Routledge
Taylor & Francis Group

Journal of Hospitality Marketing & Management

ISSN: 1936-8623 (Print) 1936-8631 (Online) Journal homepage: www.tandfonline.com/journals/whmm20

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To cite this article: Hien Thu Bui, Viachaslau Filimonau & Hakan Sezerel (22 Jun 2025): From function to feeling: exploring the effects of human-like traits in service robots on perceived authenticity and value, Journal of Hospitality Marketing & Management, DOI: 10.1080/19368623.2025.2519732

To link to this article: https://doi.org/10.1080/19368623.2025.2519732

Published online: 22 Jun 2025.

JOURNAL OF HOSPITALITY MARKETING & MANAGEMENT
https://doi.org/10.1080/19368623.2025.2519732

From function to feeling: exploring the effects of human-like traits in service robots on perceived authenticity and value

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ABSTRACT

The potential for integrating service robots into hospitality operations calls for exploring customer perceptions of robotic service delivery from the perspective of its acceptance. Research is necessitated to establish the determinants of positive perception of service robots among hospitality consumers. This study examined the effect of three human-centric robot traits, including personalization, efficiency, and anthropomorphism on the perceived authenticity and value of a restaurant service. The survey results ($n = 358$) revealed significant effects of personalization, efficiency, and anthropomorphism on perceived authenticity and four dimensions of perceived value, including emotional, social, functional, and epistemic values. Perceived authenticity partially mediated the relationship between personalization, efficiency, anthropomorphism and four value dimensions. The results demonstrated the importance of designing service robots with human-centric traits to provide more authentic and valuable service to hospitality customers.

摘要

将服务机器人集成到酒店运营中的潜力要求从接受机器人服务的角度探索客户对机器人服务交付的看法. 有必要进行研究, 以确定酒店消费者对服务机器人积极感知的决定因素. 本研究考察了三种以人类为中心的机器人特征, 包括个性化、效率和拟人化, 对餐厅服务的真实性和价值的影响. 调查结果 (n=358) 显示, 个性化、效率和拟人化对感知真实性和感知价值的四个维度 (包括情感、社会、功能和认知价值) 有显著影响. 感知真实性在一定程度上调节了个性化、效率、拟人化和四个价值维度之间的关系. 研究结果表明, 设计具有以人为本特征的服务机器人对于为酒店客户提供更真实、更有价值的服务具有重要意义.

KEYWORDS

Anthropomorphism; efficiency; personalization; perceived authenticity; perceived value; Service robots

Introduction

Technological developments, reduced costs of automation, and challenges of staff recruitment prompt hospitality organizations to consider the provision of robotic services (Reis et al., 2020). Although service robots are unlikely to replace the human workforce in hospitality operations completely, they can improve service quality due to their contribution to such critical operational areas as customer service and foodservice (Chen & Girish, 2023). Growing evidence pinpoints the positive effect of robotic services on attitudes and

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behavioral intentions of hospitality customers (Qian & Wan, 2024), yet there remains the need to better understand the scope for potential integration of service robots within the industry (Lu et al., 2024).

Academic research has set to support hospitality professionals in the embracement of service robots. Such topics as customer, employee, and management perception (Belanche, Casaló, & Flavián, 2021), experience (Tung & Au, 2018), loyalty (Pizam et al., 2022), perceived value (Lin & Mattila, 2021), and perceived quality and authenticity (H. Song et al., 2023) have attracted scholarly attention within the context of robotic hospitality service. Despite growing research on service robots in the hospitality industry, gaps persist in the discourse of robots' perceived authenticity and value.

The first gap is that previous studies conceptualize robots' values as a precursor to behavioral outcomes, such as customer acceptance (Lin & Mattila, 2021), usage intentions (Meidute-Kavaliauskiene et al., 2021), or loyalty (Hong et al., 2023), rather than treating it as an outcome on its own. This perspective limits an understanding of how and why users derive value from robots.

The second gap is that perceived value is often treated as a singular, overarching construct, which oversimplifies the complexities of user experiences (de Kervenoael et al., 2020; Hong et al., 2025; Meidute-Kavaliauskiene et al., 2021). Such an approach overlooks the multidimensional nature of perceived value, which encompasses a range of distinct, yet interconnected components/facets (Boksberger & Melsen, 2011). These facets are attributed to customer perception of value, such as functionality (Lin & Mattila, 2021) and the improved experience that a robotic service can provide (Hu, 2021).

The third gap is that even when perceived value is examined as an outcome and from a multidimensional perspective, studies (Chang, 2024; Hu, 2021; Odekerken-Schröder et al., 2022; J. J. Wu et al., 2024) have prioritized hedonic (i.e., pleasure-driven) and utilitarian (i.e., practicality-driven) dimensions, overlooking other critical dimensions of emotional (i.e., affective responses), social (i.e., status or relationship-related benefits), functional (i.e., task-oriented utility), and epistemic (i.e., curiosity and knowledge-seeking) values (Caber et al., 2020; Jamrozy & Lawonk, 2017). By narrowing the scope to hedonic and utilitarian aspects, extant studies fail to account for the broader spectrum of value perceptions among hospitality customers. A more holistic approach incorporating these multifaceted dimensions is essential to capture the diverse ways by which hospitality customers interpret and assess service robots' value.

The fourth gap is that some studies tend to solely focus on the perceived value of robotic restaurants as a whole, without distinguishing the unique contributions of the restaurant environment and the service robots, see, for example, Kwak et al. (2021) and Gong et al. (2024). Such approach to research limits an understanding of the service robots' value as it considers robots a single component within the larger restaurant experience. Although such an approach to researching robotic restaurants is relevant, it does not recognize service robots as a distinct entity that can influence part of the customer experience of a robotic restaurant and shape customer perceptions of value independently of other restaurant attributes. Our study addresses this gap by demonstrating that the perceived value under investigation is derivative of both the dining experience at a robotic restaurant and the role of serving robots.

The last research gap is the paucity of studies on the perceived authenticity of robots. Literature has focused on service authenticity, brand authenticity, and existential

authenticity in the robotic service environment (H. Song et al., 2023; M. Wu et al., 2023) rather than on how hospitality customers perceive the authenticity of robots as a distinct entity. This approach to research restricts an understanding of how customers perceive robots from the perspective of their own authenticity. Unlike traditional service agents or brands, robots can interact with users in highly dynamic, personalized ways, thus making their authenticity unique (Seyitoğlu et al., 2024). Therefore, expanding an understanding on the perceived authenticity of robots is essential for bridging this research gap and improving both the design and acceptance of robotic services in hospitality and foodservice provision.

Given these research gaps, the current study examines the effect of three human-centric robot traits i.e., personalization, efficiency, and anthropomorphism on four dimensions of perceived value i.e., emotional, social, functional, and epistemic. The focus on human-centric traits is grounded on the pivotal role of human-like robots in creating collaborative human-robot environments and facilitating seamless human-robot interactions (Ajoudani et al., 2017). The emphasis on personalization, efficiency, and anthropomorphism as the key human-centric robot traits is premised on the fact that they have widely been documented in the current hospitality robotics literature as key enablers of human-robot interaction (Chuah et al., 2022a; Seyitoğlu et al., 2024), and they are consistently linked to perceptions of authenticity, trust, and value in service contexts (Ajoudani et al., 2017). Moreover, these traits align with the human-centric approach that prioritizes design, functionality, and interaction to make the technology more accessible, relatable, and beneficial to humans (Castellano, 2020). Specifically, by adapting to individual user preferences, personalization fosters more natural, and intuitive interactions that increase user engagement. Personalization boosts functionality by tailoring robotic services to specific user needs, thereby improving relevance, and overall performance. Personalization is acknowledged as a key to the design of human-centric customer experiences in service industries which can be achieved via, for example, chatbot training (T. Chong et al., 2021). Efficiency relates to functionality by ensuring that robots perform tasks effectively and reliably. Efficiency has been recognized as an important human-centric trait in the design of autonomous vehicle systems (Ullah et al., 2024). Lastly, anthropomorphism reflects the importance of design by incorporating human-like features that make technology more relatable and approachable. Anthropomorphism is also considered a critical factor in human-robot interaction (Murphy et al., 2021). The positive effect of anthropomorphism on customer service has been established, emphasizing its importance for the design and provision of human-centric experiences (Blut et al., 2021). The next section reviews the literature to provide further background for this study and formulate its research hypotheses.

Literature review and hypotheses development

Effects of personalization, efficiency, and anthropomorphism on robots' perceived authenticity

Personalization in robotics refers to the ability of robots to adjust their interactions and services to meet the unique demands and preferences of clients (Gasteiger et al., 2023). This can involve, for example, remembering customer preferences, addressing them by name, or providing tailored recommendations (Riegger et al., 2021). Personalized interactions with

service robots can foster a sense of authenticity among customers (Van Doorn et al., 2017) as robots can create the impression that the service is tailored to individual needs and preferences (C. Yang & Hu, 2022). The extent of robotic service personalization can influence customer-employee relations and improve consumer loyalty (Chuah et al., 2022a). This can bridge the gap between customers' desire for genuine, human-like interactions and the technological nature of the hospitality service provider. The following research hypothesis was therefore formulated:

H1. *Robotic service personalization positively influences customers' perceived authenticity of robots.*

Efficiency refers to a robot's ability to accurately and promptly complete tasks (Coronado et al., 2022). Efficient robotic services save customers time by automating processes and delivering prompt service (Choi et al., 2020). This efficiency enhances the perception of the robotic service's authenticity as it demonstrates professionalism and competence (X. S. Liu et al., 2022). This can bridge the gap between customers' desire for genuine, human-like interactions and the technological nature of robotic service. Accordingly, the following research hypothesis was developed:

H2. *Robotic service efficiency positively influences customers' perceived authenticity of robots*

In machine-human interaction, perceived anthropomorphism refers to attributing human-like characteristics, intentions, emotions, and behaviors to non-human agents (Munnukka et al., 2022). Perceived anthropomorphism influences customers' perception of genuineness (Ham et al., 2023) and employees' positive emotions (W. Yang et al., 2025). The presence of human-like qualities in a service provider fosters a perception of naturalness, credibility, and trustworthiness, thereby enhancing the authenticity of the service provided (C. Huang & Guo, 2021; Seyitoglu, 2021). Moreover, the anthropomorphic nature of service robots creates a sense of reality and ensures an authentic experience (H. Song et al., 2022). This suggests that perceived anthropomorphism may play a role in customers' perception of the authenticity of robots. Accordingly, the following research hypothesis was established:

H3. *Perceived anthropomorphism of service robots positively influences customers' perceived authenticity of robots.*

Effects of personalization, efficiency, and anthropomorphism on perceived value dimensions in the service robot context

Perceived value dimensions in the service robot context

Perceived value is a well-established framework in service marketing, and research on perceived value has evolved into an interdisciplinary field incorporating psychology, sociology, economics, and business concepts (Zietsman et al., 2020). A literature review by Boksberger and Melsen (2011) identifies two main research streams. The first perspective is utilitarian, based on the expected utility theory, which conceptualizes perceived value as

a trade-off between the utility gained from using a service and the disutility of obtaining and using it (Gremler et al., 2020). The second is the behavioral perspective, which originates from social exchange theory and later integrates consumption value theory (Sheth et al., 1991). This perspective defines perceived value as a customer's preference for and evaluation of product attributes, attribute performance, and the consequences of use in achieving their goals and purposes in specific situations (Sánchez-Fernández & Iniesta-Bonillo, 2007).

