IS IMPORTANT THE LOSS OF HUMAN CONTACT IN THE ACCEPTANCE OF SOCIAL ROBOTS BY RETAIL CUSTOMERS?

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EXTENDED ABSTRACT

In recent years, there have been great advances in different disciplines such as computing and mechanics that have enabled the development of robots to perform multiple tasks, both industrial tasks and other tasks such as interation with people in numeous environments (health, education, commercial...) providing services such as care for ederly people, advisory tasks in commercial environments, medical tasks, etc. (Torras, 2014). The increasing digitization of human activity has merged the physical, digital and biological worlds in ways that will change the humanity in its own essence (Porcelli, 2021). In this sense, the different advances are transforming the retail sector (Shankar, 2018; De Bellis & Venkataramani, 2020). Despite the fact that the use of new technologies bring benefits (Grewal et al., 2017), it also raises ehtical dilemmas and it is necessary to formulate modern legislation according to the new reality.

For this reason, there has been an increase in awareness and interest in the ethical considerations for the development of social robots since it is expected that these new technologies will become part of our daily lives in the near future (Malle et al., 2015; Li et al., 2019; Van Maris et al., 2020). All this has been reflected in conferences such as the International Conference on Robot Ethics and Robots Stardards and new ethical Standards in Robotics and AI (Winfield, 2019). Despite this interest on the part of academics, we don't know if it's also interesting for customers that go to stores.

Currently, the main ethical problems that have been most frequently addressed in the literature are privacy/ data control, deception, human autonomy and loss of human contact (Paredo Boada et al., 2021):

- -Privacy/Data control: it's understood as a right against arbitrary interference in one's private life, which leads users to have control over their personal information. Benefits such as reliability and precision are related to this ethical issue.

- -Deception: it's based on the deceptive relationship that human-robot interaction (HRI) can entail. The benefit of reliability is related to this ethical problem.

- -Autonomy: excessive use of technology could lead to a loss of users capabilities. The benefit of not relating to human beings is related to this ethical problem.

- -Loss of human contact: the use of social robots could enhace social isolation. The benefit of not relating to human beings is algo related to this ethical issue.

Research questions, objectives and methodology

Social Robots research in retail represents a new field of marketing research given it's disruptive and distinctive characteristics. There is an important gap in the literature (Belanché et al., 2020; Grewal et al., 2017) that needs to be answered: Are ethical aspects important for customers to decide to use social robots?

That's why our research addresses the potential core benefits sought from using social robots in trading through a sequential proccess. First, a qualitative analysis was carried out based on an open question asked to 1.069 individuals over 18 years of age that live where the 12 main basic benefits sought were obtained (see table 1). Several of these main basic benefits in the acceptance of social robots are related to ethical aspects related to human contact: i) if a robot serves me, i will avoid possible unpleasant treatment by sellers; iii) if a robot assists me, i will avoid interacting with the sellers; iv) if a robot serves me, i will have the same treatment as the rest of the customers (i will avoid discrimination).

After this, secondly, with a second sample of 735 individuals over 18 years of age residing in Spain, the model was contrasted by applying a personal survey on the benefits that have been obtained in the qualitative analysis and the intention to use social robots.

Table 1. Expected Benefits.

		Average size	Variance
Expected Benefits		If a robot assists me in the store,I will have more reliable information	0 1 2 3 4 5 6 7 8 9 10
		If a robot assists me in the store, my purchase will be confortable	0 1 2 3 4 5 6 7 8 9 10
		If a robot assists me in the store, my purchase will be faster	0 1 2 3 4 5 6 7 8 9 10
		If a robot assists me in the store, my purchase will be easier	0 1 2 3 4 5 6 7 8 9 10
		If a robot assists me in the store, my purchase will be pleasant	0 1 2 3 4 5 6 7 8 9 10
		If a robot assists me in the store, my purchase will be more accurate (without errors)	0 1 2 3 4 5 6 7 8 9 10
		If a robot assists me in the store, I will be able to buy at any time	0 1 2 3 4 5 6 7 8 9 10
		If a robot assits me in the store, they will be able to low the prices and I will buy cheaper	0 1 2 3 4 5 6 7 8 9 10
		If a robot assists me in the store, I will solve my accessibility problems (example: language, mobility, hearing…)	0 1 2 3 4 5 6 7 8 9 10
		If a robot assists me in the store, I will avoid possible unpleasant treatment	0 1 2 3 4 5 6 7 8 9 10
		If a robot assists me in the store, I will avoid to interact with sellers	0 1 2 3 4 5 6 7 8 9 10
		If a robot assists me in the store, I will have the same treatment as the rest of the customers	0 1 2 3 4 5 6 7 8 9 10

