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Cuteness vs. Usefulness: A Dual Perspective on Service Robot Acceptance in the Travel Industry

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Abstract: The integration of service robots in the travel and hospitality industry is rapidly transforming customer interactions, offering both operational efficiencies and novel guest experiences. Despite their increasing presence, there remains a gap in understanding the factors influencing tourists' acceptance of service robots, particularly the interplay between hedonic and functional motivations. Existing research has not fully explored how perceived cuteness and usefulness shape both initial interest and long-term acceptance of these technologies. This study addresses this gap by applying the Service Robot Acceptance Model (SRAM) and the Technology Acceptance Model (TAM) to examine the dual role of cuteness and usefulness in shaping consumer attitudes toward service robots in tourism. We employ a PLS-SEM approach based on survey data from 183 respondents, analyzing how these perceptions differ between individuals who have and have not previously interacted with service robots. Findings reveal that cuteness influences initial interest but does not translate into acceptance, whereas perceived usefulness and performance expectancy drive both interest and long-term acceptance. Additionally, we highlight the impact of sample composition on these results, recognizing potential biases and suggesting future research directions to improve generalizability. These insights offer practical guidance for tourism managers and marketers, helping them optimize service robot deployment by balancing aesthetic appeal with functional efficiency to enhance customer experiences.

Keywords: service robots; tourism industry; customer experience; hedonic motivations; functional motivations; robot design; marketing strategies

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1. Introduction

The tourism and hospitality industry is increasingly integrating service robots to enhance operational efficiency and customer experience. From hotels using robots for check-in and concierge services to restaurants employing robotic waiters, these innovations are reshaping service encounters. The use of service robots addresses the results of an increasingly technological world, one which seems to be increasingly heading towards the automation of several tasks. Artificial intelligence (AI) has become a widespread presence in several industries, such as healthcare, banking, entertainment, and automotives. This is mostly attributed to its advantages in terms of increased productivity, reduced costs for staff replacement, and accuracy and efficiency when performing tasks. This fast and widespread use of AI has had an impact on the use service robots, as their growth rate is much faster than even the robotic manufacturing market [1]. This is sure to have an impact within several organizations and change the world as we know it today. In fact, service robots are already substituting and improving the human workforce [1], as their highly

efficient nature allows them to perform dual functions, and therefore take care of some repetitive and monotonous service requests [2]. This is being felt in the tourism business as well, as hotels and restaurants have begun to replace some of their workforce with automated service robots, with all the advantages in mind, while looking to maintain the same service quality for guests [1].

However, replacing human employees with service robots in tourism and hospitality settings, which are known for their intense human interactions, not only modifies the nature of the service experience to include human–robot interactions, but it may also have a significant impact on customer behavior and attitudes [3]. This is what we will look to comprehend throughout the thesis, as the presence of service robots in this domain is a relatively new topic [3], and therefore there is much opportunity for contribution.

With these developments in mind, tourism is, like all other fields, sure to be affected, as is marketing within this area. Therefore, our interest in this topic lies in the examination of the travel industry, with a specific focus on the impact of service robots on customer experiences, the customer's acceptance of service robots, the desire or disinterest in having touristic experiences which involve service robots. We will then conclude by looking at possible shifts in marketing within this field.

Preparing for a future that, in fact, is already here, is key to success. Some of the studies already made, which will be further developed in the literature review, look at several characteristics and establish different connections between a plethora of different variables. Most studies used the base model that is also used in this study, the Service Robot Acceptance Model [4], explored both sides of hedonic experiences and functional experiences, and drew conclusions on their widely different topics. Through a thorough literature review, our objective is to use the studies which have already been made and the conclusions which have already been drawn and expand on them. In order to innovate, we developed a conceptual model, which can be seen in the literature review of this work, that contemplates different variables from several articles and different models, with the goal of reaching a conclusion as to whether there is a difference between the stage of interest and the acceptance of service robots in the tourism field, and to determine which constructs have the biggest impact on these two variables.

To achieve this goal, three questions were prepared that we intend to answer with this research:

RQ1: How does cuteness influence interest and acceptance of service robots among different user groups?

RQ2: Do people have hedonic or functional motivations on the use of service robots in their touristic experiences?

RQ3: To what extent does perceived usefulness contribute to shaping users' interest in service robots compared with its impact on acceptance?

2. Literature Review

2.1. Definitions and Current Research

A new topic arose in 1956, when the term "artificial intelligence" was first introduced by scholars. This term would then go on to experience a long development period of over 70 years [5]. AI has had an incredible and rapid development in recent years, has been applied to several areas and has now become an impactful proponent of our everyday lives. Following the 1990s, the use of robots in the production sector progressively evolved to the service sector, leading to a rapid development of service robots [6]. This was possible due to many recent developments in artificial intelligence and machine learning, which have allowed robots to be able to detect and react to their surroundings, making way for their application outside of contained production areas, and expand into new fields, such

as the service field [7]. These changes were, in turn, potentiated by an advancement in complementary technologies, like AI and cloud computing, as well as increased computing capabilities, lighter materials, and lower hardware costs [7]. The market for service robots is now growing worldwide, driven mainly by Japan, whose market for service robots is expected to grow significantly between now and 2035 [8]. It is now possible to see service robots in several fields. In terms of the tourism industry, we can look at the example of several restaurants around the world, where robot chefs and greeters have been transforming traveler's experiences, by cooking and welcoming them in a different way [9].