In the service robot context, the behavioral perspective of perceived value highlights how customers evaluate robotic services based on their interactions, expectations, and the broader social and emotional implications of using robots (Lin & Mattila, 2021). This perspective suggests that users evaluate service robots based on their functional performance and through the lens of reciprocity, trust, and the perceived fairness of the interaction (Fang et al., 2024). Moreover, the behavioral perspective acknowledges that perceived value is dynamic, varying across pre-use expectations, actual service encounters, and post-use reflections (L. Huang et al., 2023). It aids in understanding user acceptance, satisfaction, and long-term adoption of robotic services (Chi et al., 2023).

As consumption value theory (Sheth et al., 1991) expands, customers derive value from multiple dimensions. Functional value emphasizes the practical benefits and utility customers gain from a product or service in fulfilling their needs and expectations (Y. K. Kim, 2002). In the service robot context, functional value refers to the practical benefits a robot provides through its performance and ability to fulfill specific tasks (Belanche, Casaló, Schepers, et al., 2021).

Emotional value reflects the feelings and experiences such as enjoyment, discomfort, or trust that influence human-robot interaction in hospitality services (D. Huang et al., 2021). It is defined as the positive feelings and enjoyable experiences that arise during interactions with a product or service (Park & Ha, 2016). Accordingly, in robotics, the emotional value represents the emotional benefits users derive from engaging with robots (de Kervenoael et al., 2020).

Social value highlights the benefits individuals gain regarding social status, approval, or relationship-building through a product or service (Altinay et al., 2016). In robotics, social value refers to the benefits that users derive from robots regarding social interaction, identity expression, and social status enhancement (Hou et al., 2021).

Epistemic value is linked to curiosity and novelty-seeking behavior (Zhu et al., 2024). It represents the intellectual stimulation of a product or service by providing new or unique experiences (Ponsignon et al., 2024). In robotics, epistemic value consists of the knowledge, learning, and discovery users gain from interacting with robots (L. Wu et al., 2021).

Effect of personalization on perceived value dimensions

Personalized robotic services are considered more valuable than standardized or non-personalized services (Park et al., 2020) as they are effective in addressing specific customer needs and preferences (M. H. Huang & Rust, 2017). By understanding individual requirements, robots can provide more relevant recommendations or assistance that significantly enhance the perceived value of service provision (Hoyer et al., 2020). By personalization, service robots can handle customer requests more effectively by, for example, expediting orders or delivering correct items (X. Zhang et al., 2022). This efficiency creates a positive impression on customers (Nakanishi et al., 2020) and enhances the perception of the

robotic service's value as it demonstrates professionalism and competence (X. S. Liu et al., 2022).

Personalized robotic services enhance functional value by expediting customer requests, optimizing recommendations, and reducing waiting times to make the service more convenient and efficient (H. A. Khan, 2024). For example, robots with AI-driven personalization can anticipate customer needs, suggest relevant products, or provide adaptive assistance based on previous interactions (Davenport et al., 2020). This efficiency creates a positive impression, as customers perceive the robotic service as professional, competent, and responsive to their unique needs (H. Song et al., 2023).

Personalized robotic services enhance emotional value by fostering more engaging and enjoyable interactions (Balaji et al., 2025). When robots adapt their responses to individual customer preferences, such as adjusting their tone and gestures, they create a sense of familiarity and emotional connection (Y. Li et al., 2024). This customization can increase trust, comfort, and positive emotional responses, making the interaction more enjoyable and satisfying (Hui et al., 2024).

Social value in robotic services emerges when personalization facilitates meaningful and socially rewarding experiences. Personalized robotic interactions contribute to social identity and status by providing services that align with individual customer preferences and social norms (Ham, 2021). For instance, a robot that remembers a guest's previous orders or suggests items based on their preferences enhances the perception of exclusivity and personal recognition (Liu et al., 2024). This social connection can strengthen customer attachment to the service environment and foster a sense of being valued, reinforcing the role of robots in social interactions (Milman et al., 2020).

Personalized robotic services can enhance epistemic value by providing customized insights, recommendations, and unique experiences that stimulate curiosity and engagement (L. Wu et al., 2021). For instance, robots that adapt their communication style or offer personalized content about a product create a sense of discovery and innovation for customers (Van Doorn et al., 2017). This interaction contributes to the perception of service robots as an advanced and intellectually enriching technology (Blöcher & Alt, 2021). Accordingly, the following hypothesis was proposed:

H4. *Robotic service personalization positively influences customers' perceived value of robotic service, including (a) emotional value, (b) social value, (c) functional value, and (d) epistemic value.*

Effect of efficiency on perceived value dimensions

Robots designed for efficiency perform tasks with high(er) precision, resulting in improved customer satisfaction and perceived value due to reduced errors (Javaid et al., 2021). Efficient robotic services enhance productivity by handling tasks faster and allowing human staff to focus on higher-value interactions or more complex tasks (Choi et al., 2020). For example, efficient robots can reduce waiting times, effectively address customer needs, and ensure a well-organized dining experience (Xiao & Kumar, 2021). These efficiencies appeal to customers who prioritize convenience and value for money (Berezina et al., 2019).

Beyond functional benefits, efficiency can also contribute to emotional value by minimizing service delays and frustration, enhancing customer comfort and satisfaction (Liu

et al., 2024). A well-coordinated robotic service can create a sense of enjoyment, making the overall experience more pleasant (Carvalho et al., 2022). Additionally, it can improve social value by reinforcing an image of modernity and technological sophistication (K. L. Chong & Zhang, 2025), enhancing customers' social perceptions. It can provide customers who interact with highly efficient robots with a sense of exclusivity and prestige, as these technologies symbolize innovation (Horng et al., 2024). The precision and speed of robotic services can spark curiosity and encourage customers to explore new service models, thereby stimulating curiosity and their engagement with emerging technologies (Akdim et al., 2023). Moreover, efficiency is directly linked to functional value, as robots that execute tasks accurately and without unnecessary delays increase overall service reliability and convenience (Gupta et al., 2022). The ability to receive prompt and error-free service enhances customer trust and reinforces their perception of robotic efficiency as a valuable service attribute. Therefore, the following hypothesis was developed.

H5. *Robotic service efficiency positively influences customers' perceived value of robotic service, including (a) emotional value, (b) social value, (c) functional value, and (d) epistemic value.*

Effect of anthropomorphism on perceived value dimensions

Customers' perception of anthropomorphism in a service provider significantly influences how customers value the service (Li et al., 2022). By boosting a sense of connection, engagement, and empathy, anthropomorphism directly contributes to the emotional value of robotic interactions, as it enhances the feelings of excitement and enjoyment during the service experience (Hu, 2021; Pelau et al., 2021). For instance, robots perceived as emotionally capable are more likely to create positive emotional experiences, thereby increasing the appeal of robotic service systems (Ivanov et al., 2023). Customers view highly intelligent and humanoid robots as lively, appealing, and prestigious (Said et al., 2023). The perceived sophistication of these robots enhances customers' social standing and enriches the overall social experience (Mende et al., 2019). Anthropomorphism can enhance the functional value of robotic service providers by making them more intuitive and user-friendly, leading to more effective service interactions (Ng et al., 2024). Highly humanoid robots are inherently intriguing and innovative, making interactions intellectually engaging and distinctive (de Kervenoael et al., 2020). This sense of novelty may enhance customers' desire to explore and engage with advanced technology. Therefore, the following research hypothesis was formulated:

H6. *Perceived anthropomorphism of service robots positively influences customers' perceived value of robotic service, including (a) emotional value, (b) social value, (c) functional value, and (d) epistemic value.*

Mediating effect of perceived authenticity

Robot personalization involves adapting flexibly to individual preferences (Ivanov et al., 2019). By tailoring its services, a robot makes the experience feel customized and relevant, enhancing authenticity (Kang et al., 2016). When robots perform tasks

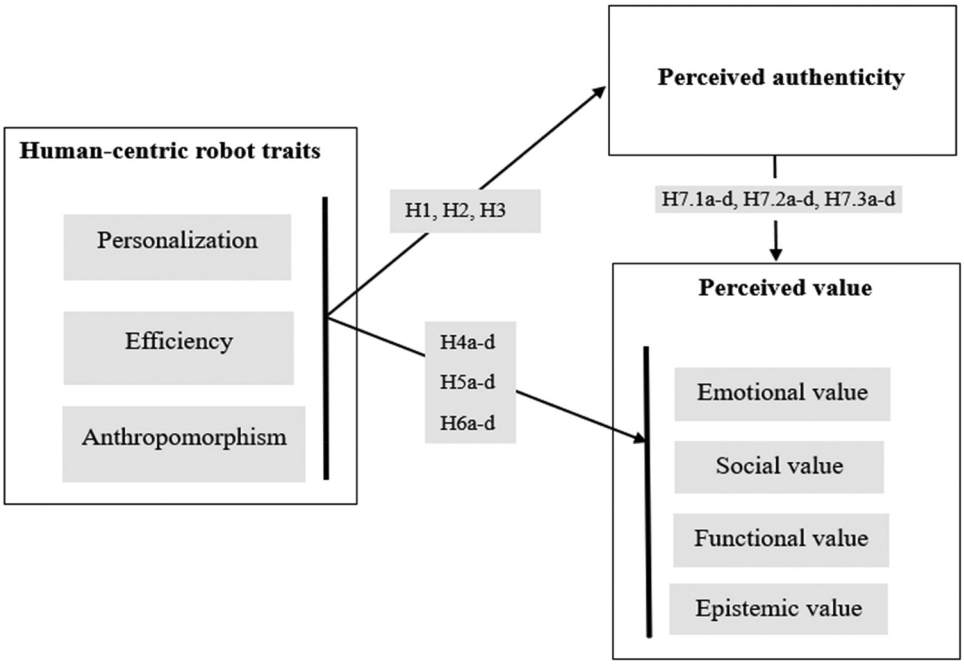

Figure 1. Research framework.

efficiently, they build trust with consumers and are seen by them as dependable and competent (Christoforakos et al., 2021). When robots display human-like qualities, such as behaving naturally or appearing conscious, their interactions with customers feel more relatable and genuine, thus advancing their perceived authenticity (M. I. Khan et al., 2024).

This sense of authenticity translates these robot traits into valuable experiences for customers (Wang & Fu, 2024). It adds social value by making customers who interact with advanced, relatable technology feel privileged, and enhancing their social image (Sarfi et al., 2021). Authenticity enhances functional value by making robotic service reliable and useful, thereby providing smooth and efficient dining experiences that are worth the investment (Guan et al., 2022). Authenticity enriches epistemic value by making the experience intellectually stimulating, satisfying curiosity, and allowing customers to explore innovative technology (Ha & Jang, 2012; Hur et al., 2012). Accordingly, the following research hypothesis was formulated:

H7: *Perceived authenticity mediates the relationship between human-centric robot traits (personalization (1), efficiency (2), and anthropomorphism (3)) and perceived value facets (emotional value (a), social value (b), functional value (c), and epistemic value (d))*

The hypotheses are visually summarized in Figure 1

Table 1. Reliability and convergent validity.

