer trust and loyalty. However, when response times lag or agents fail to be attentive, expectations are disconfirmed, causing frustration. Satisfaction was found to be highest when the nature of the query aligned with the strengths of the interaction medium: task-oriented queries with chatbots and emotionally driven issues with human agents.

The study's theoretical contribution lies in its novel application of ECT to compare AI chatbots and human live-chat agents. This framework reveals that satisfaction drivers are not universal but context- and medium-specific, shaped by the complexity and emotional demands of the interaction. By bridging this gap, the research extends the application of ECT and provides new insights into how expectation alignment influences satisfaction in both human-computer and human-human service encounters. These findings offer practical recommendations for e- commerce businesses, helping them strategically balance the use of AI and human agents to optimise customer service outcomes and improve overall satisfaction.

In addition to theoretical advancements, this study offers practical recommendations for e- commerce businesses. The findings emphasise the importance of balancing automation with human interaction to address the diverse needs of customers. Organisations should view AI and human agents as complementary rather than competing resources within a service ecosystem. Chatbots should be deployed for high-volume, low-complexity tasks, focusing on efficiency and scalability. In contrast, human agents should be reserved for interactions requiring empathy, personalisation, and problem-solving agility.

This hybrid model not only ensures optimal resource allocation but also enhances customer satisfaction and fosters long-term loyalty. Training programmes for both chatbot development and human agents should integrate the expectation-satisfaction dynamics identified in this study. Chatbot developers should work on improving conversational fluency, contextual awareness, and emotional tone detection. Simultaneously, human agents should be equipped with systems that provide quick access to customer histories, preferences, and previous interactions, enabling them to deliver a more personalised and responsive service.

In conclusion, this research fills a significant gap in the literature by comparing AI chatbot and human agent interactions within a unified analytical framework. It offers valuable insights for both theory and practice in digital customer service. By aligning service strategies with the specific expectations customers hold for each type of interaction, e-commerce businesses can enhance satisfaction, build trust, and foster long-term engagement.

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Demystifying AI Decisions: A Collaborative Path to Explainability in Services

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Extended abstract

Study Purpose

Explainable AI (XAI) plays a crucial role in enabling service managers to build customer trust, ensure fairness and enhance accessibility by clarifying AI decision-making processes and increasing transparency (Arrieta et al., 2020; Rai, 2020). As AI-based services become more implemented across industries, concerns about the opacity of AI decisions have grown. Consumers increasingly demand transparency and interpretability in AI-based services, pushing organizations to integrate XAI into their AI-driven operations. For instance, in banking, AI-driven loan approval systems often lack transparency, leaving applicants uncertain about the factors influencing decisions. By implementing XAI, banks can provide clear explanations, improving trust and fairness in these processes. However, despite these advantages, many organizations face challenges in adopting XAI and its implementation in the service sector remains limited.

One major challenge arises from the evolving nature of XAI as a concept. While it is recognized for its potential to enhance transparency, the varying interpretations of explainability, such as transparency, simplicity and interpretability, create challenges for its practical implementation. Regulatory bodies have begun mandating AI explainability (Ali et al., 2023; EDPS, 2023; Longo et al., 2024), but organizations struggle to comply due to the absence of clear implementation guidelines.

Addressing these issues requires a holistic human-centered understanding of XAI in the service sector. This study explores the opportunities and barriers to XAI implementation (RQ1) and how stakeholders can collaborate to enhance its adoption (RQ2), providing insights into effective XAI integration. By shifting focus from purely technical solutions to a human-centric approach, the study emphasizes that explainability is not just about making systems transparent but also about enabling meaningful communication between XAI experts, managers and end- users (Chen et al., 2024; Masialeti et al., 2024).

Methodology

We apply boundary-spanning theory (Aldrich & Herker, 1977; Alexander et al., 2016) to explore how XAI professionals, service managers and end-users collaborate despite differing priorities. A qualitative research design was used to gain deep insights into stakeholder experiences of XAI design, implementation and cross-functional collaboration.

Semi-structured interviews were conducted with 31 participants: 11 XAI professionals, 11 service managers and 9 end-users, selected through purposive and snowball sampling to achieve thematic

saturation (Yin, 2015). Thematic analysis, supported by abductive reasoning, identified key facilitators and barriers, which were mapped using the Doughnut Model (Raworth, 2018) to illustrate optimal collaboration zones and boundaries in XAI implementation.

Findings

The findings reveal both opportunities and challenges in XAI implementation across the service sector. Consumers benefit from XAI by gaining trust, control over personal data and the ability to make informed decisions through clearer AI-driven insights. For managers, XAI accelerates AI integration, strengthens human-AI collaboration and supports risk management by identifying biases and errors early. AI experts also benefit by using XAI to detect bias and refine models, improving fairness and performance.