However, there is a looming danger in all of this. The topic of human replacement of frontline employees by service robots is one over which a lot of literature has delved into, as service robots can work under the economic principle of economies of scale, while frontline employees are not scalable at all, as every new hire is accompanied by ongoing costs [4].

Considering the base concept for this study, it is possible to say that AI is the general term for the science that simulates human intelligence using computers, and that it involves teaching machines to mimic human cognitive processes like learning, judgment, and decision-making [5].

Secondly, it is also important to look at the definition of service robots, a crucial part of what we will look to investigate, as, although AI is sure to be used in tourism in many ways and appear to the customer in many shapes and forms (such as chatbots, VR tourism, amongst others), AI-driven service robots are the main focus of the study. Therefore, it is possible to say that service robots are adaptable autonomous machine interfaces, which are capable of interacting, communicating, and providing services to consumers [4]. They can be humanoid (anthropomorph) or non-humanoid in terms of their appearance. A humanoid is a human-like service robot, and a non-humanoid has the physical look of a machine. Lastly, these service robots can perform cognitive–analytical tasks and emotional–social tasks [4].

When evaluating touristic experiences with service robots in places such as hotels or restaurants, it is important to look at the idea of the customer journey as a base concept, one which includes three stages of interaction: the pre-service, service, and post-service encounter stages [10]. A consumer's path, with an entity throughout the course of the whole purchase cycle and which spans the previously mentioned touchpoints, may be conceptualized as a customer journey. It is a dynamic process, which means that outside variables and events from the past may have an influence on its outcome. Companies can only control a portion of the touchpoints that the customer experiences [11].

The Technology Acceptance Model (TAM), introduced by Davis [12], serves as a foundation for understanding the factors that influence users' decisions to accept new technologies. The TAM, in short, postulates that perceived usefulness and perceived ease of use are critical determinants of technology acceptance [12]. In general, TAM concerns the functional motives for the use of technology, presenting arguments such as the cost–benefit theory and the self-efficacy theory [12].

The Service Robot Acceptance Model (SRAM) is presented here in a simultaneously complementary and contradictory manner [4]. The Service Robot Acceptance Model was developed by [4], and helps one to understand users' interactions with robots in service situations, making it the perfect base model from which to build upon. The SRAM postulates that consumer acceptance of service robots depends on three sorts of elements: functional, social–emotional and relational. SRAM draws from the Technology Acceptance Model and uses three variables for "Functional elements" (perceived ease of use, perceived usefulness; subjective social norms); the model also has three "social–emotional" variables which are perceived humanness, perceived social interaction and perceived social presence;

finally, the variables used to compose relational elements are trust and rapport. The conclusions drawn from this model, in sum, are that the relationships established between these sets of elements and customer acceptance of service robots are, in fact, positive, meaning that emotional–social and relational elements also play a role in the acceptance of service robots [4] and that customer needs are essential when looking at the achievement of harmony across all three dimensions [13].

When taking the SRAM into the tourism sector, it is important to denote that the touristic experience is often just that, an experience, rather than a goal or a solution to a problem, and that service delivery can therefore occur at several touchpoints. Consumers who are looking for enjoyable touristic experiences usually have high expectations associated with an enjoyable social presence, engagement and the sharing of vibrant emotions [13].

In examining the acceptance process of service robots in touristic settings, this study found that it is essential to distinguish between two critical stages of the consumer's "funnel:" interest and acceptance. Interest is often a neglected emotion in studies, but it is a fundamental one, representing the initial phase, as it is a source of intrinsic motivation to develop the further seeking of information [14] or, in this case, interaction with the service robots. This manifests itself through acceptance, which marks a more mature phase of the adoption process, where users make a conscious decision to integrate service robots into their experiences based on functional motivations, functional elements and social–emotional elements [4,12]. In this study, and specifically regarding the acceptance of service robots, our focus will be on re-testing one of both the social–emotional elements (hedonic) and functional elements, as well as on testing a new variable within this model for each of these types of elements (cuteness and performance expectancy). The relational elements were not studied, as they were the least mentioned by tourists when describing their interactions with robots in this field in Fuentes-Moraleda et al. [13]'s study.

2.2. Hypotheses and Conceptual Model

2.2.1. Hedonic Factors

Cuteness

Cuteness is a hedonic factor which will act as a representative of the customer's cognitive experience, one of the most fundamental influencers of human behavior [15], and the most mentioned experience felt by consumers in Huang et al. [16]'s survey. There is little literature regarding the direct relation between this construct and service robots, and therefore it is worth studying.