Constructs and measurement items	Mean	SD	Factor loadings	CR	AVE	Cronbach's alpha
Personalization (adapted from Guan et al., 2022; Prentice & Nguyen, 2021)				0.885	0.719	0.88
I believe that robotic waiters can handle a variety of customers' needs.	4.594	1.325	0.795			
I believe that robotic waiters can flexibly be adjusted to meet customers' new demands.	4.325	1.357	0.863			
I believe that robotic waiters can be versatile in addressing customers' needs	4.249	1.365	0.884			
Efficiency (adapted from Prentice & Nguyen, 2021)				0.887	0.886	0.89
I trust that robotic waiters' services are accurate.	5.202	1.031	0.791			
I trust that robotic waiters' services are quick.	5.247	1.148	0.752			
I trust that robotic waiters' services are consistent.	5.513	1.010	0.849			
I trust that robotic waiters' services are reliable.	5.242	1.091	0.863			
Anthropomorphism (adapted from Qiu et al., 2020)				0.813	0.592	0.81
Robotic waiters are humanlike.	2.794	1.344	0.748			
Robotic waiters are conscious.	2.241	1.219	0.811			
Robotic waiters are natural.	2.439	1.250	0.748			
Perceived authenticity (adapted from H. Song et al., 2022)				0.879	0.712	0.87
I believe that robot waiters are honest in their interactions.	4.891	1.305	0.715			
I believe that robotic waiters are sincere.	4.379	1.297	0.897			
I believe that robotic waiters' behaviour is genuine to their purpose.	4.501	1.372	0.905			
Emotional value (adapted from Chuah et al., 2022a; Guan et al., 2022)				0.90	0.750	0.89
The thought of being served by robotic waiters could make me want to experience it.	5.567	1.240	0.857			
I feel excited about a robot restaurant.	5.098	1.408	0.919			
Interacting with robotic waiters would be enjoyable.	4.919	1.358	0.820			
Social value (adapted from Chuah et al., 2022a)				0.926	0.808	0.92
Dining at a robotic restaurant could provide me with social approval.	3.593	1.443	0.803			
Dining at a robotic restaurant could improve the way others perceive me.	3.139	1.462	0.953			
Dining at a robotic restaurant could help me make a good impression on others.	3.148	1.457	0.934			
Functional value (adapted from Guan et al., 2022; Hu, 2021)				0.769	0.526	0.73
Robotic waiters could enhance restaurant guests' dining experience.	4.359	1.251	0.716			
Robotic waiters could reduce dining guests' waiting time.	4.914	1.189	0.753			
Dining at a robotic restaurant could offer great value for money.	4.383	1.123	0.706			
Epistemic value (adapted from Ha & Jang, 2012)				0.856	0.665	0.82
Dining at a robotic restaurant could satisfy my sense of curiosity.	5.694	1.144	0.892			
Dining at a robotic restaurant could give me an opportunity to keep up to date with technology trends.	5.158	1.290	0.758			
Dining at a robotic restaurant would be a novel experience in my life.	5.852	1.108	0.791			

Methods

Measures development & questionnaire design

Data were collected through a survey questionnaire. The instrument was composed of eight constructs, including personalization, efficiency, anthropomorphism, perceived authenticity, and four perceived value dimensions: emotional, social, functional, and epistemic. All constructs were adapted from the literature and measured with a 7-point Likert-type scale. The mean, standard deviation, Cronbach's alpha, and correlations among the constructs are presented in Table 1.

The questionnaire was composed of three sections. Section I was designed to screen eligible survey respondents. It explained the concept of a "robotic restaurant" with

specific examples given to ensure prospective participants could get a clear idea of the study's focus. The focus on robotic restaurants was grounded on the increasing adoption of robots in the restaurant sector worldwide (Cheong et al., 2016). Section II comprised the rating scales on human-centric robot traits (personalization, efficiency, and anthropomorphism), perceived authenticity, and four perceived value dimensions. Section III obtained socio-demographic information. Two attention checks were integrated into the random parts of the questionnaire to improve data quality (Abbey & Meloy, 2017).

The questionnaire was designed and distributed in English. It was piloted with 30 restaurant customers in October 2023 to estimate the completion time, check the understanding of items' wording alongside the online questionnaire navigation for any potential issues before the formal survey. The feedback obtained from the pilot study was as follows: the questionnaire was considered straightforward, easily navigated on all electronic devices, and could be completed in less than 15 minutes. No issues were reported in the pilot study.

Data collection

The target population was restaurant customers who were interested in and/or have had a robotic dining experience. As the number of robotic restaurants worldwide remains limited (Seyitoğlu & Ivanov, 2022), focusing on both prospective and existing customers of such restaurants is justified. The same methodological approach was used in other studies examining the topic of robotization in hospitality settings (e.g., Chuah et al., 2022a; J. J. Kim et al., 2021; B. Song et al., 2022). Given the target population, a purposive sampling technique was adopted. Accordingly, to qualify for this study, participants must have been interested in and/or have dined in a robotic restaurant. Two questions were used to filter qualified participants, i.e., "Have you dined in a robotic restaurant before?" and "Are you interested in dining out in a robotic restaurant?." Those who answered "no" to both questions were considered not qualified and directed to the end of the online survey. Participants who answered "yes" to either question were included in the study sample.

To recruit participants, a Qualtrics-based questionnaire survey was launched on Prolific, a dedicated online panel for academic research (Palan & Schitter, 2018), to reach the target population. Out of 450 questionnaires distributed in October 2023, 358 completed responses were retained for data analysis. Given the number of 25 measurement items in this study, the sample size satisfied the recommended 10:1 ratio by Hair et al. (2011). Out of 358 valid respondents, over half of the sample (64.2%) were females and 64.2% were between 26 and 45 years old. Nearly half of the participants (49%) reported a monthly income between $2,001–$3,000. The technology usage level was high among the majority of participants (81.1%). Most participants (65.8%) usually dined out with their spouse/partner and children. The robotic restaurants the participants dined in were located in the United Kingdom (42.9%), Japan (36.5%), South Korea (10.3%), the United States of America (5.6%), and Australia (4.7%).

Table 2. Construct correlations & discriminant validity.

	Pers	Eff	Anth	Auth	EV	SV	FV	EPS
Pers	**0.848**							
Eff	0.380	**0.941**						
Anth	0.243	0.213	**0.769**					
Auth	0.385**	0.431**	0.311**	**0.844**				
EV	0.470**	0.481**	0.367**	0.459	**0.866**			
SV	0.364**	0.363**	0.419**	0.265	0.325	**0.899**		
FV	0.430**	0.555**	0.386**	0.469	0.335	0.225	**0.725**	
EPV	0.429**	0.499**	0.354**	0.419	0.211	0.362	0.269	**0.816**

Notes. Pers: personalization, Eff: efficiency, Anth: anthropomorphism, Auth: authenticity, EV: emotional value, SV: social value, FV: functional value, EPV: epistemic value.
**p<0.01 (2-tailed).

Common method bias

Common method bias refers to the error variance shared across variables due to the measurement method used, which can undermine construct validity in quantitative research (Drost, 2011; Richardson et al., 2009). The Harman's single-factor test revealed that the first factor accounted for 35.26% of the total variance, which is well below the 50% threshold recommended by Podsakoff et al. (2003). Common method bias was, thus, not a significant concern for the study's validity.

Analysis and results

Reliability and validity

The Cronbach's alpha value of all constructs exceeded the threshold of 0.7 (Nunnally, 1978), indicating the internal reliability. The factor loadings and the composite reliabilities (CRs) were all higher than 0.7 and the average variance extracted (AVE) values were greater than 0.5 (Hair et al., 2011). Accordingly, the convergent validity was upheld as shown in Table 1.

Table 2 indicates that the human-centric robot traits, including personalization, efficiency, and anthropomorphism were significantly and positively correlated with all four perceived value dimensions and perceived authenticity ($p < 0.01$). Table 2 also shows that the square roots of AVE for each factor were higher than the correlation of that factor with other factors, indicating discriminant validity (Fornell & Larcker, 1981). Therefore, the discriminant validity was confirmed.

Direct effects of human-centric robot traits on perceived authenticity and value dimensions

The direct effects of personalization (H1), efficiency (H2) and anthropomorphism (H3) on perceived authenticity were examined using a multiple regression analysis. H1 (adjusted $R^2 = 0.142$, standardized $\beta = 0.380$, $F = 70.700$, $t = 8.408$, $p < 0.001$); H2 (adjusted $R^2 = 0.183$, standardized $\beta = 0.430$, $F = 95.088$, $t = 9.751$, $p < 0.001$); and H3 (adjusted $R^2 = 0.094$, standardized $\beta = 0.310$, $F = 44.428$, $t = 6.665$, $p < 0.001$) were all confirmed.

The direct effects of personalization (H4a-d), efficiency (H5a-d), and anthropomorphism (H6a-d) on four value dimensions were also tested by regression analysis. Personalization was found to directly influence emotional value (H4a: adjusted $R^2 =$

Table 3. Mediating results.

	Direct effect				Indirect effect		
Paths	Effect	SE	$CI_{95\%}$ [LLCI, ULCI]	p	Effect	SE	$CI_{95\%}$ [LLCI, ULCI]
Pers➔Auth➔EV	0.3406	0.0433	[0.2556, 0.4256]	***	0.1227	0.0270	[0.0735, 0.1807]
Pers➔Auth➔SV	0.2102	0.0553	[0.1015, 0.3188]		0.0803	0.0269	[0.0301, 0.1381]
Pers➔Auth➔FV	0.2284	0.0345	[0.1605, 0.2963]		0.1053	0.0228	[0.0637, 0.1526]
Pers➔Auth➔EPV	0.2591	0.0374	[0.1857, 0.3326]		0.0932	0.0238	[0.0531, 0.1449]
Eff➔Auth➔EV	0.4571	0.0594	[0.3405, 0.5738]	***	0.1747	0.0376	[0.1063, 0.2551]
Eff➔Auth➔SV	0.2679	0.0758	[0.1189, 0.4170]		0.1183	0.0405	[0.0443, 0.2008]
Eff➔Auth➔FV	0.4491	0.0445	[0.3615, 0.5366]		0.1253	0.0265	[0.0767, 0.1797]
Eff➔Auth➔EPV	0.4283	0.0498	[0.3305, 0.5262]		0.1179	0.0289	[0.0644, 0.1795]
Anth➔Auth➔EV	0.1486	0.0491	[0.0521, 0.2450]	***	0.1395	0.0298	[0.0880, 0.2024]
Anth➔Auth➔SV	0.4510	0.0560	[0.3410, 0.5610]		0.0560	0.0212	[0.0173, 0.100]
Anth➔Auth➔FV	0.2264	0.0372	[0.1532, 0.2996]		0.1018	0.0216	[0.0630, 0.1464]
Anth➔Auth➔EPV	0.2693	0.0421	[0.0134, 0.1521]		0.1107	0.0225	[0.0650, 0.1623]

Notes. Pers: personalization, Eff: efficiency, Anth: anthropomorphism, Auth: Authenticity, EV: emotional value, SV: social value, FV: functional value, EPV: epistemic value.
***$p<0.0001$.