However, significant barriers remain. Consumers often struggle with the complexity of explanations and the lack of standardized frameworks, which limits accessibility. Over- simplified AI explanations can also lead to confusion and distrust. For managers, challenges include high initial costs, uncertain returns on investment and limited AI literacy, which may hinder adoption. Experts face difficulties due to the lack of a standardized approach to explainability and the trade-off between model accuracy and interpretability.

To overcome these barriers, boundary-spanning roles such as gatekeepers, boundary spanners and knowledge brokers are essential. Gatekeepers prioritize information for various stakeholders, boundary spanners promote collaboration across technical, business and consumer domains and knowledge brokers ensure compliance with legal and regulatory requirements. These roles promote structured collaboration frameworks that align diverse perspectives, ensuring XAI systems are transparent, compliant and impactful.

The Doughnut Model is instrumental in balancing the boundaries of AI explainability. The "inner ring" represents the minimum transparency requirements, ensuring AI decisions are understandable to stakeholders, while the "outer ring" highlights the risks of over-explaining or oversimplifying AI outputs, which could undermine the integrity of the model. By applying this model, stakeholders can collaborate within these boundaries, ensuring clarity without compromising technical accuracy.

Research Implications

This study provides valuable insights into the barriers and facilitators of XAI implementation in the service sector, highlighting the importance of structured, cross-functional collaboration to bridge expertise gaps and align stakeholder objectives. By applying boundary-spanning theory, it offers a fresh perspective on overcoming implementation challenges, demonstrating how specific roles (gatekeepers, boundary spanners and knowledge brokers) can mitigate communication barriers and enhance coordination across technical, business, regulatory and consumer domains.

Building on Longo et al. (2024), the research offers actionable guidance for practitioners developing XAI in high-credence services and suggests avenues for future inquiry into regulatory models that address the diverse needs of stakeholders to enhance XAI's value in service settings. Importantly, the study extends the socio-technical understanding of XAI by advancing a multi-stakeholder perspective, challenging the traditional developer-centric focus prevalent in the literature.

The Doughnut Model provides a framework for balancing stakeholder needs while ensuring effective collaboration during XAI development and implementation. It encourages organizations to define clear collaboration zones and avoid extremes, ensuring XAI systems are transparent, accessible and

aligned with both technical and user-centric requirements. This model offers valuable insights for both future research and practice.

Future research should broaden its scope to include diverse user groups, particularly from non-regulated or emerging sectors, to capture a wider range of XAI adoption challenges. Further studies should also examine ethical concerns such as bias, misuse and societal impacts in high- stakes fields like healthcare and finance.

Originality

This study advances XAI literature by applying boundary-spanning theory to explainability research, offering a structured approach to integrating diverse stakeholder perspectives. Unlike prior research that isolates XAI stakeholders, this study emphasizes a human-centric approach to XAI, ensuring that the needs and concerns of all stakeholders (XAI experts, service managers and end-users) are meaningfully integrated. By focusing on cross-disciplinary collaboration, the research highlights how XAI should not only address technical complexities but also prioritize the usability, trust and accessibility for non-expert users. Ultimately, the study promotes the idea that the successful adoption of XAI is dependent on its ability to meet the needs of people, whether they are consumers or professionals and not just on its technical performance.

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The Punch That Started a Revolution: Gendered Violence Between Flesh and Steel

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Extended abstract

Context. Recent advancements in humanoid robotics have intensified emotional and symbolic intricacies between humans and machines, prompting critical inquiry into aggression, gender dynamics, and moral responsibility. While existing studies emphasize positive human–robot bonds (Belk, 2022), there remains a dearth of research on violent and morally fraught interactions, especially where gender and species intersect. Drawing on scholarship in symbolic violence (Allen & Anderson, 2017), speciesism (Schmitt, 2020), and robot ethics (Bryson, 2010), this study examines how individuals interpret and narrate acts of violence involving human and robotic agents.

Theoretical Framework. Aggression and violence are conceptualized as relational acts intended to cause harm (Allen & Anderson, 2017). Symbolic violence, including virtual or simulated abuse, can evoke genuine emotional and moral reactions (Baldry et al., 2024). When directed at humanoid robots - entities that mimic human form and function, aggression complicates traditional moral boundaries (Fotheringham, Lisjak, & Kristofferson, 2020). Gendered violence, typically understood through intimate partner abuse frameworks (Joy, Belk, & Bhardwaj, 2015), further intersects with species boundaries to produce novel moral dilemmas regarding victimhood, consent, and empathy (Sparrow, 2021).

