

Attitudes Towards the Use of Robots in the Service Sector on Customer Satisfaction, Revisits and Recommendations Within the Perceived Innovativeness Framework ¹

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Abstract

With the rapid advancement of technology, the use of robots in the service sector is becoming increasingly widespread. This study examines how robot usage in the service sector affects customer satisfaction, revisit intention, and recommendations through the lens of perceived innovativeness. Data was collected using a survey method from 380 individuals who had received food and beverage services. The analysis results indicate that perceiving robots as innovative positively influences customer satisfaction.

Furthermore, customers' attitudes toward robots in food and beverage services impact on their intention to recommend and revisit the restaurant. In conclusion, the use of robots in the service sector has the potential to enhance customer experience. To increase customer satisfaction, revisit intention, and positive recommendation behavior, businesses must emphasize the innovative features of robots.

Key words: Perceived Innovativeness, Service Robots, Digital Marketing, Customer Satisfaction, Revisit, Recommendation.

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1. Introduction

In the increasingly technological business world, innovations such as artificial intelligence, cloud computing, blockchain, and robotic technologies have

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begun to reshape sectors and consumer attitudes. These innovations are particularly prominent in the service sector, especially in tourism and hospitality. Service robots are now being designed and used to perform tasks traditionally done by humans, which is reshaping the dynamics of service marketing and affecting customer attitudes. The adoption of robots in this sector has sparked significant interest in understanding their effects on customer satisfaction, revisit intentions, and recommendations. Consumers who are open to innovations tend to adapt more easily to them.

The subject of this study is the use of robots in food and beverage services. While the rapid adoption of robots offers a promising way to enhance operational productivity and standardized services, there is a limited understanding of their psychological impact on customer perceptions and behaviors. This study examines how the use of robots in the service sector, within the framework of perceived innovativeness, affects customer attitudes, satisfaction, revisit intentions, and recommendations. It explores the complex interaction between technological novelty and consumer response, providing actionable insights for businesses integrating robots into their processes.

2. Literature Review

Service Robots

In the fields of tourism and gastronomy, service robots have become increasingly common, providing distinct experiences for both businesses and consumers. These autonomous or semi-autonomous machines are designed to perform a wide range of tasks, from customer service and information provision to delivery. In restaurants, they are used for services such as greeting, serving, and collecting empty plates. This shift marks a new era that enhances customer interactions and operational efficiency, offering businesses advantages like more efficient processes, standardized service quality, and cost benefits. For customers, the use of robots is often perceived as innovative and interesting, which can improve their overall experience and lead to increased satisfaction through convenient and efficient service.

The emergence of service robots has initiated a new era in the service sector, altering customer interactions and operational efficiency (Çallı, 2021). Defined as autonomous or semi-autonomous machines, service robots are engineered to execute a wide variety of tasks, from customer service and information provision to inventory management and delivery (Zhong et al., 2020). For example, restaurants in the food and beverage sector now use robots for tasks such as greeting, serving, and collecting empty plates (Zhong et al., 2020). Similarly, self-service kiosks, considered earlier versions of service robots, have a significant impact on businesses by improving speed, information quality, reliability, convenience, and usability (Lee & Oh, 2022).

Although a relatively nascent field, the adoption of service robots is accelerating across various sectors, including tourism, hospitality, retail, healthcare, and banking. Advances in artificial intelligence, machine learning, and robotic technologies are making it increasingly feasible to develop sophisticated robots that can interact with customers in a natural and intuitive manner (Çerkez & Kızıldemir, 2020). Businesses are also motivated to explore the potential of service robots due to factors like reduced labor costs, enhanced service consistency, and increased productivity.

Service robots offer businesses various advantages. These advantages include making processes more efficient, standardizing service quality, reducing costs, and eliminating the need for physical contact. Despite these advantages, robots lack human touch and personalized interactions. Consumers may be skeptical about trusting robots for complex services. Employees may be concerned about job loss. The increasing similarity of robots to humans affects the acceptance of robots (Lu et al., 2020; Meidute-Kavaliauskiene et al., 2021).

Customer perceptions of service robots are complex and multifaceted. The literature suggests that consumers generally perceive service robots as innovative and interesting, and this can improve their experience with the service provided (Kim et al., 2016). Consumers who describe the meals cooked by chef robots as an innovative experience stated that they would want to visit a robotic restaurant (Fust-Forn, 2021). Service robots provide a convenient and efficient service, leading to increased customer satisfaction (Belanche et al., 2020).