0.219, standardized $\beta = 0.470$, $F = 118.764$, $t = 10.898$, $p < 0.001$), social value (H4b: adjusted $R^2 = 0.067$, standardized $\beta = 0.264$, $F = 31.386$, $t = 5.602$, $p < 0.001$), functional value (H4c: adjusted $R^2 = 0.182$, standardized $\beta = 0.429$, $F = 94.424$, $t = 9.717$, $p < 0.001$), and epistemic value (H4d: adjusted $R^2 = 0.183$, standardized $\beta = 0.430$, $F = 95.267$, $t = 9.760$, $p < 0.001$). Efficiency was found to directly influence emotional value (H5a: adjusted $R^2 = 0.230$, standardized $\beta = 0.481$, $F = 126.252$, $t = 11.236$, $p < 0.001$), social value (H5b: adjusted $R^2 = 0.065$, standardized $\beta = 0.260$, $F = 30.360$, $t = 5.510$, $p < 0.001$), functional value (H5c: adjusted $R^2 = 0.307$, standardized $\beta = 0.555$, $F = 186.936$, $t = 13.672$, $p < 0.001$), and epistemic value (H5d: adjusted $R^2 = 0.248$, standardized $\beta = 0.500$, $F = 139.553$, $t = 11.813$, $p < 0.001$).

Anthropomorphism was found to directly influence emotional value (H6a: adjusted $R^2 = 0.069$, standardized $\beta = 0.266$, $F = 32.006$, $t = 5.657$, $p < 0.001$), social value (H6b: adjusted $R^2 = 0.172$, standardized $\beta = 0.418$, $F = 88.469$, $t = 9.406$, $p < 0.001$), functional value (H6c: adjusted R2 = 0.147, standardized $\beta = 0.386$, $F = 73.233$, $t = 8.558$, $p < 0.001$), and epistemic value (H6d: adjusted R2 = 0.036, standardized $\beta = 0.196$, $F = 16.805$, $t = 4.099$, $p < 0.001$).

Mediating effect of perceived authenticity on the relationship between human-centric robot traits and perceived value facets

Hayes Process Model 4 (version 4.2) was used to test the mediation effect captured by hypotheses H7.1a-d, H7.2a-d, and H7.3a-d (Table 3). To test H7.1a-d, personalization served as the independent variable, and perceived authenticity was used as the mediator. Emotional, social, functional, and epistemic value dimensions were applied as the dependent variables. The results showed that perceived authenticity partially mediated the relationship between personalization and emotional value (H7.1a), social value (H7.1b), functional value (H7.1c), and epistemic value (H7.1d).

To test H7.2a-d, efficiency was employed as the independent variable, and perceived authenticity served as the mediator. The dependent variables included emotional, social, functional, and epistemic value dimensions. The results showed that perceived authenticity

Table 4. Results of hypotheses testing.

Hypotheses		Results
H1. Personalization➔Authenticity		Supported
H2. Efficiency➔Authenticity		Supported
H3. Anthropomorphism➔Authenticity		Supported
H4	a. Personalization➔Emotional value	Supported
	b. Personalization➔Social value	Supported
	c. Personalization➔Functional value	Supported
	d. Personalization➔Epistemic value	Supported
H5	a. Efficiency➔Emotional value	Supported
	b. Efficiency➔Social value	Supported
	c. Efficiency➔Functional value	Supported
	d. Efficiency➔Epistemic value	Supported
H6	a. Anthropomorphism➔Emotional value	Supported
	b. Anthropomorphism➔Social value	Supported
	c. Anthropomorphism➔Functional value	Supported
	d. Anthropomorphism➔Epistemic value	Supported
H7.1	a. Personalization➔Authenticity➔Emotional value	Supported
	b. Personalization➔Authenticity➔Social value	Supported
	c. Personalization➔Authenticity➔Functional value	Supported
	d. Personalization➔Authenticity➔Epistemic value	Supported
H7.2	a. Efficiency➔Authenticity➔Emotional value	Supported
	b. Efficiency➔Authenticity➔Social value	Supported
	c. Efficiency➔Authenticity➔Functional value	Supported
	d. Efficiency➔Authenticity➔Epistemic value	Supported
H7.3	a. Anthropomorphism➔Authenticity➔Emotional value	Supported
	b. Anthropomorphism➔Authenticity➔Social value	Supported
	c. Anthropomorphism➔Authenticity➔Functional value	Supported
	d. Anthropomorphism➔Authenticity➔Epistemic value	Supported

partially mediated the relationship between efficiency and emotional value (H7.2a), social value (H7.2b), functional value (H7.2c), and epistemic value (H7.2d).

To test H7.3a-d, anthropomorphism was considered the independent variable, while emotional, social, functional, and epistemic value dimensions were the dependent variables. The mediator was perceived authenticity. The relationships between anthropomorphism and emotional value (H7.3a), social value (H7.3b), functional value (H7.3c), and epistemic value (H7.3d) were also partially mediated by perceived authenticity. The mediating results are detailed in Table 3 and all hypotheses are summarized in Table 4.

Discussion

The results demonstrate that the human-like traits of personalization, efficiency, and anthropomorphism have a significant positive effect on how customers perceive the value and authenticity of service provided by service robots in restaurants. Personalization exerts the strongest influence on emotional and epistemic value dimensions. This implies that the provision of personalized robotic services can trigger positive emotions among hospitality customers and reinforce their appreciation for the need to integrate service robots into hospitality operations. A similar conclusion is derived by S. H. Wu (2024), who has established that personalized service provided by robots can prompt such emotional responses from restaurant guests as perceived relatedness and warmth, ultimately leading to consumer acceptance of service robots and increasing the feeling of brand love toward restaurants integrating robotic services in their operations.

The efficiency of robotic services has the strongest effect on the functional and epistemic value dimensions. This suggests that hospitality customers are more likely to appreciate service robots for their efficiency, particularly in relation to the specific functions these robots are designed to perform and the operational needs of the restaurant. This is because the efficiency of service robots plays a crucial role in driving customer engagement and acceptance in the restaurant context (Shah et al., 2023).

The factor of anthropomorphism exerts the strongest influence on the social and functional values. This implies that the social roles and functionalities of human-like robots are more likely to be acknowledged by hospitality customers. In other words, restaurant customers are more likely to appreciate anthropomorphism when robots can engage in meaningful interactions with them, particularly when such interactions are essential for effective service delivery. For instance, when a robot assists in addressing specific needs, such as inquiring about food allergies or providing personalized recommendations, customers perceive these interactions as more valuable. The ability of a robot to participate in tasks that directly enhance the service experience fosters a sense of utility and relevance, making customers more receptive to the robot's anthropomorphic qualities.

The importance of integrating humanoid service robots into hospitality operations to trigger positive emotional responses among customers has been recognized in literature, albeit largely from the perspective of perceived service quality (Chiang et al., 2022; Lu et al., 2021; Qian & Wan, 2024). This notwithstanding, Chiang et al. (2022) demonstrate how the factor of anthropomorphism can cause the feeling of perceived companionship and friendship among hospitality customers. This implies the role of humanoid service robots in building perceived social values. Likewise, Qian and Wan (2024) discuss the social role of humanoid service robots in restaurants; however, their analysis does not address how customers perceive robot values. The current study bridges the gap by establishing a connection between the anthropomorphism of service robots and the four key dimensions of emotional, social, functional, and epistemic values, shedding light on the importance of anthropomorphic design in customers' perception of robot values, particularly within the context of robotic restaurant environments.

The current study establishes the effect of anthropomorphism on perceived authenticity as strong; however, it is less significant compared to the effects of personalization and efficiency. This suggests that while human-like traits, such as appearance, gestures, or behaviors can make robots seem more authentic, these traits alone are not sufficient to create a truly authentic experience. Personalization and efficiency appear to be stronger drivers of authenticity, implying that hospitality guests prioritize how well a robot can tailor the service to customers' needs and preferences over its human-like qualities. In hospitality or service contexts, where guest satisfaction often hinges on individualized attention and seamless service (Ariffin, 2013; Mandic et al., 2023), personalization and efficiency may, thus, contribute more significantly to perceptions of authenticity than anthropomorphism.

The results demonstrate that perceived authenticity exerts partial influence on the relationship between human-centric traits and all four value dimensions. This contribution to knowledge is novel as past research has only considered perceived authenticity as either a mediator or a direct influencer of revisit/repurchase intentions of hospitality customers (H. Song et al., 2023), or as a dependent variable in the context of perceived brand

authenticity and brand loyalty (Hwang et al., 2022). This current study showcases perceived authenticity of robotic services as a potential mediating factor in the effect of personalization, efficiency and anthropomorphism on the four value dimensions. This suggests that when hospitality customers perceive service robots as authentic, these robots are more likely to be recognized and valued for their contribution to restaurant operations from the perspective of increased personalization, improved efficiency, and demonstrated anthropomorphism. Moreover, the results indicate that the indirect effects of personalization, efficiency, and anthropomorphism on perceived value vary across dimensions when mediated by perceived authenticity. Notably, the strongest indirect effect is observed on emotional value, suggesting that consumers' emotional responses are particularly sensitive to perceived authentic experiences. This implies that authenticity serves as a critical lens through which personalization and anthropomorphic cues are interpreted, promoting emotional engagement. In contrast, the relatively weaker indirect effects on social value, especially for personalization and anthropomorphism, and on epistemic value for efficiency, point to a more limited role for perceived authenticity in influencing social connectivity and knowledge-seeking behaviors. These differentiated pathways advance theoretical understanding by demonstrating that the indirect influence of human-centric robot traits, mediated by perceived authenticity, varies across different value dimensions.

Conclusion

This study investigated the influence of three human-like traits, including personalization, efficiency, and anthropomorphism on perceived authenticity and four dimensions of emotional, social, functional, and epistemic values. The results demonstrated that all human-like traits significantly influence perceived authenticity and the four dimensions of perceived value. The results also confirmed the mediating effect of perceived authenticity on the relationship between the human-like robot traits and the four value dimensions. Such findings offered important theoretical and practical implications, as discussed below.

Theoretical implications

This study addressed the following research gaps in customer perception of service robots in the hospitality industry. First, unlike previous studies that have considered the values provided by service robots as precursors of consumer behavioral intentions and behavior (Hong et al., 2023; Lin & Mattila, 2021; Meidute-Kavaliauskiene et al., 2021), this current study demonstrated that these values could also be potential outcomes of customer judgment. This novel theoretical perspective reinforces an understanding of the value created by employing service robots in hospitality organizations. More specifically, this current study indicates that the benefit of this employment may not only be in driving positive consumer behavior, such as patronage intentions, but also in valuing and better appreciating robotic service on its own. An understanding of the underlying factors behind this valuation and appreciation is important, given that hospitality organizations are likely to engage robots in service provision more often in the future (Chuah & Soeiro, 2025). The current study demonstrates that human-centric robot traits, including personalization, efficiency, and anthropomorphism, can represent examples of these underlying factors.