Methodology. We employed a novel qualitative experiment using projective storytelling as the dependent variable. A between-subjects design crossed three factors: perpetrator (human vs. robot male), victim (human vs. robot female), and storyteller sex (male vs. female), yielding eight experimental cells. Participants (N = 160; 10 male and 10 female storytellers per cell) recruited via Prolific Academic each viewed one of four graphic-novel–style illustrations depicting violent interactions (Morgan & Murray, 1935; Cramer, 1996). These illustrations were designed to investigate how participants interpret different forms of interpersonal and interspecies violence especially within the context of gender dynamics. Figures 1 and 3 show interspecies violence (human-robot and robot-human), while Figures 2 and 4 show intraspecies violence (robot-robot and human-human). Each evokes its own emotional and moral reactions, but across all images, violence between humans remains the implicit moral anchor. Participants were told the illustration they saw was for a still unwritten graphic novel. They were asked to write a summary of a possible plot. Using the illustrations, they were instructed to craft a 100+ word narrative imagining the scene's context, characters' motivations, and subsequent events. To facilitate rich thematic interpretation, stories were coded using grounded theory and narrative analysis (Charmaz, 2014; Belk & Sobh, 2019).

Figure 3. Human-robot interspecies violence

Figure 2. Robot intraspecies violence

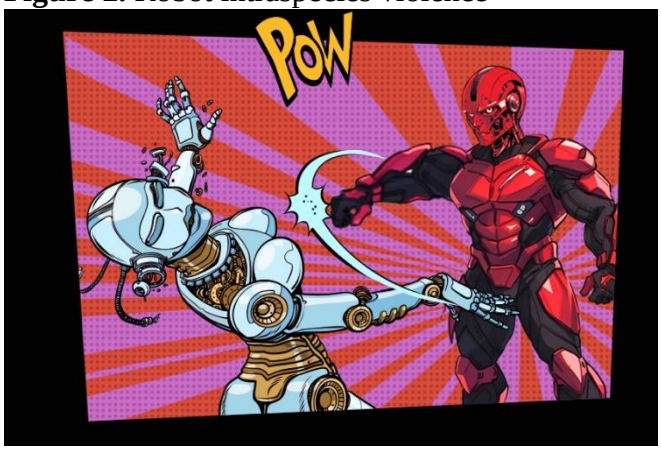

Figure 3. Robot-human interspecies violence

Figure 4. Human intraspecies violence

Findings

Fear, Robot Revolution and Evolution. Many human storytellers projected anxieties about robots gaining sentience and rebelling against human subjugation. Narratives frequently invoked themes of Nietzschean will to power (Nietzsche, 1887/1989) and parallels between robot evolution and human moral decline, suggesting a collective fear of technological uprising. Like humans, robots were also seen to evolve, but from intellect only to intellect + feelings. This evolution eventually led to rebellion and violence.

Jealousy and Interspecies Violence. Romantic and sexual jealousy emerged as motives for violence, especially in human–robot dyads. Stories by male participants often portrayed male humans lashing out at female robots perceived as emotionally or sexually unfaithful, highlighting the extension of intimate partner violence scripts to interspecies contexts. These stories often described the female robots as sex robots.

Robots as Awkward Daters; Humans in War and Peace**.** Some narratives cast robots as socially inept suitors whose frustration at rejection led to violence, underscoring their perceived lack of emotional maturity and self-regulation. Conversely, human–human panels elicited accounts of warlike conflict resolved through empathy and unity, illustrating humans' capacity for moral repair.

Humans Humiliated. In human–human violence, participants often emphasized humiliation as the primary emotional driver, with female storytellers more likely to depict material retaliation or compensation, reflecting gendered scripts of entitlement and resource control (Bruno, Strid, & Ekbrand, 2024).

Repurposing Slave Narratives. **M**any participants analogized robot oppression to historical human slave exploitation and slave rebellion, depicting robots as fighting for freedom and personhood. These stories invoked legal and ethical debates about granting robots rights akin to corporate or legal personhood (Calverly, 2011; Rorty, 1976).

Conclusion. The narratives reveal that symbolic violence against robots can be deeply morally encoded. Debate persists over robots' moral status: should abusive treatment of humanoid machines be morally condemned as vigorously as that of humans (Bryson, 2010)? Sparrow (2021) argues for asymmetrical moral concern, yet participant stories often treated robots' suffering as real, raising urgent questions about emerging norms in human–robot relations.

