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Augmenting Consumer Acceptance of Robot-Assisted Technologies in Retail Industry: An Interdisciplinary Approach

Khalufi Nasser Ali M.*

Abstract

Since they have been incorporated into retail, robots have been discussed more frequently in academic publications and public debate. Customers in retail sector, as well as workers will be resistant to the rising employment of robots as their capabilities increase and they are employed to supplement or replace human labour. "Interdisciplinary" denotes a technique that amalgamates knowledge and methodologies from several academic or professional domains to attain a thorough comprehension of a particular subject or matter. As robots and AI become more common in society, this study examines the pub†lic's attitudes towards their use in retail. Consumer perceptions of retail robots are examined using consumer psychology and technology attitudes literature. To fill the research gap, 393 retailers' responses on service robot deployment in retail contexts are analyzed, with an emphasis on the East region. Service robot attitudes vary based on aspects such as robot benefits, social skills, and technology attitudes. Cluster analysis divides respondents into "high techies" and "high touches," depending on their service robot acceptance. The regression study clarifies how numerous factors affect retail robot-assisted service perceptions. Retailers and policymakers can learn from the survey that consumer opinion is significant for the future integration of robots in retail.

Keywords: robots-experience, repot-tich, customer-service, retail-technologies.

I. INTRODUCTION

The robot era has come to pass. Robotics are becoming pervasive in our daily lives and economic environments. In his 1920 play R.U.R. (Rossum's Universal Robots), Karel apek established the idea of the robot (Suhluli et al., 2022). Although the robots that ‡Apek envisioned were innovative, it is remarkable how swiftly their capabilities have advanced in less than a century. Although the term "robot" has been used for almost a century to describe the idea that many of us understand as a mechanical device powered by a computer, robots have evolved to become smarter and more pervasive in recent years, posing a serious threat to economic and social stability in the not-too-distant future.

The robot has played a disruptive and intriguing role in the economic landscape from the beginning and will do so going forward. Self-driving cars are currently in an advanced stage of development before becoming commonplace fixtures on our highways, and robots are replacing many human jobs. The advent of the self-driving truck will have a significant influence on workers in the industrial sector. For instance, according to 2014 data from the USA, "truck driver" was the most popular occupation in 29 of the country's 50 states (Suhluli et al., 2022). These employees will almost

* Assistant professor. Department of Management and Marketing, College of Business, Jazan University, 45142 Jazan, Saudi Arabia. E-mail: nkhalufi@jazanu.edu.sa.

immediately lose their jobs as a result of the self-driving truck, which is a robot (Khan & Damanhori, 2017). There should be worries that a computer-controlled self-driving truck may abruptly replace one of the few employment categories that allows people with only a high school degree to live in the middle class.

Self-driving cars and speech recognition technology, for example, have the potential to disrupt the corporate world and spur innovation significantly (Brynjolfsson et al., 2014; Ivanov, 2017; and LaGrandeur & Hughes 2017). Although there is a history of machines taking the place of human labour (coin-operated vending machines found in public places perform the duties of a hospitality worker, and ATMs have largely replaced the human labour of the bank teller), these minor mechanical advancements will be nothing compared to what is about to happen. Although it is unknown what the economic externalities and social and market repercussions of the adoption of such technologies into the economy will be, the next generation of technologies that are just around the corner should offer fantastic leaps in terms of technological advancement and economic efficiency.

1.1. Research Problem

Increasing robot and AI use in retail is a major social change that affects customers and industry stakeholders. Robotics may increase efficiency and customer service, but public opinion is mixed. To navigate this changing environment, retailers and governments must understand consumer impressions of robot-assisted service in retail. Asian retail research is scarce despite the wealth of consumer psychology and technology acceptance studies. Several studies overlook the relationship between consumers' technology perceptions and service robot attitudes. Thus, public opinions about robot integration in retail should be examined, including perceived benefits, robot social skills, and demographic characteristics. By filling these gaps, the present research aims to help retailers and policymakers make strategic robotics adoption and implementation decisions.