Something being cute implies that humans will tend to look at it longer, and studies show that the emotional feeling of something being cute is normally related to a mix of feelings, both caring impulses and aggressive responses, such as wanting to pinch, squeeze, or bite the target and the act of clenching hands and teeth [15].

In touristic experiences, cuteness relates to the way in which guests think of the service the robot is providing as "cute", an attractive characteristic of having service robots in the frontlines. This cuteness often comes from the robot having a childlike voice, its physical appearance and expression, and sometimes also by its uncoordinated movements (cuteness by contrast of its highly developed technology and its somehow silly behaviors) [16]. In a study led by Guo et al. [17], it was concluded that consumers are more willing to interact with cuter service robots, specifically in terms of hedonic services, such as a touristic experience.

Cuteness is also shown to be able to increase customers' tolerance of service failure [15], though only in low severity and low-time pressure conditions [18]. Therefore, it can be concluded that having cuteness (baby-like characteristics such as softness, small limbs, round shapes in head and body, large eyes and a large head) [19] as a component of a service

robot is a powerful tool when looking for customer acceptance. Cuteness is a significant technique for gaining customer acceptance, as humans are more likely to approach a cute object [20].

With this in mind, as well as the research questions, this study proposes some advancements: Firstly, and while focusing on the lack of literature on what is clearly an important variable, we sought to further study this subject in regards to the interest there is in having service robots in touristic experiences, as well as the robots' acceptance. Secondly, we sought to test with different user groups, as research suggests that perception of something, in this case service robot cuteness, is determined by sensory input, individual expectations and prior knowledge [21].

All of this led us to the following hypotheses, tested on two different user groups:

H1Y: *Cuteness positively influences interest in having service robots in touristic experiences.*

H1N: *Cuteness positively influences interest in having service robots in touristic experiences (individuals who have not interacted with one).*

H2Y: *Cuteness positively influences service robot acceptance.*

H2N: *Cuteness positively influences service robot acceptance (individuals who have never interacted with one).*

Perceived Humanness

An integral part of the Service Robot Acceptance Model, perceived humanness is a variable which is integrated into the social–emotional dimension and has an impact on the acceptance of service robots according to the model [13]. With this variable we plan to retest this in both the generation of initial interest in having service robots in touristic experiences and service robot acceptance in this specific field.

Perceived humanness is related to anthropomorphism, the condition of looking and acting like a human. In the service industry, additionally to being cute, looking and/or acting like a human goes a long way in establishing meaningful social interaction. However, contrary to cuteness, an overly simulated human appearance may create a feeling of high expectation which can easily cause disappointed customers. This is because the more human-like a robot appears, the more human the customer expects it to behave. An overly human likeness can also scare away some customers, meaning that having small details which make it look like a robot is also important [4]. This is related to the "Uncanny Valley" theoretical concept, which tells us that if a robot's appearance and actions are made more human-like, people's emotional response will increase and that this increase will continue to a certain point, beyond which revulsion occurs [22].

At this point, it is important to clarify the distinction between the constructs of cuteness and perceived humanness. These are distinct but related constructs that influence consumer perceptions of service robots in different ways. Cuteness is primarily a hedonic attribute that elicits positive affective responses, often driven by baby-like features such as large eyes, round shapes, and small body proportions [15]. It has been shown to increase engagement and initial attraction to service robots, particularly in hedonic service settings where emotional appeal is a key factor [17]. In contrast, perceived humanness refers to the extent to which a robot is anthropomorphic in appearance and behavior, influencing social interaction and relational expectations [4]. While a higher degree of humanness can enhance trust and social presence, it can also trigger the uncanny valley effect, leading to discomfort when a robot's appearance is too human-like [22].

Focusing on improving human interaction and human-like behavior has been proven to enhance customer satisfaction and, ultimately, the continued acceptance of service robots in service sectors which can be related to touristic experiences, such as restaurants [23]. Wong and Wong [23]'s study emphasizes the critical role of the anthropomorphic influences of appearance on robot interaction intention and engagement, on the generation of positive feelings and on positive word-of-mouth among museum visitors who interacted with service robots. This led us to our third and fourth hypotheses, as follows, based on an understanding of whether perceived humanness leads to interest in having service robots in touristic experiences in general and to their acceptance:

H3: *Perceived humanness positively influences interest in having service robots in touristic experiences.*

H4: *Perceived humanness positively influences service robot acceptance.*

2.2.2. Functional Factors

Perceived Usefulness

Moving on to functional factors, and looking specifically at perceived usefulness, this variable is connected to a customer's cognitive experience and influences his intention to use a new technology [4], such as a service robot. The perceived usefulness of service robots is related to their ability to obtain a practical advantage in the eyes of the customer, such as enjoyment [24,25], or how that technology would enhance their performance [12].