However, not all consumers are willing to interact with robots. While some consumers are concerned about privacy and security, others may prefer to interact only with humans. Negative experiences with service robots, such as technical glitches or communication interruptions, can lead to dissatisfaction and damage brand reputation.

Perceived Innovation and Consumer Responses

Perceived innovation is defined as the extent to which consumers recognize and appreciate new technologies or methods in service delivery. In the context of service marketing, innovation is crucial for improving customer experience, differentiating service offerings, and gaining a competitive advantage (Berry et al., 2002). The use of robots in the service sector is an example of such innovations aimed at improving the efficiency, accuracy, and personalization of services.

In the adoption of service robots, the robot's functionality, appearance, and interaction style are important. The literature states that perceived innovativeness positively affects customer satisfaction and behavioral intentions. A study by Kim et al. (2016) concluded that hotel guests who perceived service robots as innovative showed increased satisfaction and stronger intentions to revisit.

Perceived innovation is an important concept in understanding consumer responses to service robots. It refers to consumer evaluations of a robot's innovation, usefulness, and overall value proposition. When consumers perceive a service robot as innovative, they are more likely to exhibit positive attitudes and behaviors toward the service encounter (Lin & Mattila, 2015). Based on this, the first hypothesis of the study is:

H₁: The innovativeness perceived by customers receiving food and beverage services affects their attitudes towards robots.

Customer Satisfaction

Customer satisfaction is a critical determinant of service success. Robots in service delivery can increase satisfaction by providing consistent, high-quality service. The innovation and technological sophistication associated with robots can create a positive impression by increasing perceived service quality (Huang & Rust, 2018). However, the impact of robots on customer satisfaction can vary depending on the context and customer expectations. For example, in high-touch services where human interaction is valued, the presence of robots can negatively impact the personalized experience (Wirtz et al., 2018).

The novelty of interacting with a robot can create a memorable and enjoyable experience. According to Parasuraman, Zeithaml, and Berry (1988), service quality dimensions such as reliability, responsiveness, and empathy significantly affect customer satisfaction. Robots can excel in these dimensions by providing precise and timely services without fatigue or human error. Based on this, the second hypothesis of the study is:

H₂: The attitude of customers receiving food and beverage services towards robots affects their satisfaction with the restaurant they go to.

Intention to Revisit

Revisit's intention refers to the likelihood that customers will return to the same service provider. The adoption of robots can positively impact revisit intentions by improving the overall service experience. Consumers who perceive the use of robots as innovative and useful are more likely to develop a positive attitude toward the service provider, resulting in higher revisit intentions. The efficiency and innovation of robot-assisted services can create a memorable experience and encourage consumers to revisit the same service provider (Lee & Lambert, 2019).

The effectiveness of robots in driving revisit intentions depends on consumer acceptance and perceived value. When consumers perceive robots as a cost-cutting factor that reduces service quality, revisit intentions may decrease. Therefore, service providers should ensure that robots enhance the service

experience rather than jeopardize it (Kuo et al., 2017). The relationship between service robots and revisit intention is complex and depends on customer expectations. Positive experiences with service robots can generate positive word-of-mouth recommendations and increase the likelihood of a repeat visit. Conversely, negative encounters can deter customers from returning and lead to negative publicity. Additionally, satisfied customers are more likely to recommend the service to others, which creates positive word-of-mouth (van Doorn et al., 2017).

Based on the studies in literature, the third hypothesis of the study is:

H₃: The attitude of customers who receive food and beverage services towards robots affects their intention to revisit the restaurant they go to.

Recommendation Behavior

Recommendation behavior, or word of mouth (WOM), is a powerful driver of customer acquisition and retention. Satisfied consumers are more likely to recommend a service provider to others. The perceived novelty associated with robot use may increase customers' propensity to recommend the service. Positive experiences with robots characterized by efficiency, novelty, and reliability can generate positive words of mouth (WOM) (Meuter et al., 2000).

The novelty of robots may trigger social media sharing as customers tend to share unique and innovative experiences on their social networks (Kim et al., 2011). The type of service robot, the level of human-robot interaction, customer demographics, and cultural factors can all influence customer perceptions and behaviors. For example, studies in the literature indicate that consumers who are familiar with technology and have positive attitudes towards robots are more likely to adopt service robots and experience positive outcomes (Belanche et al., 2020). Again, studies show that younger generations and individuals who are more prone to technology tend to be more open to service robots (Dabholkar et al., 2020). Based on this, the fourth hypothesis of the study is:

H₄: The attitude of customers who receive food and beverage services towards robots affects their intention to recommend the restaurant they go to.