In this paper, we examine public opinions toward the adoption of robots and artificial intelligence in the retail sector. Given that we are aware of the onslaught of cutting-edge technologies entering the market, we should be mindful of the resistance that customers may show when these technologies are implemented and displace a significant amount of human labour. They might, however, be open to some technology. In this article, we use a poll of 393 respondents to look into how retailers feel about the deployment of service robots in the retail sector. Other geographical areas, including Eastern Europe, Latin America, Africa, and the Middle East, are disregarded in research on service robots, which often concentrates on developed economies (e.g., the United States, Western Europe, Japan, and South Korea). By examining the views of service robots in Asia, this research attempts to fill up some of this vacuum.

The section that follows reviews the literature on robot uses and how people see their usefulness in the retail sector. Then, we move on to the research techniques and data analysis from the 393-consumer survey. Finally, we conclude by outlining what the data and research have revealed about how consumers feel about the integration of robotics and artificial intelligence into the retail industry.

II. LITERATURE REVIEW

When it comes to comprehending and interpreting the problem of introducing cutting-edge technology like robotics and artificial intelligence into the retail sector, there are many different factors to take into account. To examine how academic literature has addressed the robot assistant and consumer thought in the retail setting, we start by

reading some of the pertinent consumer psychology literature. The general academic literature on how consumers interact with robots and artificial intelligence is where we look next. The scholarly literature recommends taking into account independent variables for the study of 393 respondents and their opinions on the application of robotics and artificial technology in the retail industry.

One of the key topics is retail consumer behaviour and social psychology. According to Ajzen and Fishbein (2005), attitudes are feelings of favorability or favorability towards a specific attitude, object, or behaviour. People are exposed to an issue over time or by receiving indirect information from others, according to certain definitions of attitude as a set of individual ideas on a subject that is based on a person's judgment of that subject and its mental data (Ajzen, 2001). Numerous definitions of these attitudes have been given and repeatedly analyzed by researchers. One of the first definitions of attitude emphasizes how crucial the psychological aspect of the human being is when creating an individual's attitude of assessment (Eagly & Chaiken, 1993). In any case, there are a variety of ways that consumer attitudes can be shaped or influenced in the minds of retailers, and there is a wealth of literature that explores these various influences on consumer attitudes (see, for instance, Fulk, 1993; Glasman & Albarracin, 2006; Kabadayi & Gupta, 2011; and Lorenzo-Romero et al., 2011). It appears that appraisal is regarded as a key component in the majority of attitude definitions. It appears that appraisal is regarded as a key component in the majority of attitude definitions. In actuality, evaluation is what is formed before attitude, and attitude plus evaluation can then form multiple modes. Although attitudes do need time to build, if evaluation and attitudes are not tightly associated, if one's assessment and attitude are closely related, then a significant amount of time is not required for their formation.

There is a large body of research relating behaviour and attitudes in the field of retail studies (see, for instance, Bamberg et al., 2003; Bamberg, 2006; Kroesen et al., 2017; and Kroesen & Chorus, 2018). The majority of studies have found that not only is it challenging to quantify attitudes and how they relate to certain behaviours, but there may be little of a relationship between behaviours and attitudes. It's particularly intriguing since empirical research suggests there is a stronger relationship between consumer conduct and attitudes than between attitudes and behaviour (Kroesen et al., 2017). indicating that attitudes and actions are influenced differently, with behaviour having a stronger influence. This suggests that attitudes follow behaviours and that attitudes are more likely to be influenced by exposure to a retailing concept than they are to be utilized as a predictor of behaviours or decisions.

People are not embracing technology and do not have the same attitude towards it that affects the way people work, even though technology has made people's lives easier (Singh, 2014). Organizations must be more inventive and productive regardless of the shift, whether it is favourable or bad, to maintain their market share (Singh, 2014). Technology will increasingly be commonplace in numerous locations due to the retail sector's increased usage of technology (Bilgihan et al., 2010).