This variable is an integral part of the TAM [12], and it was chosen over perceived ease of use as it is the closest tied variable to anthropomorphism [26] (which also affects cuteness). Therefore, to obtain a homogenic model which does not disperse too much, we decided upon this variable over the others in the functional elements of SRAM (perceived ease of use and subjective norms) [4].

Prior research shows a significant positive effect of perceived usefulness on engagement, interest in interacting with, and continued use of, service robots in museum settings [24], as well as intention to revisit service robot restaurants [27]. This aligns with Davis [12]'s TAM. On the other hand, one study found that, in the service sector, perceived usefulness significantly affects customers' acceptance of service robots for credence service settings (like a hospital), but it is not significant for experience service settings, meaning that, for touristic experiences, it should have little-to-no impact [24].

With these contradictory findings in mind, we decided to re-test this construct for the tourism sector, and the following hypotheses were developed:

H5: *Perceived usefulness positively influences interest in having service robots in touristic experiences.*

H6: *Perceived usefulness positively influences service robot acceptance.*

Performance Expectancy

When looking at performance expectancy, this variable refers to the consumer's belief that the acceptance of service robots will increase the ability and competency to satisfy their needs [1]. Performance expectancy is related to a subjective form of performance, over which there is in fact a proven link between perceived performance and satisfaction, but only when placed in an individual value system [28].

Customers' trust and confidence, and therefore future acceptance of service robots decreased when their actual performance did not meet the expectations of the hotel's guests. This further shows the importance of testing this variable and realizing its true value in the

tourism sector in terms of the interest in having service robots in touristic experiences and of the acceptance of service robots.

Being a variable which is highly regarded in the UTAUT model [29], the plan was to associate it more with the model of [4] by implementing it into our model as a new functional construct and then testing the validity of the following hypothesis:

H7: *Performance expectancy positively influences interest in having service robots in touristic experiences.*

H8: *Performance expectancy positively influences service robot acceptance.*

3. Methods

3.1. Research Design

In order to answer the research questions, a deductive approach was taken, as we took definitions, as well as conclusions and theoretical positions drawn by previous studies, and tested whether a different group of people (varied age groups) impacted the relationship between the acceptance of service robots and the hypothesis already tested in other studies and which integrate SRAM, as well as the ones we decided to use as representatives and whose relevance was explained in the literature review. The objective was to then conclude whether people have a desire or a disinterest in having service robots in their touristic experiences.

A multi-group analysis was, therefore, conducted. In terms of the type of research being conducted, we undertook a mix between analytical and predictive research as we collected and analyzed data. Doing this also allowed us to speculate intelligently on the future of marketing in this field, caused by the voice and will of the customer, which dictates market needs and, therefore, shapes marketing. The goal was to establish business outcomes from customer needs.

3.2. Sample

By using a questionnaire survey and a convenience sample, this study looked to gather insights into the acceptance of service robots, as well as peoples' interest in having them in their touristic experiences. We managed to gather 213 responses, of which 183 were usable and the rest incomplete. All of the respondents were over 18, most of them being aged between 31 and 55 (49.7%). Most respondents were women—131—(71.2%), full-time employees (71%) and with earnings of between EUR 1000 and EUR 1400 (29.5%) of the average individual liquid salary. Most respondents had secondary school as their highest level of education (41.5%), with a bachelor's as a close second (37.7%). Out of our sample of 183 people, 141 had not yet interacted with a service robot at the time of the survey (77%). Out of the remaining 42 people who had interacted with service robots before, most of them claimed to have had this experience in restaurants (76.1%). A more detailed sample description is presented in Table 1.

While the sample size of 183 is relatively small, it meets the commonly accepted thresholds for PLS-SEM analysis, which emphasizes predictive modeling rather than strict parametric assumptions, and is appropriate for exploratory studies in emerging fields like service robot acceptance. Furthermore, this technique considers the rule of thumb of 10 responses for each variable, meaning that the sample is more than the double the minimum acceptable.

Table 1. Demographic data table.

Demographic Variable	Frequency (n)	Percentage (%)
Age group		
18–30	49	26.7
31–55	91	49.7
55+	43	23.6
Total	183	100.0
Gender		
Female	131	71.2
Male	51	27.8
Other	1	0.5
Total	183	100.0
Occupation		
Employed full-time	130	71.0
Employed part-time	3	1.6
Retired	14	7.7
Student	13	7.1
Student-worker	15	8.2
Unemployed	8	4.4
Total	183	100.0
Monthly salary (euros)		
<1000	38	20.8
>2000	25	13.7
1000–1400	54	29.5
1400–2000	46	25.1
No salary	20	10.9
Total	183	100.0
Highest education level		
Bachelor's	69	37.7
Doctorate	1	0.5
Less than secondary school	10	5.5
Master's	27	14.8
Secondary school	76	41.5
Total	183	100.0

3.3. Instrument and Measurement

The questionnaire was divided into three parts: Firstly, the demographic questions, which made it possible to characterize the sample. As one of the variables was cuteness, this required knowledge of a service robot's appearance. To accommodate both the participants who had interacted with a service robot and those who had never had that experience, we decided to use branching in our survey design. Branching allowed us to, unbeknownst to the respondent, organize the initial part of the survey in a way that they could answer questions related to the variable "cuteness," regardless of whether they had interacted with a service robot or not. We did this by showing those who were yet to interact with one an image of a service robot and having them answer the same questions (the figure of the Pepper Robot was used). This was undertaken for this variable only, as the survey converged on the remaining questions as they did not require experience with a service robot. Using the branching method also allowed us to have a follow-up question [30] for those who answered "yes" as to whether they had had an interaction with a service robot or not, giving us more insight into how they had interacted with it.