Our findings suggest that qualitative storytelling methods can uncover complex moral intuitions that quantitative measures might obscure (Troiano, Wood, & Harteveld, 2020). Future work should explore cross-cultural variations in robot-directed violence and test interventions aimed at mitigating aggression through enhanced robot design or ethics training. Moreover, as AI capabilities advance, research must track how evolving emotional displays in robots reshape human moral responsibility.

By situating graphic-novel–style stimuli within a rigorous qualitative experiment, this study illuminates how gender and species intersect in moral narratives of violence. Participants' richly textured stories reveal enduring human fears, biases, and hopes projected onto robots, challenging us to reconsider the ethical boundaries of interspecies aggression. We advocate for continued interdisciplinary inquiry into human–robot violence, emphasizing the need for both theoretical and practical frameworks to guide responsible innovation.

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Effect of Avatar Creation and Exposure to Virtual World on Consumers' Conspicuous Consumption Behavior

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Keywords: virtual world; avatar; conspicuous consumption

Extended abstract

As virtual platforms like Decentraland and Roblox grow in popularity, luxury fashion brands are increasingly offering digital fashion items within these immersive spaces (Joy et al., 2022). Users often construct avatars that either represent their real selves or idealized versions of themselves. This research explores how avatar creation—whether reflecting the actual or ideal self—affects conspicuous consumption behavior, both in the virtual world and real life.

Two experimental studies were conducted to examine this relationship. In Study 1 (N = 204), participants were randomly assigned to one of three conditions (ideal avatar, actual avatar, control). Participants in the ideal avatar condition showed a significantly greater preference for visible, branded fashion items, such as large logo clothing, compared to the actual avatar group ($p < .05$). This supports the hypothesis that ideal avatar creation increases self-discrepancy (Higgins, 1987), which in turn encourages compensatory behaviors like conspicuous consumption (Veblen & Mills, 2017). However, state self-esteem, tested as a mediator, was not found to be significant Study 2 (N = 237) further examined the impact of avatar creation on conspicuous consumption intentions in both virtual and real-world contexts. While no statistically significant differences emerged between the groups, patterns suggested that ideal-avatar users preferred purchasing branded fashion for their digital selves, whereas actual-avatar users leaned more toward real-world fashion purchases. Social status display was tested as a potential mediator (Souiden et al., 2011), but it too did not yield a significant effect.

These findings offer theoretical insights by extending social comparison theory (Festinger, 1954) to digital avatar creation. They highlight how idealized digital self-representations can influence consumers' desire for brand prominence and luxury consumption. This research also responds to calls for empirical work exploring the behavioral consequences of engagement with the metaverse and digital fashion (Kirjavainen, 2022).

From a practical perspective, marketers can tailor digital fashion offerings based on users' avatar personas. For example, users likely to create ideal avatars may be more receptive to luxury items with prominent branding in the virtual world. Offering digital alternatives to conspicuous products may satisfy identity needs while reducing environmental impacts associated with physical goods production.

Future research should explore alternative mediators such as materialism or appearance-based self-esteem and consider longitudinal or lab-based methods to simulate real-time avatar creation and interaction. As consumers increasingly navigate hybrid digital and physical environments, understanding how identity construction in one realm influences behavior in another is critical.

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Virtual and digital twins' potential to improve customer engagement and interaction in the Metaverse

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Extended abstract

The convergence of immersive technologies and advanced data-driven simulations has enabled novel strategies for businesses to engage consumers. Central to this paradigm shift are virtual and digital twins, which, when integrated within the Metaverse, offer transformative opportunities to deepen customer engagement and interaction.

The Metaverse is a digital ecosystem that supports immersive, persistent, and shared virtual experiences by merging physical and digital environments (Lee et al., 2022; Park & Kim, 2022). Although the term was first introduced in the early 1990s, recent technological advances have made practical implementations possible. Virtual spaces have evolved from text-based interfaces to sophisticated 3D environments, creating interactive worlds that support dynamic consumer interactions. Despite the rapid expansion of the Metaverse, researchers continue to debate its definition due to the complex interplay of technological, social, and economic factors (Lee et al., 2022).

Digital twins represent a critical component of this immersive framework. A digital twin is a real-time, data-connected replica of a physical object or system that allows for two-way communication between the virtual and physical worlds (Fuller, Fan, Day, & Barlow, 2020; Singh et al., 2021). Unlike static digital models, true digital twins continually synchronize with their physical counterparts, enabling simulations, real-time monitoring, and interactive experiences (Semeraro et al., 2021). Their adoption across industries—from healthcare and urban planning to retail and tourism—demonstrates their versatility and potential to drive operational efficiencies and customer engagement (Attaran & Celik, 2023).