Advanced technologies like robotics and AI are changing how customers interact and service delivery in retail. To improve customer experiences and operational efficiency, merchants must understand consumer perceptions regarding these technological advances. The present study explores a literature review from diverse domains in the context of humanoid robots to evaluate the customer experience. Using the social psychology-based approach, the study illustrates the adoption of technology by consumers, emphasizing sociocultural norms, norms, and peer judgments in the rsobot-assisted retail store. (Cialdini & Goldstein, 2004; Schultz et al., 2007). Researchers can

determine the socio-psychological elements that affect robot-assisted service acceptability by studying how people perceive and respond to technology's social cues and norms.

Consumers' perceptions of service robots' usefulness and simplicity of use can be examined using Davis's (1989) Technology Acceptance Model (TAM). TAM offers insights into retail consumers' intent to adopt robot-assisted services by analyzing perceived utility, perceived ease of use, and attitudes toward technology adoption. According to Venkatesh and Davis (2000), TAM can anticipate customer acceptance of technological advancements like service robots.

Cultures adapt technology differently, emphasizing the necessity for cross-cultural study to determine consumer views regarding retail robot integration. Hofstede's cultural dimensions theory (2001) emphasizes individuality vs. collectivism and uncertainty avoidance to explain cultural differences in technology adoption. Businesses in varied cultures can learn from studies on how culture affects consumer impressions of robot-assisted service (Marcus & Gould, 2000).

Research on robot emotional intelligence and ethical issues, including data privacy and algorithmic bias, clarifies consumer views and concerns about retail robot-assisted service. To improve consumer experiences, Picard et al. (2004) emphasize emotional intelligence in robotic interactions and affective computing. Studying data privacy and algorithmic bias illuminates customer concerns about the ethical consequences of AI-driven retail systems (Mittelstadt et al., 2016; Liao et al., 2020).

These varied perspectives expand the literature by offering a holistic understanding of consumer attitudes toward new retail robotics. Through social psychology, technology acceptance research, cross-cultural studies, and ethics, businesses can better understand consumer perceptions and preferences for robot-assisted service. Based on this insight, retailers may build and deploy technology-driven solutions that satisfy the demands and expectations of their broad customer base while resolving ethical concerns and guaranteeing consumer confidence and approval.

2.1. Theoretical Framework of Study

The study's framework is based on the Acceptance Model (TAM), which Davis developed in 1989. The TAM forecasts the acceptance and application of information technologies in diverse domains. In the current study, the TAM is used for Robot-Assisted Retail Stores robots (Cialdini & Goldstein, 2004; Schultz et al., 2007). The model is comprised of the essential assumption that behavioral intention is derived from factors including perceived ease of use and perceived usefulness. Perceived usefulness is defined as the level of a person's belief that utilizing a specific method would improve his or her current situation. The degree to which the customer perceives ease of use is described as how easy the adoption and its use are. According to Marcus and Gould (2000) and Hofstede (2001), cultural differences in technology adoption. Cross-cultural studies are needed to determine consumer attitudes regarding retail robot integration.

The study also highlighted that emotional intelligence in robots and ethical issues like data privacy and algorithmic bias help to embrace consumer perceptions and concerns about retail robot-assisted service. Therefore, the current literature holistically understands customer sentiments toward retail robotics' changing scenario, adding significance to the contribution in this domain. Hence, the study examines consumer perceptions and preferences in using social influence, perceived usefulness, perceived ease of use, cultural norms, robot emotional intelligence, and ethical issues. This theoretical framework helps retailers understand consumer behavior and decide whether to use robotics and AI in retail.