3. Methodology

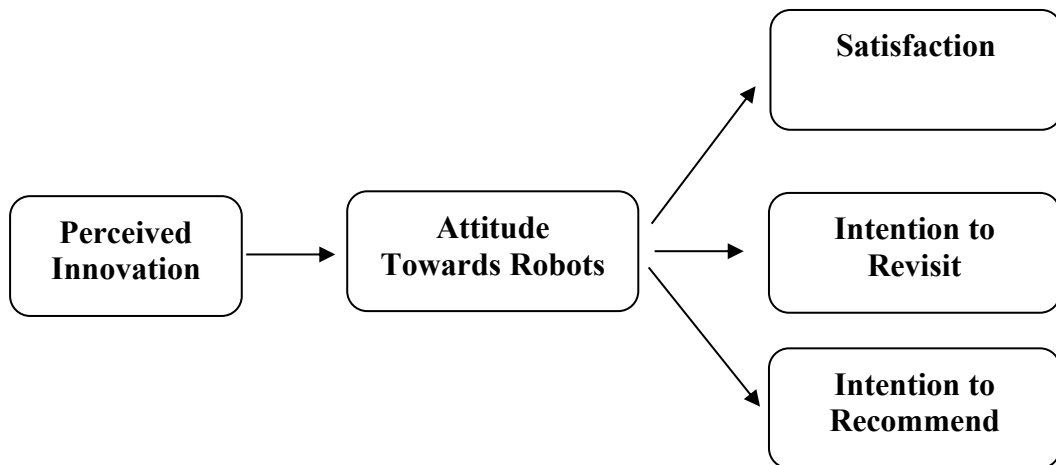
The study utilized a descriptive model, which is a type of quantitative research method. Data was collected via a survey distributed through online channels. The survey was composed of five sections, including demographic questions. The items used in the survey were adapted from the scales of Han and Ryu (2009), Artuğer (2015), Hosany et al. (2015), and Hwang et al. (2020).

A convenience sampling method was chosen for the study. The target population consisted of consumers who received food and beverage services away from home. The survey included 15 Likert-type statements: three for perceived

innovation, three for attitudes toward robot use, three for satisfaction, two for intention to recommend, and four for intention to revisit. Seven demographic questions covering age, education, and gender were also included, for a total of 22 questions on the survey form.

The survey was initially sent to 400 people. After eliminating incomplete and incorrect responses, 380 usable surveys were evaluated for analysis. The data was analyzed using a statistical software package.

Figure 1. Research Model



4. Findings

Demographic Information

The sample of 380 individuals consisted of 195 females, 178 males, and 7 participants who did not indicate their gender. In terms of marital status, the majority were single (n=234), while 135 were married, and 10 did not specify their status. The age distribution showed that the largest group was between 18 and 25 years old (n=139), followed by those aged 26-35 (n=108), 36-45 (n=88), 46-55 (n=33), and 56 or older (n=12). Regarding educational background, 202 people held a bachelor's degree. The occupational distribution indicated that the majority were students (n=112), with 97 private sector employees and 78 public employees. The largest income group (n=118) reported an income of 45,001 TL and above. Finally, almost half of the participants (168 people) stated that they eat out more than once a week. This demographic information is detailed in Table 1.

Table 1. Demographic Information of Participants

Demographic Information		n	%	Demographic Information		n	%
Gender	Woman	195	46.8	Income (TL)	Under 17.000	104	27.4
	Male	178	51.3		17.000-25.000	68	17.9
	Uncertain	7	1.8		25.001-35.000	42	11.1
Age	18-25	139	36.6	Eating Out	35.001-45.000	48	12.7
	26-35	108	28.4		45.001 and above	118	30.9
	36-45	88	23.2		Once a week	71	8.7
	46-55	33	8.7		More than once a week	168	44.3
	56 and above	12	3.2		Once a month	65	17.2
					More than once a month	63	16.6
Marital Status	Single	234	61.7	Educational Status	Other	13	3.2
	Married	135	35.6		Primary school	7	1.8
	Uncertain	10	2.6		High school	49	12.9
Occupational Status	Unemployed	12	3.2		Associate degree	50	13.2
	Public	78	20.5		Licence	202	53.2
	Private Sector	97	25.5		Postgraduate	72	18.9
	Freelance	35	9.2	Total			
	Retired	12	3.2				
	Student	112	29.5				
	Housewife	13	3.4				
	Other	21	5.5				
						380	100