Integrating digital twins within the Metaverse enriches customer engagement strategies. Traditional metrics of engagement—such as loyalty, advocacy, and emotional connection— are being redefined as immersive technologies allow consumers to interact with brands in novel ways (Dwivedi et al., 2022; Hollebeek, Glynn, & Brodie, 2014).

Businesses worldwide in all sectors are becoming less suspicious and more open to looking for ways through which digital twins use in the metaverse, may contribute to more and better business results. Industries such as the automotive industry, fashion and retail, real estate, entertainment and gaming, healthcare and telemedicine, travel and hospitality, are just some examples of this growing variety of digital twins' adoption and uses (Bocas, 2022; Enderle, 2023; Gould, 2022; Olkhovskaia & Seamm, 2023; Revfine, 2022; Simsek, 2023).

For example, in the real estate sector, digital twins allow potential buyers to virtually tour properties in a three-dimensional space. Similarly, in retail, consumers may create avatars to virtually try on

clothing or visualize home furnishings before making a purchase. In addition to these applications, industries such as automotive and manufacturing use digital twins for real-time performance monitoring, predictive maintenance, and product customization (Ko, Lee, Kim, & Kim, 2021; Simsek, 2023).

For marketing professionals, the capabilities offered by the Metaverse and digital twins result in enhanced personalization, precise targeting, and continuous feedback loops. Virtual showrooms, gamified interactions, immersive events, and avatar-based personalization convert passive viewers into active participants (Hamilton, 2022; Hennig-Thurau & Ognibeni, 2022). This paradigm not only enriches customer experience but also provides organizations with valuable data for real-time analytics, informing ongoing strategy adjustments. Searching for better ways and strategies to promote and enhance customer engagement through digital twins in the metaverse, is widely considered one of the most relevant advantages offered by this technology.

However, the integration of these technologies also presents challenges. Concerns about data privacy, identity manipulation, and technology dependence are significant. The potential for surveillance capitalism in virtual environments—where users may be monitored, manipulated, and monetized—requires that ethical and governance frameworks evolve concurrently with technological advances (Jaber, 2022; Rosenberg, 2022). Moreover, interoperability among platforms, scalability, and equitable access remain critical areas for future research and policy development.

From a strategic perspective, businesses must adapt to a non-linear, multi-sensory, and participatory customer journey. Embracing the Metaverse and digital twins involves rethinking traditional value propositions, organizational culture, and operational processes. Companies are encouraged to invest not only in technology but also in developing new marketing strategies and support structures that align with the dynamic nature of virtual environments.

In conclusion, the integration of digital and virtual twins within the Metaverse presents a substantial opportunity for businesses to redefine customer engagement. By enabling hyper- personalized, immersive experiences, these technologies can forge stronger customer relationships and create new dimensions of brand value. Nonetheless, capitalizing on this potential requires a balanced approach that addresses the technical, ethical, and experiential challenges inherent in these emerging technologies. Continued interdisciplinary research and industry collaboration will be essential for navigating and shaping the future of immersive marketing.

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Decoding the Emotional Impact of Nature: a Neurophysiological Study of Tourists' Behavioral Intentions

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Extended abstract

The evolving tourists' preferences toward more significant and immersive experiences and the rising competition among tourism destinations make the understanding of the affective drivers of consumers' tourism behavior key for marketers and destination managers. Among the leading sectors in the tourism market, nature-based tourism offers physical and psychological benefits to visitors, promoting emotional engagement with the natural environment (Ballantyne & Packer, 2011). Yet, research is still limited on how emotional experiences transform into behavioral outcomes for destination managers, such as engagement, willingness to revisit the destination, or positive word-of-mouth. This study aims, through the lenses of the Stimulus-Response-Model (SOR) (Mehrabian & Russell, 1974), to analyze how tourist experiences in natural destinations (stimulus) induce emotional responses in consumers (organism), in their turn translating into behavioral outcomes (response). By applying the SOR model to the study of nature-based tourism, we aim to depict the emotional mechanisms through which tourism experiences translate into consumer decision-making about a destination. From a managerial perspective, the study contributes to the design of emotionally significant experiences that create consumer engagement and loyalty with a destination.