III. RESEARCH METHODOLOGY

The present study employed a mixed approach to retail robotics and AI to assess customer perception. The study targeted 500 respondents to collect data, but only 393 completely and unbiased responses were considered for the data analysis. Semi-structured interviews were formulated with the participants to collect qualitative data. The study used convenience sampling, with a sample of 18-year-olds participating in the interviews. The sample was diverse in age, gender, education, and retail experience to ensure representation. All of the items were developed in English so that they would be suitable for the people who participated in the survey. The questionnaire measured their robotic retail agreement on a five-point Likert scale. The scale measured service robot usefulness, convenience, and emotional responses. An online Google forms poll will emphasize the key aspects to qualify hypothesis testing. Measurement will use a Likert scale from "strongly disagree" to "strongly agree" (Joshi et al., 2015).

To examine consumer perceptions towards service robots in retail stores, variables from previous have been chosen and adapted. Emotional engagement, adapted from Ha et al. (2020), includes empathy and response to help service robots engage with consumers. Emotional or affective robots can engage with people more naturally, intuitively, and empathetically. Trustworthiness evaluates service robots' accuracy and consistency in meeting consumer expectations, adapted from Christoforakos et al. (2021). Robot adaptability can refer to robots that can learn from their environment and communicate with people (Romero-Garces et al., 2023). Data ethics refers to the set of principles and considerations surrounding the morally sound gathering, retention, and utilization of personal data by humanoid robots (Page et al., 2018). Data ethics ensures fair and beneficial use of data through collection, sharing, and utilization. These human robots can offer customer satisfaction that extends from comfort, perceived value, and value to usability (Frijns et al., 2023). Hence, these variables laid the foundation for the study's framework.

Semi-structured interviews were collected to guarantee the inculcation of diverse groups in the data collection process. In the interview, the insights from the participant's motives, concerns, and experiences were examined thoroughly. Data analysis was done using mean scores, standard deviations, and inferential tests like Mann-Whitney U-tests and Kruskal-Wallis tests, which were used to analyze respondents' service robot attitudes across demographic characteristics. Transcription and thematic analysis of qualitative interview data revealed patterns, themes, and narratives on robot-assisted service perspectives. Iterative coding and classification identified themes, using inter-coder dependability to assure data interpretation rigor and consistency.

Table 1
Sample Characteristics

Characteristic		Number of Respondents	Percent
Gender	Male	206	52.4
	Female	187	47.6
Education	Bachelor	141	35.9
	Master	12	3.1
	PhD	39	9.9
Age	18-30	272	69.2
	Over 30	121	30.8

To be continued Table 1.

Characteristic		Number of Respondents	Percent
	0	30	7.6
	1-5	242	61.6
Retailing	6-10	95	24.2
Experience	11-15	12	3.1
	16-20	3	0.8
	21+	11	2.8
Total		**393**	**100.0**

English was the first language used to design the questionnaire. There were multiple blocks of questions in it. The respondents were asked in the first block about their opinions of the (possible) use of robots generally and in the retail industry specifically. The acceptability of various tasks that robots could carry out in the retail sector was the subject of the second block's evaluation of respondents' views. The next group of questions centered on respondents' preferences for the robot's look (machine-like vs. human-like). The fourth block assessed attitudes towards robots by measuring levels of agreement (5-point Likert scale) with various statements relating to the benefits and drawbacks of using robots as service employees and the user experience they produce while interacting with humans. Data on respondents' demographic traits were gathered in the final block. Data analysis techniques included exploratory factor analysis, cluster analysis, and hypothesis testing. The distribution of respondents' replies deviated statistically from normal, as shown by the Kolmogorov-Smirnov z-test. To test the validity of the hypothesis, the non-parametric Mann-Whitney U-test and Kruskal-Wallis 2-test were employed.

Findings

Tables 2 - 6 present the research findings.