Results

The results of the exploratory factor analysis showed an adequate KMO (0.933) and the efficiency of Barlett's test reflected a significance level <0.001. Based on the results, a confirmatory factor analysis was performed. We obtained 3 factors. The goodness of fit results for the confirmatory were satisfactory: BBNFI=0.958; BBNNFI=0.953; CFI=0.965; robust CFI=0.971; GFI=0.947; AGFI=0.915; RMSEA=0.078; robust RMSEA=0.067. All the variables showed loads higher than 0.7 except two of them that showed values slightly lower than 0.7. However, all had t-values>0.96.

In terms of reliability and convergent validity, it's adequate. Regarding the convergent validity criteria, the average variance extracted (AVE) of all the constructs was greater than 0.5 for the factors (Hair, Anderson, Tatham y Javis, 2005).

Table 2. Composite Reliability and AVE.

Factor	Composite Reliability	AVE
1	0,923	0,668
2	0,785	0,549
3	0,720	0,563

In terms of discriminant validity, all possible correlations between the factors have been calculated. In this way, the confidence interval of the correlations between the dimensions has been obtained. As it's shown in Table 4, the discriminant validity can be supported since none of the confidence intervals of these correlations contains the value 1. Therefore, there is no covariance problem between the factors involved and the discriminant validity test is achieved.

Table 3. Discriminant validity. Confident intervals of the correlations between the dimensions.

	Covariance	Standard Error	Int. conf. Covar.		Interval conf. Correlat.		Var 1 er Fac	Var 2º Fac
F2-F1	0,695	0,026	0,643	0,747	0,643	0,747	1	1
F3-F1	0,782	0,025	0,732	0,832	0,732	0,832	1	1
F3-F2	0,923	0,023	0,877	0,969	0,877	0,969	1	1

After this verification of the dimensions in which the basic benefits were grouped, factor 3 included the dimension related to the ethical aspects of human contact. Subsequently, using Structural Equations based on Covariances, the influence of the three factors on the intention to use social robots was analysed. The model fits were good: BBNFI = 0.96; BBNFI Robust= 0.96; BBNNFI= 0.95; CFI = 0.96; robust CFI = 0.97; AGFI = 0.90; RMSEA = 0.076; ; robust RMSEA=0.067. The model showed an R^2 = 0.65. The first factor showed a path coefficient = 0.66 and significant, the second factor a path coefficient = -0.103 and not significant and the third factor a path coefficient = 0.270 and not significant.

The factor related to ethical aspects (second factor) did not show a significant influence on the intention to use social robots. The factor that influenced the intention to use social robots (factor 1) was related to the fact that the use of social robots makes shopping more reliable, comfortable, easy, pleasant, fast and precise. Therefore, related to usefulness of using the social robot.

Conclusions

The current focus of the retail industry is mainly based on the transformation of the point of sale through the use of technology (Paschen et al., 2019) and the autonomy of customer service (Baird, 2018). Social Robots are going to transform the current shopping experience. Taking into account the benefits obtained from the qualitative analysis, the ethics related to social contact can be a relevant point in the acceptance by customers of social robots in retail commerce. Nowadays there is a notable lack of attention regarding the implications of robotics from a practical point of view. That is, how is the practice being tranformed when a robot is introduced? (Pareto Boada, 2021). If robotics is introduced into everyday tasks, it's necessary to think on the implications according to the values and purposes of the practice it serves. Our results show that despite the importance given by the literature to ethics on aspects of human contact, we have seen that the factor related to ethical aspects associated to human contact, even though it's a basic benefit by customers, it's not a determining factor when using social robots in retail.

KEYWORDS: Social robots, smart technologies, ethics, technology acceptance.

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