Second, this study extends prior research that has treated perceived robotic service value as a singular construct (de Kervenoael et al., 2020; Kwak et al., 2021; Meidute-Kavaliauskiene et al., 2021). Instead, this study delved into the multidimensionality of perceived value, encompassing emotional, social, functional, and epistemic values, to provide a more granular analysis of customer judgment in hospitality settings. This refined approach, unlike previous studies focused solely on practicality and pleasurable experiences (Chang, 2024; Hu, 2021; J. J. Wu et al., 2024), allows academics and industry stakeholders to identify specific value dimensions which need to be emphasized when deploying robotic services in restaurants, such as functionality in fast food restaurants or the robots' ability to explain food provenance in fine dining. By acknowledging these diverse value facets, including emotional responses, social interactions, functional benefits, and epistemic curiosity, this research underlines the need for (more) nuanced investigations across various customer demographics (for example, older versus younger diners), service settings (for instance, fast food versus casual dining), and hospitality markets (for example, well-established versus emerging). This will enable a more accurate assessment of how design (anthropomorphism), relational (personalization), and functional (efficiency) aspects of human-robot interactions influence distinct aspects of perceived value of restaurant guests, ultimately improving their patronage intentions. The holistic view presented in this study captures both practical and hedonic elements of robotic service provision in restaurants, as well as the more profound psychological and social impacts of human-centric robot design, offering richer insights for technology developers aiming to create robots that resonate with consumers on multiple levels.

Third, an extensive line of research on customer perceptions of the value provided by robotic services in the hospitality industry has focused on restaurants as a whole, not always differentiating between restaurants as hospitality organizations and robots as providers of foodservice in these organizations (see, for example, Gong et al., 2024; C. Y. Kim & Cha, 2024; Kwak et al., 2021). Although such research approach is warranted, it does not necessarily enable an understanding of what exactly hospitality customers value i.e., a robotic restaurant or a robot as a service provider. Such nuances are however critical for analysis because other restaurant attributes, such as food quality, amenities, and the overall ambiance (Filimonau et al., 2017), can affect consumer evaluations, thus not being directly related to robots. The current study contributes to knowledge with empirical evidence of the determinants of perceived value that hospitality customers attach to robotic services rather than restaurants in which these robots operate.

The fourth theoretical contribution of the current study is in reinforcing an understanding of the perceived authenticity of robotic services in hospitality organizations. Past research has largely been concerned with the interlinkages between robots and brand authenticity of restaurants in which they operate (Hwang et al., 2022; Seyitoğlu, 2021; H. Song et al., 2022). Although robots, like human employees, can indeed contribute to brand authenticity and even become brand ambassadors (J. Zhang et al., 2024), this perspective on authenticity prevents an understanding of how and if robotic services are perceived as authentic by customers. This current study extends the growing line of research on the topic of authenticity in the context of robotic service provision toward authenticity perceptions of robots by restaurant guests. Further, the current study underscores that perceived robotic authenticity in hospitality organizations is not only driven by such features of robots as anthropomorphism and perceived intelligence and perceived animacy

(M. Wu et al., 2023) but is also influenced by how well robots can balance personalized engagement with practical, reliable performance. Accordingly, the current study offers a more nuanced understanding of how hospitality service robots can be perceived as authentic, emphasizing the importance of both relational and functional dynamics in fostering genuine user experiences.

Lastly, emphasizing the contribution of the current study to the topic of robotic anthropomorphism, past research has demonstrated both positive (X. Song et al., 2024) and negative (Akdim et al., 2023) effects of robots' anthropomorphism on hospitality customers' attitudes and behavioral intentions. The current study is aligned with and empirically supports the positive perspective, thus providing further empirical evidence to justify the need for robot developers and manufacturers to design hospitality service robots (more) human-like. This especially applies to customer-facing service robots, such as waiters and bar(wo)men, whose anthropomorphism is likely to be perceived by hospitality customers as more authentic.

Managerial implications

The findings that the human-centric traits, including personalization, efficiency, and anthropomorphism significantly influence all perceived value facets (emotional, social, functional, and epistemic) and perceived authenticity offer actionable insights for hospitality businesses. Hospitality practitioners should take advantage of personalized robotic services to create bespoke guest interactions. For example, a robot concierge that remembers a returning guest's past food preferences and proactively offers customized suggestions adds a level of attentiveness and care that makes the service feel authentic and memorable and helps to attract and retain customers. Moreover, the adoption of robots that can personalize services provides hospitality practitioners with valuable insights into guest preferences and behaviors. These insights can inform marketing strategies, enabling more targeted promotions and loyalty programs.

In addition to deploying robots capable of providing tailored services, hospitality practitioners should employ robots that can perform tasks efficiently and exhibit human behaviors. The discovery by Japanese scientists of a method to attach living skin to robotic faces, enabling more realistic facial expressions (Roberts, 2024), represents a significant step toward robots displaying human-like behaviors, such as smiling and gesturing. This technological advancement holds great promise for enhancing the authenticity of robot-human interactions. Efficient robots with anthropomorphic traits are particularly valuable during peak hours or high-demand situations. For example, in a restaurant setting, a humanoid robot at the reception could handle reservation confirmations and provide guests with a menu while engaging guests with friendly greetings. Such interactions not only save time but also leave a positive impression, reinforcing both perceived value and authenticity.

While both personalization and efficiency influence perceived value and authenticity, a trade-off exists between efficiency and personalization in robotic services (Tofangchi et al., 2021). Therefore, it is important for hospitality practitioners to strike the right balance between these two aspects. To balance them in a restaurant context, such low-touch tasks as food delivery or clearing tables can be efficiently automated with robots designed to perform these functions quickly. On the other hand, such high-touch and personalized tasks as greeting guests, inquiring about their dietary preferences or food allergies, offering

personalized menu recommendations, or addressing special requests should be handled by robots with human-like traits, allowing for more engaging and customized interactions.

The indirect effects of personalization, efficiency, and anthropomorphism on each perceived value dimension suggest that restaurants aiming to enhance consumers' emotional value should prioritize strategies that strengthen perceived authenticity. For instance, leveraging personalized robotic services and anthropomorphic design features can create more emotionally resonant digital experiences, thereby deepening customer engagement. Conversely, given that the indirect effects on social and epistemic value are comparatively weaker, restaurants may need to employ additional initiatives, such as fostering interactive communities, user-generated content or offering educational content on robot-powered restaurant operations, to effectively boost these dimensions. By recognizing and tailoring strategies to these differences, restaurants can more precisely target the distinct facets of perceived value, ultimately optimizing customer satisfaction and loyalty.

To maximize the effectiveness of personalized, efficient and anthropomorphic robots, hospitality practitioners should ensure that human staff play a role in service encounters. Robots should be used as tools to enhance rather than replace human interactions because in dynamic service environments, such as restaurants, customers often seek human connections as part of their overall experience (Chung-Herrera, 2007; Immonen et al., 2018). For instance, a robot could efficiently deliver orders to the table, confirming the dishes and wishing the guests a pleasant meal, while human staff could check in with diners to ensure satisfaction and address any concerns. This synergy between robotic service and human touch reinforces the perception of a thoughtful, well-rounded service provided by a restaurant.

Limitations and future research

Efforts have been made to uphold the research rigor. However, as with any research endeavors, the current study is not without limitations, which present opportunities for future investigations. First, this study relied on an online panel for data collection, which potentially limits the generalizability of the findings to the broader population. Future research could address this limitation by incorporating both online and offline participants. For example, researchers could use a mixed-methods approach, combining online surveys with in-person interviews or focus groups, to ensure that all demographic groups, including those with limited internet access, are adequately represented.

Second, the data for this study was collected in October 2023 to provide a foundation for understanding the dynamics of the studied relationships and offer insights for both academics and practitioners. However, as societal and technological trends evolve, future studies could advance this study by incorporating updated data to capture potential changes in consumer perceptions and behaviors, allowing for a meaningful comparison. Longitudinal studies could also provide insights into how/if the relationships examined in the current study evolved over time.

Third, the study's population was diverse, comprising participants from various countries, including the United Kingdom, the United States of America, Australia, Japan, and South Korea. Though the sample was not limited to a specific culture or country, the study did not account for the potential influence of national culture on the relationship between human-centric robot traits and perceived value or authenticity. As shown in past research (Kenebayeva et al., 2025), customers in individualistic and short-term-oriented national

cultures may have different preferences for service robots compared to those in collectivistic and long-term-oriented cultures. Therefore, future research should consider cultural differences by conducting cross-cultural investigations that explore how different cultural values, traditions, and societal norms moderate the influence of human-centric robot traits on each perceived value dimension and authenticity. Such studies would provide actionable insights to help hospitality practitioners tailor robotic services to meet the specific needs and preferences of diverse consumer groups.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

The research was funded by York St John University. The grant number is [QR22-23-87].

Credit statement

Hien Thu Bui: Conceptualization, Methodology, Funding acquisition, Data curation, Data analysis, Visualization, Writing-original draft, Writing-review and editing
Viachaslau Filimonau: Writing-original draft, Writing- review and editing
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References

Abbey, J. D., & Meloy, M. G. (2017). Attention by design: Using attention checks to detect inattentive respondents and improve data quality. *Journal of Operations Management*, *53-56*(1), 63–70. https://doi.org/10.1016/j.jom.2017.06.001

Ajoudani, A., Zanchettin, A., Ivaldi, S., Albu-Schäffer, A., Kosuge, K., & Khatib, O. (2017). Progress and prospects of the human-robot collaboration. *Autonomous Robots*, *42*(5), 957–975. https://doi.org/10.1007/s10514-017-9677-2

Akdim, K., Belanche, D., & Flavián, M. (2023). Attitudes toward service robots: Analyses of explicit and implicit attitudes based on anthropomorphism and construal level theory. *International Journal of Contemporary Hospitality Management*, *35*(8), 2816–2837. https://doi.org/10.1108/IJCHM-12-2020-1406

Altinay, L., Sigala, M., & Waligo, V. (2016). Social value creation through tourism enterprise. *Tourism Management*, *54*, 404–417. https://doi.org/10.1016/j.tourman.2015.12.011

Ariffin, A. (2013). Generic dimensionality of hospitality in the hotel industry: A host-guest relationship perspective. *International Journal of Hospitality Management*, *35*, 171–179. https://doi.org/10.1016/j.ijhm.2013.06.002

Balaji, M. S., Jiang, Y., & Zhang, X. (2025). Robots in service: How robot capabilities and personalities drive customer value co-creation and satisfaction. *International Journal of Contemporary Hospitality Management*, *37*(3), 1016–1035. https://doi.org/10.1108/IJCHM-01-2024-0112

Belanche, D., Casaló, L. V., & Flavián, C. (2021). Frontline robots in tourism and hospitality: Service enhancement or cost reduction? *Electronic Markets*, *31*(3), 477–492. https://doi.org/10.1007/s12525-020-00432-5

Belanche, D., Casaló, L. V., Schepers, J., & Flavián, C. (2021). Examining the effects of robots' physical appearance, warmth, and competence in frontline services: The humanness-value-loyalty model. *Psychology & Marketing*, *38*(12), 2357–2376. https://doi.org/10.1002/mar.21532

Berezina, K., Ciftci, O., & Cobanoglu, C. (2019). Robots, artificial intelligence, and service automation in restaurants. In S. Ivanov & C. Webster (Eds.), *Robots, artificial intelligence, and service automation in travel, tourism and hospitality* (pp. 185–219). Emerald Publishing Limited.