Table 2

Attitudes Towards the (Potential) Use of Robots in Hotels

Attitudes towards the (potential) use of robots in hotels	Mean	Std. Dev.	Mann-Whitney U-test			Kruskal-Wallis χ2-test		
			Gender	Age	Cluster	Retail Experience	Attitudes Towards Service Robots	Education
Personal attitude towards service robots in general)	3.52	1.072	16,592**	14,221.5**	8,428***	4.773	x	9.001
Personal attitude towards being served by robots in a retail a)	3.50	1.195	18,426.5	14,802.5	9,127.5***	5.232	137.408***	5.228
Robots will be faster than human employees d)	3.42	1.188	17,937	15,806	6,135***	7.793	62.391***	1.449
Robots will deal with calculations better than human employees d)	3.73	1.145	17,309	15,766.5	6,748***	6.449	70.969***	4.791
Robots will provide more accurate information than human employees d)	3.54	1.210	17,150.5	14,476**	6,199***	3.946	47.215***	2.118

To be continued Table 2.

Attitudes towards the (potential) use of robots in hotels	Mean	Std. Dev.	Mann-Whitney U-test			Kruskal-Wallis χ2-test		
			Gender	Age	Cluster	Retail Experience	Attitudes Towards Service Robots	Education
Robots will be able to provide information in more languages than human employees d)	3.82	1.192	15,811***	15,359	6,439***	16.604***	60.101***	7.641
Robots will be friendlier than human em-ployees d)	2.45	1.334	18,623	15,924	13,826***	13.814**	12.249**	13.312***
Robots will be more polite than human employees d)	3.22	1.317	19,020	16,337.5	7,461***	3.252	40.534***	2.819
Robots will be able to understand a guest's level of satisfaction d)	2.82	1.202	18,815.5	14,727	13,693***	15.721***	11.617**	9.519**
Robots consume too much electricity e)	2.67	0.988	18,312.5	16,112	13,492.5***	4.528	22.239***	3.111
Robots can malfunction during service e)	2.34	1.018	17,094.5**	15,562	12,914.5***	7.948	16.008***	2.740
Robots can misunderstand a question/order e)	2.30	0.978	17,414.5	16,158	11,707.5***	6.213	20.091***	6.980
Robots can't do special requests/ they work only in a programmed frame e)	1.96	1.052	17,457	14,866.5	10,335***	8.572	44.711***	17.483***
Being served by robots will be a memorable experience d)	3.59	1.170	17,800	14,078**	3,549***	23.913***	65.562***	2.715
Being served by robots will be a pleasu-rable experience)	3.45	1.180	17,824.5	13,928**	3,971.5***	14.305**	67.566***	0.611
Being served by robots will be an exciting experience)	3.51	1.206	17,194.5	13,558.5***	3,491***	18.809***	69.962***	2.464
Preferences towards the appearance of the robots b)	2.81	1.259	18,849.5	16,119.5	16,467**	6.834	3.866	6.458
Preferences towards the human employees-robots ratio in a hotel c)	3.76	1.026	16,545**	15,340	16,024.5**	8.451	7.363	14.951***

Notes: 1. Coding: a) 1-completely negative, 5-completely positive; b) 1-Strongly prefer machine-like appearance of the robots, 5 strongly prefer human-like appearance of the robots; c) 1-I prefer to be served only by robots, 5-I prefer to be served only by human employees; d) 1-completely disagree, 5-completely agree; e) reverse coding: 1-completely agree, 5-completely disagree; 2. Levels of significance: *** $p<0.01$, ** $p<0.05$.

Table 3
Clusters Characteristics

Characteristic		Cluster 1 (The high techies)		Cluster 2 (The high-touches)		Pearson χ2-test
		Number of Respondents	Per-cent	Number of respondents	Per-cent	
Gender	Male	115	49.8%	91	56.2%	1.559
	Female	116	50.2%	71	43.8%	
Education	Diploma	83	35.9%	75	46.3%	10.177**
	Associate degree	21	9.1%	22	13.6%	
	Bachelor	92	39.8%	49	30.2%	
	Master	10	4.3%	2	1.2%	
	PhD	25	10.8%	14	8.6%	
Age	18-30	150	64.9%	122	75.3%	4.809**
	Over 30	81	35.1%	40	24.7%	
Retail experience spent in a retail storelast 12 months)	0	22	9.5%	8	4.9%	13.772**
	1-5	128	55.4%	114	70.4%	
	6-10	68	29.4%	27	16.7%	
	11-15	6	2.6%	6	3.7%	
	16-20	2	0.9%	1	0.6%	
	21+	5	2.2%	6	3.7%	
Total		**231**		**162**		