For all of the variables in the concept model, validated scales were used. The questionnaire was fully done in English and translated into Portuguese, keeping in mind both linguistic and psychological meaning [31]. A Likert-type scale (1—totally disagree to 5—totally agree) was used to measure the items in the questionnaire.

Cuteness is the emotional feeling that makes humans look at things longer and leads to both caring impulses and aggressive responses, such as wanting to pinch, squeeze, or bite the target and the act of clenching hands and teeth [15]. It is related to having baby-like characteristics such as softness, small limbs, round shapes in head and body, large eyes large head) [19]. To measure this construct, we used the same items as [32], which are the following: (1) The service robot was cute; (2) the service robot was adorable; (3) the service robot was endearing; and (4) the service robot had a loveable appearance.

Perceived humanness reflects the service robot's ability to look and/or act like a human [4]. The measures used for this construct in this study refer to [33] and were the following: (1) "I find it better overall if the appearance of the robot is very human like" and (2) "I find it better overall if the appearance of the robot is very mechanical".

Performance expectancy is the consumer's belief that the acceptance of service robots will increase their ability and competency to satisfying their needs [1]. In this study, we measured this construct with four items, adapted from Walton et al. [34]'s study, which measure performance expectancy of mobile internet: (1) I find that service robots are useful in touristic experiences; (2) service robots increase my chances of having a good experience; (3) service robots help to achieve things more quickly (such as serving food at a restaurant or carrying bags up the stairs in hotels); and (4) service robots are more productive then human employees in touristic related businesses.

In this study, perceived usefulness of service robots is related to being able to obtain a practical advantage in the eyes of the customer, such as enjoyment [24], or how a particular technology would enhance job performance [25]. It was measured using three items, adapted from Lee et al., [35], which are the following: (1) Using service robots will improve my experience with a touristic event; (2) the advantages of using service robots in tourism outweigh the disadvantages; and (3) overall, using service robots in touristic experiences will be advantageous.

Interest in having service robots in touristic experiences was measured using the following item (1): how interested are you in having service robots assist in your touristic experiences? on a Likert type-scale, where 1—not interested at all and 5—extremely interested.

As for the acceptance of service robots, the founding theory of this paper tells us that the relationships established between the three sets of elements and customer acceptance of service robots were, in fact, positive, and that customer needs are essential when looking at the achievement of harmony across all three dimensions [13]. One item was used, as many of the variables used in this study are also used in the Service Robot Acceptance Model [4]. This item was as follows: (1) Based on your experience (or what you imagine), how likely are you to accept service robots in future touristic experiences? and this item was measured on a Likert-type scale, from 1 to 5, where 1—very unlikely and 5—very likely.

3.4. Data Collection

Before starting to distribute the survey, a pre-test was undertaken on seven academics, and their feedback was collected and used to make the necessary changes to ensure alignment with the goal. This survey was created using Qualtrics Survey Software and analyzed using SPSS 3.0 and Smart PLS 4. As previously mentioned, a translation was applied so that the questionnaire could be distributed in both Portuguese and English. The final version of the questionnaire was mostly spread between several social media platforms, as the increased visibility of social media can often lead to higher engagement rates and potentially more responses to our survey, as well as facilitate simple interaction pathways between researchers and potential participants [36]. In addition, this was undertaken over 30 days during August 2024.

4. Results

As mentioned before, and because there was a need to analyze both the measurement characteristics of constructs and their interactions at the same time, we used structural equation modelling (SEM). In particular, partial least squares (PLS) was used, which is a causal–predictive approach to SEM that is used to provide important insights into the strength and significance of the model's relationships. To do this, Smart PLS4 software was used. Importance performance matrix analysis (IPMA) is another technique that was applied, and was used in order to be able to rank the importance of the constructs towards the model's overall performance in practical applications [37].

The analysis and interpretation of data was undertaken in two major steps: firstly, the reliability of metrics used and the validity and the quality of the measurement model were studied; it was only after this that we studied the hypotheses.