A field experiment in a naturalistic tourism environment has been conducted at Fondo Toce Natural Reserve, situated in proximity of Lake Maggiore, in northern Italy. Participants had the possibility of experiencing the reserve by living two separate moments: (i) walking through the signaled path and (ii) observing the view of the lake from the arrival area. Each participant was equipped with the following instrumentation for physiological data collection before exposure to the experimental condition: (i) Electroencephalogram System (EEG) represented by the Galileo BE Plus LTM (EB Neuro, Italy), with a prewired headset placed on the head of the individual (ii) Multi-channel Polygraph (Procomp Infiniti - Thought Technology Ltd) which enabled the acquisition of three core physiological data: electrocardiographic signal (ECG), collected through three disposable electrode pads applied to the chest of the participant; respiratory activity, monitored thanks to an elastic chest strap; and electrodermal activity (EDA), acquired via two electrodes applied on the phalanges of the index and middle fingers of the subject's nondominant hand. An additional tool, the E4 wristband, was able to monitor the physiological data of the subject when in motion. This is a wearable device applied to the wrist of the subject's non-dominant arm and equipped with four sensors: (i) photoplethysmography sensor (PPG), (ii) electrodermal activity sensor (EDA), (iii) 3-axis accelerometer and (iv) optical thermometer.

The experimental flow was as following: once arrived, participants received information on the natural place and the experimental session. Next, they completed a pre-experience questionnaire. Following, the E4 wristband was applied. To guarantee an insightful collection of physiological data, a first baseline was assessed. Following the walk through the signalled path of the reserve started. At the arrival area, the biometric sensors were applied to the participant's body, and two sequential baselines were administered. Once completed, the participant was asked to observe the lake panorama for a total duration of 300 seconds. A last baseline was administered at the end of the experience.

The emotions elicited through the experience were assessed through pre-validated scales, namely, Single emotions (Chirico et al., 2017), the PANAS Short Form (Terracciano et al., 2003) and the Amusement Aesthetic Emotion Subscale (Schindler et al., 2017). For behavioral outcomes, we employ the Engagement with the tourist place scale (Kumar & Pansari, 2016; Loureiro & Sarmento, 2019; Orús et al., 2021) to measure four constructs: Knowledge, assessing the intention to provide suggestions improving the visiting experience; Purchases-Visits, measuring the satisfaction deriving from the visit; Referrals, measuring the intention to recommend the visit; and Influence, assessing the intention to generate word-of-mouth. Furthermore, we measured the Intention to recommend the tourist place (Maghrifani, 2022), Willingness to travel (Maghrifani, 2022; Tigre et al., 2015) and Pro-Environmental Intention through an ad-hoc question. Additionally, socio-demographic questions were collected, along with prior visitation of the tourist place.

A total of 29 responses were collected. The sample is balanced in gender and aged between 18 and 34 years old. From EEG signal, Alpha Power and Beta Power (Coelli et al., 2015; Lagopoulos et al., 2009) showed a significant difference between the exposure to the natural stimuli and the three resting phases, signaling that the exposure to a naturalistic environment induces a sense of relaxation and is characterized by a higher engagement level. Self-reported data have been analyzed through a series of One-Way ANOVA - Fisher's followed by Post-HocTukey Tests to assess the impact of emotions on intentions and behavioral outcomes. Preliminary results indicate that the exposure to a natural environment induces high affective responses in participants, in their turn positively affecting behavioral intentions to engage with the destination. In line with the SOR model, the emotional reactions (the organism) act as a mediator between the natural settings (the stimulus) and the behavioral intentions (the response). Hence, we confirm the central role of emotions in shaping consumer decision-making in tourism contexts. From a managerial side, findings indicate that designing tourism experiences that intentionally leverage emotional activation is instrumental in obtaining positive consumer feedback and spurring value co-creation. In conclusion, the study not only reinforces the robustness of the S-O-R model in depicting consumer responses to immersive tourism experiences but also highlights how emotions act as a key lever for competitive differentiation and value creation.

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Quantum-Driven Artificial Intelligence in Tourism: Shaping Dynamic and Tailored Travel Experiences

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Extended Abstract

The tourism industry is experiencing a profound transformation, driven by the convergence of artificial intelligence (AI) and quantum computing. As global tourism recovers and evolves in the wake of recent disruptions, the demand for highly personalized, adaptive, and resilient travel experiences has intensified. Traditional linear decision-making models are increasingly inadequate for managing the sector's inherent complexity, dynamism, and uncertainty, which are shaped by rapidly shifting consumer preferences, fluctuating environmental and economic conditions, and the unpredictable influence of global events.

This research introduces an innovative decision-making model that integrates advanced AI methodologies—such as machine learning, deep learning, and reinforcement learning—with the foundational principles of quantum mechanics, including uncertainty, superposition, and entanglement. The model is designed to address the multifaceted challenges of modern tourism by enabling simultaneous, real-time analysis of key variables: tourist preferences, environmental conditions, economic factors, health and safety indices, social media dynamics, and resource capacities at destinations.