Note: levels of significance ** $p<0.05$

According to Table 2's findings, respondents are open to service robots (m= 3.52) and their entry into the retail industry (m= 3.50). They also concur that robots will be able to deliver information in more languages (m= 3.82), handle calculations better (m= 3.73), and provide more accurate information (m= 3.54) than human employees. Robots, on the other hand, can only function within the confines of a predetermined framework (m= 1.96), they can misinterpret commands and questions (m= 2.30), and they have the potential to break down while providing a service (m= 2.34). The vast majority of respondents are certain that receiving service from a robot would be a memorable (m= 3.59), thrilling (m= 3.51), and enjoyable (m= 3.45) experience for them. However, respondents clearly preferred more human personnel than robots in the hotel (m= 3.76). Clearly, respondents favour more robotic-looking humanoids over humanoids in terms of appearance (m= 2.81).

Results indicate that women would accept a higher percentage of robots in the hotel than men would ($p<0.05$), and women are generally slightly more favourable towards robots. In comparison to older respondents, younger respondents (those under 30) showed a less favourable attitude towards robots ($p<0.05$). They were less certain that their interactions with robots would be enjoyable, exciting, or memorable ($p<0.05$), respectively. Respondents with less education had higher expectations for robot friendliness ($p<0.01$) and were more positive about their capacity to operate outside of the parameters of their programming ($p<0.01$). In comparison to travellers who had stayed in hotels more frequently, respondents with less extensive travel experiences had significantly higher expectations about memorability ($p<0.01$), enjoyment ($p<0.05$), and excitement ($p<0.01$) of their engagement with robots. The results also demonstrate that there is a significant halo effect, with respondents who have more favourable attitudes towards service robots in general also having more favourable attitudes towards service robots in hotels specifically, having higher expectations for the interactions between humans and robots, and being more forgiving of the technical shortcomings of robots (all but one p-values are significant at 0.01).

The cluster analysis of the attitudinal statements yielded two unique clusters, the traits of which are shown in Table 3. There are 231 respondents in the first cluster, which is referred to as the "high techies." The group's name comes from their extremely favourable opinions towards "high-tech" service robots in general (m= 3.94) and robots in hotels in particular (m= 3.94). The second cluster, dubbed the "high-touchies," is more wary of service robots in general (m= 2.93) and in hotels in particular (m= 2.87) and prefers high-touch human-delivered care; this is how the group gets its name. The Mann-Whitney U-test results in Table 2 demonstrate that the differences between the two groups' attitudes are significant at $p<0.01$ for both groups.

Table 4
Factor Analysis Results

Factors	Factor Loading	Cronbach's Alpha	Eigen-value	Variance Explained
Factor 1: Robots' advantages		0.860	5.816	41.543%
Robots will provide more accurate information than human employees	0.808			
Robots will be able to provide information in more languages than human employees	0.771			
Robots will deal with calculations better than human employees	0.757			
Robots will be faster than human employees	0.681			
Robots will be more polite than human employees	0.680			
Factor 2: Experience		0.940	1.870	13.358%
Being served by robots will be an exciting experience	0.881			
Being served by robots will be a pleasurable experience	0.865			
Being served by robots will be a memorable experience	0.849			
Factor 3: Robots' disadvantages		0.798	1.247	8.909%
Robots can malfunction during service	0.844			
Robots can misunderstand a question/order	0.838			
Robots consume too much electricity	0.685			
Robots can't do special requests/they work only in a programmed frame	0.665			
Factor 4: Social skills of robots		0.636	1.148	8.203%
Robots will be friendlier than human employees	0.820			
Robots will be able to understand a guest's degree of satisfaction. Total variance explained	0.757			72.012%

Notes: a) Coding: 1-completely disagree, 5-completely agree; b) Extraction method: principal component analysis; c) Rotation method: varimax with Kaiser normalization. Rotation converged in 6 iterations; d) KMO measure of sampling adequacy= 0.865; Bartlett's test of sphericity: χ^2= 3045.517, df= 91, p= 0.000.