The indicators of reliability, convergent and discriminant validity and internal consistency reliability were used to see the validity of the used measurement model [38]. By analyzing the output, we can see that the standardized factor loadings of all items are greater than 0.5 (at a minimum value of 0.79) and were all significant at $p < 0.05$ (all of them being $p < 0.001$ or n/a). This provided evidence for the individual indicator's reliability [38]. As for internal consistency reliability, this was also confirmed, as the Cronbach alpha and construct reliability of each of the constructs were greater than 0.7. As a result, the predicted parameters for these relationships are not affected by measurement errors [38].

To test convergent validity, it was crucial to look at one extra validation. Firstly, and as verified before, all items loaded at a minimum value of $0.79 > 0.5$, and they were all significant within their respective constructs. They all also had construct reliability (CR) greater than 0.7. With this in mind, and as Table 2 shows, the average variance extracted (AVE) for all of the constructs was greater than 0.5, which proved convergent validity [38].

Table 2. Cronbach's alpha, composite reliability, average experience extracted, correlations and discrimination validity checks.

	CA	CR	AVE	1	2	3	4
CuteN (1)	0.880	0.918	0.737	**0.858**	0.045	0.229	0.274
CuteY (2)	0.954	0.967	0.879	0.042	**0.937**	0.573	0.657
Perceived Useful (3)	0.922	0.950	0.864	0.211	0.539	**0.930**	0.885
PerformanceExp (4)	0.876	0.916	0.731	0.248	0.604	0.886	**0.855**

With convergent validity established, the first condition for discriminant validity was complete [39]. Many recommendations exist on how to evaluate discriminant validity, but in this study, it was tested using two procedures, the Fornell and Larcker criterion and the heterotrait—monotrait ratio (HTMT) criterion [38]. The Fornell and Larcker criterion requires that, for any two given constructs, the AVE's square root of one's shared experience with itself is greater than any other [40]. This establishes discriminant validity and can be seen in Table 2 (the numbers in a diagonal, in bold). As for the HTMT criterion, all ratios were below the value of 0.85, except for one, which was the value between performance expectancy and perceived usefulness, which exceeded the conventional threshold (0.88). This is not unexpected, as there is a big theoretical link between these two constructs. Despite this finding, the overall model maintains strong validity, indicated by all of the remaining excellent HTMT values for the other constructs and the Fornell Larcker criterion. providing additional evidence of discrimination validity—Table 2 (above the diagonal numbers in bold).

With collinearity verified, as all the VIF values in the inner model were below the value of 5, we moved on to the structural model. This was analyzed through the sign,

magnitude and significance of the structural path coefficients; the magnitude of R squared for both endogenous variables in the model, as a measure of its accuracy; and lastly by Stone–Geisser's Q squared values as a measure of predictive relevance [41]. R squared coefficients were both above 10%, with the two endogenous variables—interest in service robots in touristic experiences and service robot acceptance—at 53% and 60%, respectively. These variables are central to the study as they receive input from all other predictor variables. The value being above 50% for both shows us that the predictor variables have a strong explanatory power on the variance of the dependent variables. As for the Q squared values, they also indicate the predictive relevance of the model, as both variables were very much above 0 (0.517 and 0.592). We can, therefore, conclude that both the variables and the model are of quality.

Moving on to the hypothesis, Table 3 shows us that cuteness (for people who have not interacted with service robots) positively influences interest in service robots in touristic experiences in a significant way ($\beta = 0.210$, $p < 0.001$). Contrarily, cuteness (for people who have not interacted with service robots) does not significantly influence service robot acceptance ($\beta = 0.039$, n.s.). As for people who have interacted with a service robot, cuteness does not have either a significant effect on interest in service robots in touristic experiences ($\beta = -0.038$, n.s) or in the service robot acceptance ($\beta = 0.094$, n.s). These results provide support for H1N. As for H2N, H1Y, H2Y, enumerated respectively above, these hypotheses are not supported.

Table 3. Structural Model Assessment.

	Beta	Standard Deviation	T Statistics	*p* Values
CuteN -> InterestServRobots1	0.210	0.051	4.128	0.000
CuteN -> SRA1	0.039	0.049	0.803	0.422
CuteY -> InterestServRobots1	−0.038	0.065	0.582	0.561
CuteY -> SRA1	0.094	0.057	1.644	0.100
PerceivedHuman -> InterestServRobots1	0.097	0.055	1.775	0.076
PerceivedHuman -> SRA1	0.004	0.056	0.063	0.950
PerceivedUseful -> InterestServRobots1	0.292	0.118	2.483	0.013
PerceivedUseful -> SRA1	0.335	0.109	3.085	0.002
PerformanceExp -> InterestServRobots1	0.360	0.126	2.855	0.004
PerformanceExp -> SRA1	0.398	0.129	3.079	0.002

As for perceived humanness, this neither has a significant effect on interest in service robots in touristic experiences ($\beta = 0.097$, n.s) nor on service robot acceptance ($\beta = 0.004$, n.s). This means that these hypotheses (H3 and H4) are not supported. Perceived usefulness has a significantly positive relation with interest in service robots in touristic experiences ($\beta = 0.292$, $p < 0.05$) and service robot acceptance ($\beta = 0.335$, $p < 0.01$). This provides support for H5 and H6. Finally, performance expectancy has a significantly positive relation with interest in service robots in touristic experiences ($\beta = 0.360$, $p < 0.01$) and service robot acceptance ($\beta = 0.398$, $p < 0.01$). This supports H7 and H8.