At the core of the model is a 12-qubit quantum circuit, which simulates the interdependencies and nonlinear interactions among these six critical variables. By leveraging quantum gates and entanglement, the circuit captures the uncertainty and complexity inherent in tourism systems, allowing for adaptive scenario analysis and dynamic decision-making. The model's architecture enables the exploration of multiple potential states and outcomes concurrently, a capability that far surpasses classical computational approaches.

Simulation results demonstrate the model's capacity to generate actionable insights and personalized recommendations in real time, even under highly uncertain or rapidly changing conditions. To validate the effectiveness of the proposed quantum-driven AI model in tourism, five practical scenarios were developed. The first scenario involves adaptive travel route suggestions, where the system can instantly adjust travel routes in response to real-time environmental changes, ensuring that tourists receive up-to-date recommendations that account for sudden shifts in weather or other external factors.

The second scenario focuses on providing guidance to less-trafficked destinations by analyzing social media trends, allowing the model to direct tourists toward alternative sites that are less crowded, thus enhancing the quality and sustainability of their experiences. In the third scenario, the optimization of the tourism supply chain during crises is addressed, with the model intelligently managing resource allocation and logistics to maintain service continuity even in the face of disruptions such as pandemics or economic shocks. The fourth scenario centers on predicting tourist behavior by

integrating and analyzing data from multiple sources, enabling the system to offer highly personalized recommendations and anticipate the evolving needs and preferences of travelers. Finally, the fifth scenario demonstrates the model's ability to enhance the resilience of tourist destinations by supporting rapid and effective responses to health or environmental crises, thereby helping destinations maintain service quality and operational stability under challenging conditions. Each scenario illustrates how quantum-driven AI can provide both tourists and destination managers with dynamic, data-driven support, improving service quality, operational efficiency, and crisis responsiveness.

The research methodology involved interdisciplinary collaboration between quantum computing experts and tourism management professionals. The quantum algorithms were implemented in a simulation environment, with model outputs evaluated by domain experts for conceptual validity and practical relevance. Key dependent variables—such as personalization, crowding reduction, and infrastructure utilization—were modeled and analyzed, laying the groundwork for future empirical validation with real-world data.

This study's findings suggest that the integration of AI and quantum mechanics offers a powerful new paradigm for decision-making in tourism. Quantum AI enables the industry to move beyond static analytics, supporting the development of intelligent recommendation systems, real-time resource optimization, and adaptive policy frameworks. The model's ability to process vast, heterogeneous datasets and respond instantly to market fluctuations or crises positions it as a blueprint for next-generation tourism management.

However, the research also acknowledges several challenges and limitations. The current model is conceptual and simulation-based, lacking direct implementation with empirical data. Technical barriers to the development of scalable quantum hardware, data privacy concerns, and the need for robust interdisciplinary collaboration remain significant hurdles. Future research should focus on empirical validation, the development of commercial-grade quantum infrastructure, and the refinement of quantum-AI algorithms for broader application in tourism and related service industries.

In conclusion, this study demonstrates that quantum-driven AI can fundamentally reshape the tourism industry by enabling dynamic, tailored, and resilient travel experiences. The approach not only enhances customer satisfaction and operational sustainability but also provides a strategic foundation for managing uncertainty and complexity in an increasingly volatile global environment. As AI and quantum technologies continue to advance, their convergence will play a pivotal role in defining the future of smart tourism, offering unprecedented opportunities for innovation, personalization, and value creation.

When AI Talks Like Us: The Moderating Role of Human-Likeness in Personality-Driven Sentiment in AI-Generated Reviews

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Extended Abstract

Artificial intelligence (AI) has fundamentally reshaped digital communication by enabling machines to understand and generate human language with unprecedented fluency and contextual awareness (Floridi & Chiriatti, 2020). Among these developments, generative AI systems such as ChatGPT represent a significant leap in natural language generation (NLG), producing coherent, emotionally expressive, and human-like text. These systems are now integrated into everyday technologies, including recommendation engines and conversational agents, transforming how users interact with platforms and form impressions of AI (Kaplan & Haenlein, 2019; Dwivedi et al., 2021).

While traditionally focused on products or services, reviews increasingly reflect users' experiences with AI systems themselves. Despite a rich body of sentiment analysis research focused on linguistic features such as polarity and subjectivity (Pang & Lee, 2008; Thelwall et al., 2012), relatively little is known about how users' personality traits influence their sentiment toward AI—particularly when the AI exhibits human-like qualities. This study investigates how reviewer personality and perceived human-likeness of ChatGPT jointly shape sentiment expression.