Insert Table 5 here.

The attitudinal statements' four factors—"robots' advantages," "experience," "robots' disadvantages," and "social skills of robots"—were determined by factor analysis (Table 4). In sum, the four variables account for 72.012% of the observed variation in respondents' responses. For the first three components, Cronbach's alpha is high (0.860, 0.940, and 0.798). Still, the fourth factor's alpha is just 0.636, which is deemed

acceptable for exploratory research like the one being conducted (Gau et al., 2017, p. 338). According to the regression analysis (Table 5, Model 1), respondents' attitudes on receiving service from robots in retail are positively and statistically significantly impacted by —"robots' advantages," "experience," "robots' disadvantages," and "social skills of robots" (all three p-values are less than 0.01). While 'robots' drawbacks' have a negative impact, as expected ($p<0.05$). However, when we take into account respondents' demographics and attitudes towards service robots generally (Table 5, Model 2), we see that attitudes towards hotel robots are only explained by four variables: "robots' advantages," "experience," "social skills of robots," and "personal attitude towards service robots generally." Robots' disadvantages are not a significant factor. The two models account for 22.4% and 39.1%, respectively, of the dependent variable's variation. There are no difficulties with multicollinearity, according to tolerance and VIF.

Table 5
Regression Analysis Results

Independent Variables	Model 1						Model 2					
	Unstd. Coefficient		Std. Coef.	t	Coll. Statistics		Unstd. Coefficient			t	Coll. Statistics	
	B	Std. Error	Beta		Tolerance	VIF	B	Std. Error	Beta		Tolerance	VIF
(Constant)	3.499	0.053		65.869***			1.479	0.234		6.324***		
Factor 1: Robots' advantages	0.392	0.053	0.328	7.378***	1.000	1.000	0.200	0.051	0.167	3.930***	0.860	1.162
Factor 2: Experience	0.373	0.053	0.312	7.021***	1.000	1.000	0.197	0.051	0.164	3.834***	0.844	1.185
Factor 3: Robots' Disadvantages	-0.117	0.053	-0.098	-2.206**	1.000	1.000	-0.004	0.049	-.003	-0.083	0.941	1.062
Factor 4: Social skills of robots	0.157	0.053	0.131	2.947***	1.000	1.000	0.144	0.049	0.121	2.968***	0.937	1.067
Personal attitude												
Towards service robots in general							0.536	0.052	0.480	10.367***	0.724	1.380
Gender							0.102	0.096	0.043	1.063	0.966	1.035
Age							0.017	0.105	0.007	0.164	0.950	1.052
Education							0.018	0.039	0.019	0.464	0.887	1.127
Retail experience							0.006	0.011	0.021	0.513	0.926	1.080
Model summary characteristics												
R	0.482						0.637					
R^2	0.232						0.405					
Adjusted R^2	0.224						0.391					
Standard error of the estimate	1.053						0.933					
Df	4						9					
N	393						393					
F	29.319***						28.982***					

Notes: Dependent variable: personal attitude towards being served by robots in a hotel. ***significant at 1% level; **significant at 5% level.