Blöcher, K., & Alt, R. (2021). AI and robotics in the European restaurant sector: Assessing potentials for process innovation in a high-contact service industry. *Electronic Markets*, *31*(3), 529–551. https://doi.org/10.1007/s12525-020-00443-2

Blut, M., Wang, C., Wünderlich, N. V., & Brock, C. (2021). Understanding anthropomorphism in service provision: A meta-analysis of physical robots, chatbots, and other AI. *Journal of the Academy of Marketing Science*, *49*(4), 632–658. https://doi.org/10.1007/s11747-020-00762-y

Boksberger, P. E., & Melsen, L. (2011). Perceived value: A critical examination of definitions, concepts and measures for the service industry. *Journal of Services Marketing*, *25*(3), 229–240. https://doi.org/10.1108/08876041111129209

Caber, M., Albayrak, T., & Crawford, D. (2020). Perceived value and its impact on travel outcomes in youth tourism. *Journal of Outdoor Recreation and Tourism*, *31*, 100327. https://doi.org/10.1016/j.jort.2020.100327

Carvalho, I., Lopes, S., Madeira, A., Palrão, T., Mendes, A. S., & Yan, Z. (2022). Robot coworkers: The vision of future hoteliers. *Human Behavior and Emerging Technologies*, *2022*(1), 1–13. https://doi.org/10.1155/2022/8567289

Castellano, G. (2020). What kind of human-centric robotics do we need?: Investigations from human-robot interactions in socially assistive scenarios. *Proceedings of the 8th International Conference on Human-Agent Interaction* (pp. 1–2), Sydney, Australia. https://doi.org/10.1145/3406499.3422313

Chang, S. T. (2024). Influence of robot coolness and affinity on behavioral intention: Examining perceived value as a mediating factor. *Journal of Hospitality & Tourism Technology*, *15*(5), 825–841. https://doi.org/10.1108/JHTT-10-2023-0316

Chen, C. F., & Girish, V. G. (2023). Investigating the use experience of restaurant service robots: The cognitive-affective-behavioral framework. *International Journal of Hospitality Management*, *111*, 103482. https://doi.org/10.1016/j.ijhm.2023.103482

Cheong, A., Lau, M. W. S., Foo, E., Hedley, J., & Bo, J. W. (2016). Development of a robotic waiter system. *IFAC-Papersonline*, *49*(21), 681–686. https://doi.org/10.1016/j.ifacol.2016.10.679

Chi, O. H., Chi, C. G., Gursoy, D., & Nunkoo, R. (2023). Customers' acceptance of artificially intelligent service robots: The influence of trust and culture. *International Journal of Information Management*, *70*, 102623. https://doi.org/10.1016/j.ijinfomgt.2023.102623

Chiang, A. H., Trimi, S., & Lo, Y. J. (2022). Emotion and service quality of anthropomorphic robots. *Technological Forecasting and Social Change*, *177*, 121550. https://doi.org/10.1016/j.techfore.2022.121550

Choi, Y., Choi, M., Oh, M., & Kim, S. (2020). Service robots in hotels: Understanding the service quality perceptions of human-robot interaction. *Journal of Hospitality Marketing and Management*, *29*(6), 613–635. https://doi.org/10.1080/19368623.2020.1703871

Chong, K. L., & Zhang, G. (2025). Perceptions and motivational factors of Chinese coffee consumers towards robot baristas: A technology acceptance model 2 perspective. *Journal of Hospitality and Tourism Insights*, *8*(1), 350–369. https://doi.org/10.1108/JHTI-01-2024-0126

Chong, T., Yu, T., Keeling, D. I., & de Ruyter, K. (2021). AI-chatbots on the services frontline addressing the challenges and opportunities of agency. *Journal of Retailing and Consumer Services*, *63*, 102735. https://doi.org/10.1016/j.jretconser.2021.102735

Christoforakos, L., Gallucci, A., Surmava-Große, T., Ullrich, D., & Diefenbach, S. (2021). Can robots earn our trust the same way humans do? A systematic exploration of competence, warmth, and anthropomorphism as determinants of trust development in HRI. *Frontiers in Robotics and AI*, *8*, 640444. https://doi.org/10.3389/frobt.2021.640444

Chuah, S. H. W., Aw, E. C. X., & Cheng, C. F. (2022a). A silver lining in the covid-19 cloud: Examining customers' value perceptions, willingness to use and pay more for robotic restaurants. *Journal of Hospitality Marketing and Management*, *31*(1), 49–76. https://doi.org/10.1080/19368623.2021.1926038

Chuah, S. H. W., Jitanugoon, S., Puntha, P., & Aw, E. C. X. (2022b). You don't have to tip the human waiters anymore, but … unveiling factors that influence consumers' willingness to pay a price premium for robotic restaurants. *International Journal of Contemporary Hospitality Management*, *34*(10), 3553–3587. https://doi.org/10.1108/IJCHM-08-2021-1023

Chuah, S. H. W., & Soeiro, J. D. (2025). When robot appearance and service style interact to influence customers' willingness to pay: The mediating role of perceived restaurant quality. *International Journal of Hospitality Management*, *127*, 104117. https://doi.org/10.1016/j.ijhm.2025.104117

Chung-Herrera, B. (2007). Customers' psychological needs in different service industries. *Journal of Services Marketing*, *21*, 263–269. https://doi.org/10.1108/08876040710758568 (4)

Coronado, E., Kiyokawa, T., Ricardez, G. A. G., Ramirez-Alpizar, I. G., Venture, G., & Yamanobe, N. (2022). Evaluating quality in human-robot interaction: A systematic search and classification of performance and human-centered factors, measures and metrics towards an industry 5.0. *Journal of Manufacturing Systems*, *63*, 392–410. https://doi.org/10.1016/j.jmsy.2022.04.007

Davenport, T., Guha, A., Grewal, D., & Bressgott, T. (2020). How artificial intelligence will change the future of marketing. *Journal of the Academy of Marketing Science*, *48*(1), 24–42. https://doi.org/10.1007/s11747-019-00696-0

de Kervenoael, R., Hasan, R., Schwob, A., & Goh, E. (2020). Leveraging human-robot interaction in hospitality services: Incorporating the role of perceived value, empathy, and information sharing into visitors' intentions to use social robots. *Tourism Management*, *78*, 104042. https://doi.org/10.1016/j.tourman.2019.104042

Drost, E. A. (2011). Validity and reliability in social science research. *International Perspectives of Higher Education Research*, *38*(1), 105–123. https://doi.org/10.70953/ERPv38.11005

Fang, S., Han, X., Zheng, Y., & Li, W. (2024). Investigating the effect of customer-robot interaction experience on customer engagement behavior and co-creation value: A mixed methods study. *Journal of Hospitality Marketing and Management*, *34*(3), 355–386. https://doi.org/10.1080/19368623.2024.2435840

Filimonau, V., Lemmer, C., Marshall, D., & Bejjani, G. (2017). Restaurant menu re-design as a facilitator of more responsible consumer choice: An exploratory and preliminary study. *Journal of Hospitality & Tourism Management*, *33*, 73–81. https://doi.org/10.1016/j.jhtm.2017.09.005

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*(1), 39–50. https://doi.org/10.1177/002224378101800104

Gasteiger, N., Hellou, M., & Ahn, H. S. (2023). Factors for personalization and localization to optimize human-robot interaction: A literature review. *International Journal of Social Robotics*, *15*(4), 689–701. https://doi.org/10.1007/s12369-021-00811-8

Gong, J., Guan, X., & Huan, T. C. (2024). Exploring the critical attributes of robot chef restaurants and their impact on customer perceived value: A mixed-methods study. *International Journal of Contemporary Hospitality Management*, *37*(2), 522–540. https://doi.org/10.1108/IJCHM-02-2024-0242

Gremler, D. D., Van Vaerenbergh, Y., Brüggen, E. C., & Gwinner, K. P. (2020). Understanding and managing customer relational benefits in services: A meta-analysis. *Journal of the Academy of Marketing Science*, *48*(3), 565–583. https://doi.org/10.1007/s11747-019-00701-6

Guan, X., Gong, J., Li, M., & Huan, T. C. (2022). Exploring key factors influencing customer behavioural intention in robot restaurants. *International Journal of Contemporary Hospitality Management*, *34*(9), 3482–3501. https://doi.org/10.1108/IJCHM-06-2021-0807

Gupta, S., Modgil, S., Lee, C. K., Cho, M., & Park, Y. (2022). Artificial intelligence enabled robots for stay experience in the hospitality industry in a smart city. *Industrial Management and Data Systems*, *122*(10), 2331–2350. https://doi.org/10.1108/IMDS-10-2021-0621

Ha, J., & Jang, S. (2012). Consumer dining value: Does it vary across different restaurant segments? *Journal of Foodservice Business Research*, *15*(2), 123–142. https://doi.org/10.1080/15378020.2012.677378

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory & Practice*, *19*(2), 139–152. https://doi.org/10.2753/MTP1069-6679190202

Ham, J. (2021). Influencing robot influence: Personalization of persuasive robots. *Interaction Studies*, *22*(3), 464–487. https://doi.org/10.1075/is.00012.ham

Ham, J., Li, S., Shah, P., & Eastin, M. S. (2023). The "mixed" reality of virtual brand endorsers: Understanding the effect of brand engagement and social cues on technological perceptions and advertising effectiveness. *Journal of Interactive Advertising*, *23*(2), 1–16. https://doi.org/10.1080/15252019.2023.2185557

Hong, C., Choi, E. K., Joung, H. W., & Kim, H. S. (2023). The impact of customer perceived value on customer satisfaction and loyalty toward the food delivery robot service. *Journal of Hospitality & Tourism Technology*, *14*(5), 908–924. https://doi.org/10.1108/JHTT-11-2022-0305

Hong, C., Choi, H. H., Choi, E. K., & Joung, H. W. (2025). Exploring customer perceptions of food delivery robots: A value-based model of perceived value, satisfaction, and their impact on behavioural intentions and word-of-mouth. *Journal of Hospitality Marketing and Management*, *34*(4), 526–548. https://doi.org/10.1080/19368623.2025.2462073

Horng, J. S., Wang, Y. C., Liu, C. H., Chou, S. F., Yu, T. Y., Huang, Y. C., & Hu, D. C. (2024). Robot anthropomorphism at luxury hotels: A dual-congruity mechanism with luxury and task under anxiety. *Journal of Hospitality Marketing and Management*, *34*(2), 204–233. https://doi.org/10.1080/19368623.2024.2425673

Hou, Y., Zhang, K., & Li, G. (2021). Service robots or human staff: How social crowding shapes tourist preferences. *Tourism Management*, *83*, 104242. https://doi.org/10.1016/j.tourman.2020.104242

Hoyer, W. D., Kroschke, M., Schmitt, B., Kraume, K., & Shankar, V. (2020). Transforming the customer experience through new technologies. *Journal of Interactive Marketing*, *51*(1), 57–71. https://doi.org/10.1016/j.intmar.2020.04.001

Hu, Y. (2021). An improvement or a gimmick? The importance of user perceived values, previous experience, and industry context in human-robot service interaction. *Journal of Destination Marketing and Management*, *21*, 100645. https://doi.org/10.1016/j.jdmm.2021.100645

Huang, C., & Guo, R. (2021). The effect of a green brand story on perceived brand authenticity and brand trust: The role of narrative rhetoric. *Journal of Brand Management*, *28*(1), 60–76. https://doi.org/10.1057/s41262-020-00213-7

Huang, D., Chen, Q., Huang, J., Kong, S., & Li, Z. (2021). Customer-robot interactions: Understanding customer experience with service robots. *International Journal of Hospitality Management*, *99*, 103078. https://doi.org/10.1016/j.ijhm.2021.103078

Huang, L., Gao, B., & Gao, M. (2023). Value realization from the perspective of customers and users. In L. Huang, B. Gao, & M. Gao (Eds.), *Value realization in the phygital reality market: Consumption and service under conflation of the physical, digital, and virtual worlds* (pp. 15–39). Springer Nature Singapore.