Reliability and Validity Results

To verify the validity and reliability of the scales, exploratory factor analysis and Cronbach's alpha reliability analysis were performed. The factor loadings, explained variances, and Cronbach's alpha reliability coefficients are presented in Table 2. All factors had a Cronbach's alpha coefficient greater than 0.70, which indicates high reliability. Additionally, the factors for all statements were well above the 0.50 threshold, and the average explained variance values were also above 0.50. These results collectively demonstrate that the study possesses both validity and reliability.

Table 2. Factor Loadings, Explained Variances and Reliability Coefficient Results of the Expressions in the Scale

Factors	Factor Loadings	Cronbach's Alpha	Variance Explained (%)
Perceived Innovation	AY1 - 0.872	0.901	44.78
	AY2 - 0.893		
	AY3 - 0.870		
Attitude Towards Robots	T1 - 0.933	0.944	88.97
	T2 - 0.911		
	T3 - 0.888		

Satisfaction	M1 - 0.966	0.957	92.16
	M2 - 0.962		
	M3 - 0.952		
Intention to Revisit	TZ1 - 0.920	0.932	83.23
	TZ2 - 0.883		
	TZ3 - 0.923		
	TZ4 - 0.923		
Intention to Recommend	TV1 - 0.975	0.947	95.03
	TV2 - 0.975		

Hypothesis Test Results

In line with the model and hypotheses developed within the scope of the research, regression models were created to determine the impact of perceived innovativeness on attitudes toward robots and the impact of attitudes toward robots on satisfaction. Accordingly, the regression analysis results are shown in Table 3.

Table 3. Regression Analysis of Hypothesis Analysis

Dependent Variable	R ² / Adjust ed R ²	Independent Variable	β	Std. Error	t	p	F	p
Attitude Towards Robots	0.290 / 0.288	Constant	0.802	0.189	4.255	0.000	153.723	0.000
		Perceived Innovation	0.570	0.46	12.398	0.000		
Satisfaction	0.610 / 0.609	Constant	0.591	0.102	5.777	0.000	588.819	0.000
		Attitude Towards Robots	0.756	0.031	24.266	0.000		
Intention to Visit Again	0.643 / 0.642	Constant	0.627	0.098	6.417	0,000	675.011	0.000
		Attitude Towards Robots	0.772	0.030	25.981	0,000		
Recommend	0.619 / 0.618	Constant	0.632	0.104	6.063	0.000	610.317	0.000
		Attitude Towards Robots	0.784	0.032	24.705	0.000		

When Table 3 is examined, it is determined that perceived innovativeness is statistically significant in explaining the attitude towards robots. Accordingly, H₁ hypothesis was accepted. It was seen that the model was significant (F=153.723, p=0.000, R²=0.290). According to these results, approximately 29% of the concept of attitude towards robots can be explained by the perceived innovativeness variable.

Also, it is determined that the attitude towards robots is statistically significant in explaining the satisfaction variable. Accordingly, H₂ hypothesis was accepted. It was seen that the model was significant ($F=588.819$, $p=0.000$, $R^2=0.610$). According to these results, approximately 61% of the concept of satisfaction can be explained by the attitude variable towards robots.

According to the regression analysis explaining the effect of attitude towards robots on revisit intention, it is determined that the attitude towards robots is statistically significant in explaining the variable of revisit intention. Accordingly, H₃ hypothesis was accepted. It was seen that the model was significant ($F=675.011$, $p=0.000$, $R^2=0.643$). According to these results, approximately 64% of the concept of satisfaction can be explained by the variable of attitude towards robots.

When regression analysis explaining the effect of attitude towards robots on recommendation variable is examined, it is determined that the attitude towards robots is statistically significant in explaining the variable of recommendation intention. Accordingly, H₄ hypothesis was accepted. It was seen that the model was significant ($F=610.317$, $p=0.000$, $R^2=0.619$). According to these results, approximately 62% of the concept of satisfaction can be explained by the variable of attitude towards robots.