To establish a "ranking" of importance, and therefore establish the most important areas of future improvement in organizations looking to go this route and have a good strategic plan, we conducted an IPMA analysis [42].

Firstly, we had to make sure that both requirements for the application of IPMA were met. Firstly, all indicator coding has the same direction. In this case, the scale is the same for cuteness, perceived humanness, perceived usefulness and performance expectancy, from 1 to 5, where 1—totally disagree and 5—totally agree. The scale was also the same in the sense of a low number representing a "negative" opinion and a higher number a positive one for interest in service robots in touristic experiences and service robot acceptance. As for the

other factor, the outer weights must not be negative, as this might represent collinearity [41]. As we can see by looking at Table 4, this criterion is also met, as all values are positive. This analysis was made for both interest in service robots in touristic experiences and service robot acceptance.

Table 4. Collinearity checks for IPMA.

	Outer Weights
CuteN1 <- CuteN	0.343
CuteN2 <- CuteN	0.310
CuteN3 <- CuteN	0.275
CuteN4 <- CuteN	0.232
CuteY1 <- CuteY	0.254
CuteY2 <- CuteY	0.273
CuteY3 <- CuteY	0.270
CuteY4 <- CuteY	0.269
InterestServRobots1 <- InterestServRobots1	1.000
PerceivedHuman1 <- PerceivedHuman	1.000
PerceivedUseful1 <- PerceivedUseful	0.343
PerceivedUseful2 <- PerceivedUseful	0.358
PerceivedUseful3 <- PerceivedUseful	0.374
PerformanceExp1 <- PerformanceExp	0.314
PerformanceExp2 <- PerformanceExp	0.302
PerformanceExp3 <- PerformanceExp	0.281
PerformanceExp4 <- PerformanceExp	0.271
SRA1 <- SRA1	1.000

The importance–performance map in Table 5 shows both the importance and performance of the constructs on interest in service robots in touristic experiences and service robot acceptance, separately of course. It is possible to draw some conclusions:

Table 5. IPMA for the variables.

	Importance	**Performance**
	Interest in Having Service Robots in Tourist Experiences	
CuteN	0.210	48.396
CuteY	−0.038	46.808
PerceivedHuman	0.097	37.158
PerceivedUseful	0.292	38.931
PerformanceExp	0.360	42.601
		Service Robot Acceptance
CuteN	0.039	48.396
CuteY	0.094	46.808
PerceivedHuman	0.004	37.158
PerceivedUseful	0.335	38.931
PerformanceExp	0.398	42.601

Performance expectancy has the highest impact on generating interest in service robots in touristic experiences, with a value of 0.360, the highest of all values. However, the performance score (42.601) indicates that there is room for improvement in how well this

expectation is currently met. As for perceived usefulness, this is the second most important factor for driving interest in service robots in touristic experiences. Its performance score is relatively low, indicating that users do not find robots as useful as they could be. The results show that these two constructs indicate the areas that require the most managerial attention [42]. Finally, when analyzing the impact of cuteness on interest in robots in touristic experiences, it is interesting to see similar performance numbers for individuals who have and who have not interacted with service robots (46.808 and 48.369, respectively) and, despite this, totally different numbers in terms of importance. As for individuals who have not interacted with a service robot, then the cuteness of the robot is one of the most important aspects, while for individuals who have, the importance of cuteness is a negative value (−0.038), which means that the cuter that individuals who have interacted with a service robot perceive the robot to be, the less interested they are in having it in their touristic experiences. This might suggest that once the interaction happens, they start to value its other functionalities, such as performance and usefulness, and this is an interesting managerial takeaway [42].

When looking at the importance and performance of the same constructs in relation to service robot acceptance, performance expectancy is also the most critical factor. Improving users' perceptions of how well the robot meets their expectations in this aspect could significantly increase acceptance. Additionally,, and like before, perceived usefulness is the second-most important construct in service robot acceptance (0.335), but it has a low performance (38.931), meaning that there is a great opportunity here for development. Finally, in terms of cuteness in relation to service robot acceptance, it is possible to conclude that, in this case, it does play a role, although of very low importance, for both people that have interacted with service robots and people who have not.

5. Discussion

5.1. The Role of Cuteness

Results show that cuteness (for people who have not interacted with a service robot), positively influences interest in service robots in touristic experiences ($\beta = 0.210$, $p < 0.001$). However, within this user group, the influence of cuteness on service robot acceptance is non-significant. This indicates, in terms of managerial implications, that a service robot's cuteness could have a role in generating initial interest, in line with Guo et al. [17]'s study, but not lead to its acceptance, where other factors such as performance and usefulness seem to be more relevant.