IV. RESULTS AND DISCUSSIONS

The regression analysis in Model 1 shows that service robot attitudes are positively influenced by robot advantages and experience, with standardized coefficients of 0.328 and 0.312. These findings show that consumers who believe in robots and have used them are more inclined to enjoy service robots. A significant negative beta coefficient (-

0.098) indicates that robot drawbacks may limit acceptance. The social skills of robots also improve attitudes, albeit less (beta= 0.131). Overall, the model explains 23.2% of service robot opinions (R^2= 0.232), suggesting that additional factors may potentially influence consumer sentiments. F-statistic (29.319***) validates model fit, underscoring the importance of these factors in understanding consumer views of service robots.

Based on Model 2, numerous factors greatly impact consumer sentiments regarding service robots. Unstandard coefficients and t-values show that certain factors affect attitudes. In particular, the component with a standardized beta coefficient of 0.480 and a t-value of 10.367*** strongly influences customer opinions. Consumer attitudes are likewise positively affected by factors with substantial beta values of 0.167, 0.164, and 0.121, although less so. Multicollinearity is not a problem in this model because tolerance values are close to 1, and VIF values are below 2. This implies that the predictors are independent, revealing how each component affects customer opinions. In Model 2, particular predictors are reinforced, and multicollinearity is eliminated, supporting the robustness of the findings.

V. CONCLUSION

Unexpectedly, women had a marginally higher favourable opinion towards service robots. Even though the majority of earlier studies found that men are typically more open to technological advancements (Katz & Halpern, 2014; Pochwatko et al., 2015; Piçarra, 2016; Hudson et al., 2017; and Ivanov et al., 2018), the results of this study broadly concur with Dinet and Vivian's (2014) findings. Except for Dinet and Vivian's (2014) findings, our data cannot definitively explain why this consumer sample appears to be an oddity. Still, we can speculate that consumers' societal mores may be a contributing factor. The results may, however, be replicated elsewhere if equivalent measurements are used in more research of this type. As robots increasingly permeate our daily lives, female resistance to them may diminish over time; this may point to a secular trend of female acceptance of robots. Another surprising finding was that respondents under the age of 30 were slightly less trusting of robots than those over the age of 30. Additionally, this goes against the findings of multiple earlier research studies that demonstrate how tech-savvy and open younger generations are to innovation.

The results of this study show that the advantages of robots are a more significant influence on respondents' opinions than the downsides of robots. This is fairly intriguing because it shows that respondents focused on robots' strengths while largely ignoring their flaws. Additionally, the results were in line with findings from earlier studies showing that overall attitudes towards robots positively influence attitudes towards using robots for certain reasons (Malchus et al., 2013). It appears that a person is more likely to accept the usage of robots for particular/specific services if they have an overall favourable attitude towards robots and artificial intelligence. According to earlier research that is most comparable to this research (Ivanov et al., 2018), we can observe the resemblance in the findings in that generalized attitudes towards robots seem to work as an attitude to enable people to accept the deployment of robots in the retail industry. Therefore, it appears that in this regard, the empirical data provide evidence that among the consumers surveyed, there is evidence that positive attitudes towards robots in general are associated with positive attitudes towards robots in the retail sector. Although it may seem intuitively evident, actual evidence indicates that there is good reason to believe that the general positively influences views about deploying robots and artificial intelligence in the workplace.

By examining customer attitudes about the prospective use of robots in the retail industry, this research adds to the body of knowledge on the adoption of robots. The results show that consumers have mixed attitudes towards using robots to assist them in retail, and these attitudes are primarily influenced by how they view the benefits of robots, how socially adept they are, what they anticipate from interactions between humans and robots, and how respondents feel about service robots in general. Despite some statistically significant differences in respondents' responses, gender, age, retailing experience, and education are not major indicators of opinions. The findings also revealed which tasks, such as cleaning, moving objects, providing information, taking customer orders, and processing payments, put people in a dominant position in their interactions with robots and are most commonly accepted by consumers. In contrast, tasks that call for people to follow a robot's commands, subject their bodies to a robot, or functions that give people the wrong impression of robots were identified. Finally, the results divided respondents into two categories based on how they felt about service robots, which were dubbed the high-techies and the high-touches.

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