Huang, M. H., & Rust, R. T. (2017). Technology-driven service strategy. *Journal of the Academy of Marketing Science*, *45*(6), 906–924. https://doi.org/10.1007/s11747-017-0545-6

Hui, Z., Khan, A. N., Chenglong, Z., & Khan, N. A. (2024). When service quality is enhanced by human-artificial intelligence interaction: An examination of anthropomorphism, responsiveness from the perspectives of employees and customers. *International Journal of human-Computer Interaction*, *40*(22), 7546–7561. https://doi.org/10.1080/10447318.2023.2266254

Hur, W. M., Yoo, J. J., & Chung, T. L. (2012). The consumption values and consumer innovativeness on convergence products. *Industrial Management and Data Systems*, *112*(5), 688–706. https://doi.org/10.1108/02635571211232271

Hwang, J., Kim, H. M., Joo, K. H., & Kim, J. J. (2022). The antecedents and consequences of brand authenticity in the restaurant industry: Robot service employees versus human service employees. *Journal of Travel and Tourism Marketing*, *39*(2), 256–270. https://doi.org/10.1080/10548408.2022.2061678

Immonen, M., Sintonen, S., & Koivuniemi, J. (2018). The value of human interaction in service channels. *Computers in Human Behavior*, *78*, 316–325. https://doi.org/10.1016/j.chb.2017.10.005

Ivanov, S., Gretzel, U., Berezina, K., Sigala, M., & Webster, C. (2019). Progress on robotics in hospitality and tourism: A review of the literature. *Journal of Hospitality & Tourism Technology*, *10*(4), 489–521. https://doi.org/10.1108/JHTT-08-2018-0087

Ivanov, S., Webster, C., & Seyitoğlu, F. (2023). Humans and/or robots? tourists' preferences towards the humans-robots mix in the service delivery system. *Service Business*, *17*(1), 195–231. https://doi.org/10.1007/s11628-022-00517-5

Jamrozy, U., & Lawonk, K. (2017). The multiple dimensions of consumption values in ecotourism. *International Journal of Culture, Tourism and Hospitality Research*, *11*(1), 18–34. https://doi.org/10.1108/IJCTHR-09-2015-0114

Javaid, M., Haleem, A., Singh, R. P., & Suman, R. (2021). Substantial capabilities of robotics in enhancing industry 4.0 implementation. *Cognitive Robotics*, *1*, 58–75. https://doi.org/10.1016/j.cogr.2021.06.001

Kang, M., Shin, D. H., & Gong, T. (2016). The role of personalization, engagement, and trust in online communities. *Information Technology & People*, *29*(3), 580–596. https://doi.org/10.1108/ITP-01-2015-0023

Kenebayeva, A., Cavusoglu, M., Hasan, R., Tazhina, G., & Abdunurova, A. (2025). A comparative study on perceived experiential value and behavioral intentions in robot-enhanced restaurants: Examining cultural and gender differences. *Journal of Hospitality & Tourism Technology*, *16*(3), 526–548. https://doi.org/10.1108/JHTT-03-2024-0154

Khan, H. A. (2024). Innovative services, processes and product design crucial for enhancing customer experience. In S. Tabari, W. Chen, & S. Kladou (Eds.) *Marketing and design in the service sector: Enhancing customer experience* (pp. 63–81). Emerald Publishing Limited.

Khan, M. I., Fatima, J. K., Bahmannia, S., Chatrath, S. K., Dale, N. F., & Johns, R. (2024). Investigating the influence of perceived humanization of service encounters on value creation of chatbot-assisted services. *Journal of Service Theory & Practice*, *35*(1), 56–88. https://doi.org/10.1108/JSTP-10-2023-0282

Kim, C. Y., & Cha, S. S. (2024). Customers' value changes on robot-serviced restaurants. *International Journal of Tourism Research*, *26*(1), e2631. https://doi.org/10.1002/jtr.2631

Kim, J. J., Choe, J. Y., & Hwang, J. (2021). Application of consumer innovativeness to the context of robotic restaurants. *International Journal of Contemporary Hospitality Management*, *33*(1), 224–242. https://doi.org/10.1108/IJCHM-06-2020-0602

Kim, Y. K. (2002). Consumer value: An application to mall and internet shopping. *International Journal of Retail & Distribution Management*, *30*(12), 595–602. https://doi.org/10.1108/09590550210453075

Kwak, M. K., Lee, J., & Cha, S. S. (2021). Senior consumer motivations and perceived value of robot service restaurants in Korea. *Sustainability*, *13*(5), 2755. https://doi.org/10.3390/su13052755

Li, M., Yin, D., Qiu, H., & Bai, B. (2022). Examining the effects of AI contactless services on customer psychological safety, perceived value, and hospitality service quality during the COVID-19 pandemic. *Journal of Hospitality Marketing and Management*, *31*(1), 24–48. https://doi.org/10.1080/19368623.2021.1934932

Li, R., Laroche, M., Richard, M. O., & Cui, X. (2022). More than a mere cup of coffee: When perceived luxuriousness triggers Chinese customers' perceptions of quality and self-congruity. *Journal of Retailing and Consumer Services*, *64*, 102759. https://doi.org/10.1016/j.jretconser.2021.102759

Li, Y., Wang, S., & Li, Z. (2024). Animating arousal and engagement: Empirical insights into AI-enhanced robotic performances and consumer reactions. *Journal of Hospitality & Tourism Technology*, *15*(5), 737–768. https://doi.org/10.1108/JHTT-01-2024-0053

Lin, I., & Mattila, A. (2021). The value of service robots from the hotel guest's perspective: A mixed-method approach. *International Journal of Hospitality Management*, *94*, 102876. https://doi.org/10.1016/j.ijhm.2021.102876

Liu, S. Q., Vakeel, K. A., Smith, N. A., Alavipour, R. S., Wei, C., & Wirtz, J. (2024). AI concierge in the customer journey: What is it and how can it add value to the customer? *Journal of Service Management*, *35*(6), 136–158. https://doi.org/10.1108/JOSM-12-2023-0523

Liu, X. S., Yi, X. S., & Wan, L. C. (2022). Friendly or competent? The effects of perception of robot appearance and service context on usage intention. *Annals of Tourism Research*, *92*, 103324. https://doi.org/10.1016/j.annals.2021.103324

Lu, L., Hua, M., Sun, X., Zou, R., & Lin, B. (2024). AI robots over sommeliers? Exploring the service provider effect on diners' wine ordering decisions at restaurants. *International Journal of Hospitality Management*, *122*, 103879. https://doi.org/10.1016/j.ijhm.2024.103879

Lu, L., Zhang, P., & Zhang, T. C. (2021). Leveraging "human-likeness" of robotic service at restaurants. *International Journal of Hospitality Management*, *94*, 102823. https://doi.org/10.1016/j.ijhm.2020.102823

Mandic, D., Panic, A., & Sain, M. (2023). Automated service delivery in hotels: Balancing efficiency and human interaction for optimal guest satisfaction. *International Scientific Conference on Economy, Management and Information Technologies*, *1*(1), 167–174.

Meidute-Kavaliauskiene, I., Çiğdem, Ş., Yildiz, B., & Davidavičius, S. (2021). The effect of perceptions on service robot usage intention: A survey study in the service sector. *Sustainability*, *13*(17), 9655. https://doi.org/10.3390/su13179655

Mende, M., Scott, M. L., Doorn, J. V., Grewal, D., & Shanks, I. (2019). Service robots rising: How humanoid robots influence service experiences and elicit compensatory consumer responses. *Journal of Marketing Research*, *56*(4), 535–556. https://doi.org/10.1177/0022243718822827

Milman, A., Tasci, A., & Zhang, T. (2020). Perceived robotic server qualities and functions explaining customer loyalty in the theme park context. *International Journal of Contemporary Hospitality Management*, *32*(12), 3895–3923. https://doi.org/10.1108/IJCHM-06-2020-0597

Munnukka, J., Talvitie-Lamberg, K., & Maity, D. (2022). Anthropomorphism and social presence in human-virtual service assistant interactions: The role of dialog length and attitudes. *Computers in Human Behavior*, *135*, 107343. https://doi.org/10.1016/j.chb.2022.107343

Murphy, J., Gretzel, U., & Pesonen, J. (2021). Marketing robot services in hospitality and tourism: The role of anthropomorphism. *Journal of Travel and Tourism Marketing*, *36*(7), 784–795. https://doi.org/10.1080/10548408.2019.1571983

Nakanishi, J., Itadera, S., Aoyama, T., & Hasegawa, Y. (2020). Towards the development of an intuitive teleoperation system for human support robot using a VR device. *Advanced Robotics*, *34*(19), 1239–1253. https://doi.org/10.1080/01691864.2020.1813623

Ng, W., Hao, F., & Zhang, C. (2024). From function to relation: Exploring the dual influences of warmth and competence on generative artificial intelligence services in the hospitality industry. *Journal of Hospitality & Tourism Research*, Vol. ahead of print, No. ahead of print, https://doi.org/10.1177/10963480241292016

Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). McGraw-Hill.