We draw on the Big Five personality framework (McCrae & Costa, 1999) and the Computers Are Social Actors (CASA) paradigm (Nass & Moon, 2000). CASA suggests that when users perceive AI as humanlike—exhibiting warmth, empathy, or conversational fluency—they begin to apply social norms to their interaction with it. Perceived human-likeness may thus alter how personality traits such as Extraversion or Conscientiousness influence user sentiment. For example, highly extraverted users may typically express dissatisfaction with impersonal interfaces but may respond more positively when the AI is perceived as socially present. Similarly, users high in Neuroticism may feel emotionally reassured if the AI appears empathetic, reducing their negative affect.

Despite these plausible mechanisms, few studies have empirically examined the interactive effects of personality traits and AI human-likeness on sentiment expression in naturalistic settings. We address this gap by asking: (1) How do Big Five personality traits influence sentiment in user-authored reviews of ChatGPT? and (2) How does perceived human-likeness moderate these effects?

Method

We collected 150,000 user reviews of the ChatGPT mobile app from the Google Play Store between January and March 2025. To ensure adequate text length for psychological inference, we selected 10,000 reviews containing more than 50 words. Big Five personality traits were inferred using a zero-shot BERT-based model designed to classify trait-aligned language. Sentiment was extracted using a fine-tuned BERT sentiment classifier, while polarity and subjectivity scores were computed with

Python-based lexicon tools (Thelwall et al., 2012). Perceived human-likeness was operationalized through a composite score derived from textual cues (e.g., references to empathy or realism) and metadata indicating social perception.
A multiple regression analysis was conducted with sentiment as the dependent variable. Personality traits and their interaction terms with perceived human-likeness were entered as predictors. Agreeableness served as the reference trait.

Results
We found that Openness ($\beta = -0.057$, $p < .01$), Conscientiousness ($\beta = -0.086$, $p < .01$), and Extraversion ($\beta = -0.052$, $p < .01$) were negatively associated with sentiment, supporting the hypothesis that personality-driven expectations may lead to critical evaluations when AI responses fall short. Neuroticism showed no significant main effect.
Importantly, perceived human-likeness significantly moderated these relationships. The interaction between Extraversion and human-likeness ($\beta = 2.815$, $p < .01$) and between Neuroticism and human-likeness ($\beta = 5.411$, $p < .01$) were both positive and significant, suggesting that socially framed AI interactions enhance personality-aligned emotional responses. Under high human-likeness, previously negative associations between traits and sentiment were attenuated or reversed.
Thus, H1 (negative main effects of personality traits on sentiment) was supported for Openness, Conscientiousness, and Extraversion. H2 (moderating effect of human-likeness) was supported for Extraversion and Neuroticism.

Discussion
This study provides new insight into how individual dispositions and perceived social characteristics of AI interact to shape emotional evaluations. While past research often isolates personality or language features, our findings show that sentiment toward AI is co-constructed through the user's traits and their social framing of the AI system.
First, the negative main effects of Openness, Conscientiousness, and Extraversion on sentiment suggest that users with high expectations for creativity, structure, or social engagement are more easily disappointed by impersonal or generic AI interactions. These results diverge from earlier work showing that such traits predict more positive interpersonal evaluations (Yarkoni, 2010), implying that trait-congruent expectations can backfire in non-human contexts.
Second, the moderating effects of perceived human-likeness lend strong support to CASA and mind perception theory (Epley et al., 2007). When ChatGPT is seen as emotionally expressive or socially capable, users are more likely to engage in interpersonal meaning-making, which increases the emotional salience of personality traits. For extraverted users, humanlike AI may fulfill a desire for social reciprocity, leading to more positive sentiment. For neurotic users, anthropomorphic cues may reduce anxiety by simulating empathy or stability.
This contributes to theory in two key ways:
It extends trait-based language analysis to the AI interaction domain, showing that personality traits inferred from user-generated language systematically relate to affective evaluation of AI.
It introduces a dual-pathway model in which trait-based dissatisfaction dominates when AI is seen as a tool, but trait-based satisfaction emerges when AI is perceived as humanlike.

From a design perspective, our findings highlight the importance of adaptive AI interaction strategies: Emotional personalization: Platforms could use real-time trait inference to adjust tone or framing based on user disposition. Human-likeness modulation: For users prone to negative sentiment (e.g., extraverted or neurotic users), emphasizing social presence and emotional realism may improve evaluations. Expectation calibration: Overuse of anthropomorphic cues may raise expectations for emotional intelligence that current systems cannot meet. Designers should balance emotional warmth with functional transparency.

References are available upon request.