According to the regression analysis results of the research, perceived innovativeness has a positive and significant effect on attitudes towards the use of robots in the service sector. On the other hand, attitudes towards the use of robots in the service sector are related to satisfaction, revisit intention, respectively. and has a positive and significant effect on the intention to recommend. Therefore, according to the findings of the regression analysis conducted to test the hypotheses, all hypotheses of the study were accepted. The regression analysis and hypothesis results are shown in the table below.

5. Conclusion and Evaluation

Technological developments are called disruptive revolutions depending on the structure of the period in which they emerged. Just like the recent innovative service tools that emerged in the service sector. Since the concept of service is structurally abstract and variable, the factors affecting the development of the sector are also quite diverse. Customer satisfaction in the service sector is of critical importance for businesses to sustain their existence. Therefore, in our research, based on the idea of what the possible disruptive changes that the rapidly developing technology will bring to the service sector today may be, we focused on the use of robots, which are expected to increase soon, although there are few examples in the service sector. In the study, the effects of robots on customers' satisfaction (satisfaction levels), their desire to revisit the business and their behaviors of recommending the business to those around them (positive word of mouth) were investigated.

When the analysis results obtained from the data collected within the scope of the research are examined, it is understood that the perception of the use of robots in the service sector as an innovative approach by the participants causes positive attitudes towards service robots to be nourished. This result means that the efforts of the companies that strive to improve themselves and offer innovative service approaches to their customers are appreciated. Continuing the traditional service approach may mean standing still for some, or even going backwards for Generation Z. This result is consistent with the results of other studies that have investigated similar topics in literature (Lin & Mattila, 2015; Kim et al., 2016).

The study also examined how the use of robots in the service sector affects customer satisfaction. As a result of the analysis, it was understood that the use of robots increased customer satisfaction. Similarly, because of the analysis of the data aimed at measuring the intention of customers to revisit the restaurant, it was determined that the use of robots increased the intention of customers to revisit the business using robots. These results may be due to the participants' thinking that the use of robots in restaurants will increase the speed of service, or they may be related to the feeling of discovering and experiencing something different. This situation supports the relevant literature since it is similar to the research results obtained from previous studies in the literature (Merkle, 2019; Wu & Huo, 2023; Seo & Lee, 2021; Lee & Lambert, 2019).

On the other hand, in the analysis of the data collected in the study to measure the positive word-of-mouth marketing behaviors of customers who received service from a robot, in other words, to recommend it to their surroundings, it was determined that the likelihood of customers recommending the restaurant increased. This finding shows that typical positive word-of-mouth behavior motivators come into play at this point. Sharing interesting and different experiences is an effective tool in gaining a social circle. Since the experience of receiving service from a robot is perceived as new and interesting by most customers, it is thought that the likelihood of them recommending the restaurant to their surroundings increases. This result is parallel to the results of other studies investigating a similar subject in the literature (Aydın, 2021; Huang & Liu, 2022; Ho et al., 2020).

The results of this study are of great importance in terms of emphasizing the importance of an innovative approach for businesses in the service sector in general and, more importantly, showing the relationship between making a difference in the service sector and being able to catch technological innovations at an early stage and being a pioneer. Considering the positive effects of robot technologies on customer satisfaction, revisit intention and recommendation behavior, it can be concluded that businesses can gain competitive advantage by investing in these technologies. At the same time, this study constitutes an important resource for academics seeking to better understand the role of service robots in service marketing.

It can be noted that there are many questions that need to be explored for future studies. This situation should be further evaluated by practitioners and academics. Longitudinal studies are needed to investigate the long-term effects of service robots on customer loyalty. The optimal balance between human and robot interaction in various service environments requires further research. Furthermore, cross-cultural studies can shed light on how perceived innovation and cultural factors interact to shape customer responses to service robots. Experimental design methods can be used to investigate the interaction between service robots and humans.

Businesses that intend to utilize robots in the provision of food and beverage or similar services should keep in mind that different variables affect customer satisfaction, and thus, customers' revisit and recommendation intentions will also be affected by this process. The design of the robots that will interact with humans, the tasks they will be used for, and the robots' level of movement and humanization should also be considered.

The most important limitations of the study are time and sample size. Future studies could be conducted with larger samples and with the addition of different variables. Another limitation of the study is the use of a convenience sampling method to obtain the sample. Future studies could use non-convenience sampling methods instead of convenience sampling.

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