Odekerken-Schröder, G., Mennens, K., Steins, M., & Mahr, D. (2022). The service triad: An empirical study of service robots, customers and frontline employees. *Journal of Service Management*, *33*(2), 246–292. https://doi.org/10.1108/JOSM-10-2020-0372

Palan, S., & Schitter, C. (2018). Prolific.Ac - a subject pool for online experiments. *Journal of Behavioral and Experimental Finance*, *17*, 22–27. https://doi.org/10.1016/j.jbef.2017.12.004

Park, J., & Ha, S. (2016). Co-creation of service recovery: Utilitarian and hedonic value and post-recovery responses. *Journal of Retailing and Consumer Services*, *28*, 310–316. https://doi.org/10.1016/j.jretconser.2015.01.003

Park, J., Yong, H., Ha, S., Lee, J., & Choi, J. (2020). Customer-specific robotic attendant for VR simulators. *IEEE Transactions on Automation Science and Engineering*, *17*(4), 1901–1910. https://doi.org/10.1109/TASE.2020.2980305

Pelau, C., Dabija, D. C., & Ene, I. (2021). What makes an AI device human-like? The role of interaction quality, empathy and perceived psychological anthropomorphic characteristics in the acceptance of artificial intelligence in the service industry. *Computers in Human Behavior*, *122*, 106855. https://doi.org/10.1016/j.chb.2021.106855

Pizam, A., Ozturk, A. B., Balderas-Cejudo, A., Buhalis, D., Fuchs, G., Hara, T., Meira, J., Revilla, M. R. G., Sethi, D., Shen, Y., & State, O. (2022). Factors affecting hotel managers' intentions to adopt robotic technologies: A global study. *International Journal of Hospitality Management*, *102*, 103139. https://doi.org/10.1016/j.ijhm.2022.103139

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *88*(5), 78–91. https://doi.org/10.1037/0021-9010.88.5.879

Ponsignon, F., Jaud, D. A., Durrieu, F., & Lunardo, R. (2024). The ability of experience design characteristics to elicit epistemic value, hedonic value, and visitor satisfaction in a wine museum. *International Journal of Contemporary Hospitality Management*, *36*(8), 2582–2600. https://doi.org/10.1108/IJCHM-07-2023-1081

Prentice, C., & Nguyen, M. (2021). Robotic service quality – scale development and validation. *Journal of Retailing and Consumer Services*, *62*, 102661. https://doi.org/10.1016/j.jretconser.2021.102661

Qian, Y., & Wan, X. (2024). Influence of robot anthropomorphism on consumer attitudes toward restaurants and service providers. *International Journal of Hospitality Management*, *123*, 103939. https://doi.org/10.1016/j.ijhm.2024.103939

Qiu, H., Li, M., Shu, B., & Bai, B. (2020). Enhancing hospitality experience with service robots: The mediating role of rapport building. *Journal of Hospitality Marketing and Management*, *29*(3), 247–268. https://doi.org/10.1080/19368623.2019.1645073

Reis, J., Melão, N., Salvadorinho, J., Soares, B., & Rosete, A. (2020). Service robots in the hospitality industry: The case of Henn-na hotel, Japan. *Technology in Society*, *63*, 101423. https://doi.org/10.1016/j.techsoc.2020.101423

Richardson, H. A., Simmering, M. J., & Sturman, M. C. (2009). A tale of three perspectives examining post hoc statistical techniques for detection and correction of common method variance. *Organizational Research Methods*, *12*(4), 762–800. https://doi.org/10.1177/1094428109332834

Riegger, A. S., Klein, J. F., Merfeld, K., & Henkel, S. (2021). Technology-enabled personalization in retail stores: Understanding drivers and barriers. *Journal of Business Research*, *123*, 140–155. https://doi.org/10.1016/j.jbusres.2020.09.039

Roberts, M. (2024, June 25). Faces made of living skin make robots smile. *BBC News*. https://www.bbc.co.uk/news/articles/cedd3208veyo

Said, N., Ben Mansour, K., Bahri-Ammari, N., Yousaf, A., & Mishra, A. (2023). Customer acceptance of humanoid service robots in hotels: Moderating effects of service voluntariness and culture. *International Journal of Contemporary Hospitality Management*, *36*(6), 1844–1867. https://doi.org/10.1108/IJCHM-12-2022-1523

Sánchez-Fernández, R., & Iniesta-Bonillo, M. Á. (2007). The concept of perceived value: A systematic review of the research. *Marketing Theory*, *7*(4), 427–451. https://doi.org/10.1177/1470593107083165

Sarfi, T., Nosrati, S., & Sabzali, M. (2021). The new celebrity economy in cyberspace. *Journal of Cyberspace Studies*, *5*(2), 203–228.

Seyitoğlu, F. (2021). Automation vs authenticity in services. *ROBONOMICS: The Journal of the Automated Economy*, *2*, 1–8. https://journal.robonomics.science/index.php/rj/article/view/20

Seyitoğlu, F., Fusté-Forné, F., Yiğit, S., & Engin, S. (2024). Robot chefs: The impacts, compatibility and suitability. *British Food Journal*, *127*(1), 307–323. https://doi.org/10.1108/BFJ-07-2024-0705

Seyitoğlu, F., & Ivanov, S. (2022). Understanding the robotic restaurant experience: A multiple case study. *Journal of Tourism Futures*, *8*(1), 55–72. https://doi.org/10.1108/JTF-04-2020-0070

Shah, T. R., Kautish, P., & Mehmood, K. (2023). Influence of robots service quality on customers' acceptance in restaurants. *Asia Pacific Journal of Marketing & Logistics*, *35*(12), 3117–3137. https://doi.org/10.1108/APJML-09-2022-0780

Sheth, J. N., Newman, B. I., & Gross, B. L. (1991). Why we buy what we buy: A theory of consumption values. *Journal of Business Research*, *22*(2), 159–170. https://doi.org/10.1016/0148-2963(91)90050-8

Song, B., Zhang, M., & Wu, P. (2022). Driven by technology or sociality? Use intention of service robots in hospitality from the human-robot interaction perspective. *International Journal of Hospitality Management*, *106*, 103278. https://doi.org/10.1016/j.ijhm.2022.103278

Song, H., Wang, Y. C., Yang, H., & Ma, E. (2022). Robotic employees vs. human employees: Customers' perceived authenticity at casual dining restaurants. *International Journal of Hospitality Management*, *106*, 103301. https://doi.org/10.1016/j.ijhm.2022.103301

Song, H., Yang, H., & Sthapit, E. (2023). Robotic service quality, authenticity, and revisit intention to restaurants in China: Extending cognitive appraisal theory. *International Journal of Contemporary Hospitality Management*, *37*(5), 1497–1515. https://doi.org/10.1108/IJCHM-11-2022-1396

Song, J., Gao, Y., Huang, Y., & Chen, L. (2023). Being friendly and competent: Service robots' proactive behavior facilitates customer value co-creation. *Technological Forecasting & Social Change*, *196*, 122861. https://doi.org/10.1016/j.techfore.2023.122861

Song, X., Li, Y., Leung, X. Y., & Mei, D. (2024). Service robots and hotel guests' perceptions: Anthropomorphism and stereotypes. *Tourism Review*, *79*(2), 505–522. https://doi.org/10.1108/TR-04-2023-0265

Tofangchi, S., Hanelt, A., Marz, D., & Kolbe, L. (2021). Handling the efficiency-personalization trade-off in service robotics: A machine-learning approach. *Journal of Management Information*, *38*(1), 246–276. https://doi.org/10.1080/07421222.2021.1870391

Tung, V. W. S., & Au, N. (2018). Exploring customer experiences with robotics in hospitality. *International Journal of Contemporary Hospitality Management*, *30*(7), 2680–2697. https://doi.org/10.1108/IJCHM-06-2017-0322

Ullah, I., Ali, F., Khan, H., Khan, F., & Bai, X. (2024). Ubiquitous computation in internet of vehicles for human-centric transport systems. *Computers in Human Behavior*, *161*, 108394. https://doi.org/10.1016/j.chb.2024.108394

Van Doorn, J., Mende, M., Noble, S. M., Hulland, J., Ostrom, A. L., Grewal, D., & Petersen, J. A. (2017). Domo arigato Mr. Roboto: Emergence of automated social presence in organizational frontlines and customers' service experiences. *Journal of Service Research*, *20*(1), 43–58. https://doi.org/10.1177/1094670516679272

Wang, J., & Fu, X. (2024). Unveiling the human-robot encounter: Guests' perspectives on smart hotel experience. *Journal of Hospitality & Tourism Technology*, *15*(5), 701–716. https://doi.org/10.1108/JHTT-01-2024-0006

Wu, J. J., Chang, S. T., Lin, Y. P., & Lin, T. M. Y. (2024). Examining how coolness of service robots influences customers' delight: Mediating role of perceived values. *Journal of Hospitality and Tourism Insights*, *7*(5), 2624–2642. https://doi.org/10.1108/JHTI-02-2023-0069

Wu, L., Fan, A., Yang, Y., & He, Z. (2021). Robotic involvement in the service encounter: A value-centric experience framework and empirical validation. *Journal of Service Management*, *32*(5), 783–812. https://doi.org/10.1108/JOSM-12-2020-0448

Wu, M., Tan, G. W. H., Aw, E. C., & Ooi, K. B. (2023). Unlocking my heart: Fostering hotel brand love with service robots. *Journal of Hospitality & Tourism Management*, *57*, 339–348. https://doi.org/10.1016/j.jhtm.2023.10.014

Wu, S. H. (2024). Deep affection: Service robots increase brand love of restaurants. *British Food Journal*, *127*(1), 129–147. https://doi.org/10.1108/BFJ-06-2024-0631

Xiao, L., & Kumar, V. (2021). Robotics for customer service: A useful complement or an ultimate substitute? *Journal of Service Research*, *24*(1), 9–29. https://doi.org/10.1177/1094670519878881

Yang, C., & Hu, J. (2022). When do consumers prefer AI-enabled customer service? The interaction effect of brand personality and service provision type on brand attitudes and purchase intentions. *Journal of Brand Management*, *29*(2), 167–189. https://doi.org/10.1057/s41262-021-00261-7

Yang, W., Xie, Y., & Wang, Y. (2025). Does the level of anthropomorphism induce cognitive crafting in human-robot interaction? The role of positive emotions and interaction frequency. *Journal of Hospitality Marketing and Management*, *34*(4), 549–573. https://doi.org/10.1080/19368623.2025.2458602

Zhang, J., Filimonau, V., & Tlemissov, U. (2024). The effect of employee based brand equity on customer experience in multinational chain hotels. *Tourism and Hospitality Research*. https://doi.org/10.1177/14673584241298769

Zhang, X., Balaji, M. S., & Jiang, Y. (2022). Robots at your service: Value facilitation and value co-creation in restaurants. *International Journal of Contemporary Hospitality Management*, *34*(5), 2004–2025. https://doi.org/10.1108/IJCHM-10-2021-1262

Zhu, Y., Li, J., Han, X., Wang, R., Wang, C., & Pu, C. (2024). Embracing the future: Perceived value, technology optimism and VR Tourism behavioral outcomes among generation Z. *International Journal of human-Computer Interaction*, *41*(4), 1–15. https://doi.org/10.1080/10447318.2024.2322203

Zietsman, M. L., Mostert, P., & Svensson, G. (2020). A multidimensional approach to the outcomes of perceived value in business relationships. *European Business Review*, *32*(4), 709–729. https://doi.org/10.1108/EBR-10-2019-0258