This is further supported by the fact that, for people who have had the experience of interacting with a service robot, cuteness plays a weaker role than initially expected following the thoughts explicated in [20], as both hypotheses deriving from this variable were non-significant. Even more so, this weak relation between cuteness (for people who have interacted with service robots) and interest has a negative value in terms of importance. Although there are only few papers on negative values of importance in IPMA, we know that, as the importance of a variable decreases, its effect on the outcome becomes adverse [43] and that this could mean that it actually holds a contrary effect, meaning that the cuter the robot is, the less interest in service robots in touristic experiences people who have already interacted with one have. This, once again, points to a shift, as people go from intrigued, to deciding if they value it in their travel experiences.

Therefore, this study advances on Guo et al. [17]'s findings, as it shows that cuteness does influence interest in having service robots in touristic experiences, but that this is only moved by initial curiosity and only for people who have not yet interacted with service robots.

This could all be linked to the novelty effect. Novelty is experiencing something unique regarding an individuals' usual experiences [44], and is seen as a driver of behavior, with the potential to lead to high emotions and peak experiences [45,46]. It can be divided between two types of novelty: retrospection (thinking about past experiences) and prospection (thinking about future experiences) [47].

Related to this is the concept of novelty seeking, usually used to understand customer behavior and travel destinations, being a crucial factor in travel choices [47]. In terms of prospection, novelty, dreams, desires, goals and intentions are four significant themes, which, once achieved, result in strong emotional responses, both of pleasure and unpleasurable [47]. This could further explain the contrasting values of interest in having service robots in touristic experiences between people who have not yet interacted with one (and therefore may have that goal or desire) and people who have had such an interaction and perhaps did not have a pleasurable experience.

5.2. Hedonic vs. Functional Motivations

All of the hypotheses that were related to the functional motivations were supported, meaning that these constructs had positive and significant effects on the dependent variables. This is in alignment with TAM, and further contributes to this model, showing another functional factor which leads to the acceptance of technology in performance expectancy. It also aligns with Seo and Lee [27] and Wong and Wong [23], as perceived usefulness significantly and positively affects both interest in having service robots in touristic experiences and acceptance of service robots, therefore contradicting [25]. Finally, it furthers Chiang and Trimi [48]'s findings through a positive relation lens, as better performance expectancy leads to the acceptance of service robots. As for hedonic factors, the only one that had a positive and significant effect was cuteness (for people who have not interacted with a service robot), as previously mentioned.

Chiang and Trimi [48]'s study also concluded that empathy, a hedonic factor, was one of the most important factors, as we are in the early stages of acceptance of service robots. However, contrary to these findings, both hedonic factors showed generally non-significant results in influencing either interest in having service robots in touristic experiences or acceptance of service robots. Focusing on perceived humanness, as cuteness has been discussed already in the previous topic, the results did not support the SRAM's notion that social–emotional elements play a factor in the acceptance of service robots [4], and they contradicted Ku [49] and Wong and Wong [23]'s findings, where this construct would affect service robot acceptance in two separate touristic areas of their study.

This could be because of many factors, such as cultural differences or the age and personality of respondents. It could also indicate that individuals in our demographic sample, specifically in the tourism sector, prioritize how well a robot performs a certain task, which aligns, in turn, with TAM.

Another reason could be that, as this is a relatively new topic, users are still in an early phase of adjusting to robotic services, focusing more on their practical implications rather than engaging with them emotionally, contrary to Chiang and Trimi [26]'s interpretation that, in this phase, emotion is one of the most important factors.

5.3. The Influence of Perceived Usefulness and Performance Expectancy

Lastly, within the two functional factors, and as we set out to understand to what extent perceived usefulness contributes to shaping users' interests in service robots compared with its impact on their acceptance, the IPMA analysis conducted on these constructs brings forward new findings.

Through this analysis, it is possible to understand that, while both constructs had a significant and positive impact on both the dependent variables, performance expectancy had the highest impact on both interest in having service robots in touristic experiences (0.360) and the acceptance of service robots (0.398). This means that users place a premium on expected performance capabilities and indicates that this construct is one of the most important in terms of the acceptance of service robots.

Perceived usefulness, while also significant and important, had a slightly weaker importance on the generation of interest. This suggests that, while both contribute to service robot acceptance, performance expectancy, which, going back to the definition, is the consumer's belief that the acceptance of service robots will increase the ability and competency to satisfy their needs [1] seems to garner more interest. This makes sense in relation to Venkatesh et al. [29]'s proposal of performance expectancy as a development/evolution of the TAM's [12] perceived usefulness variable, in his UTAUT model [29], which is a more complete construct. Therefore, this study advances the idea that it would make sense to use performance expectancy in models, such as the SRAM explicated in [4], and any future developments.

5.4. Limitations

While this study provides valuable insights into the factors influencing service robot acceptance in tourism, several limitations must be acknowledged. First, data collection was conducted at a single point in time and within a specific cultural context, limiting the ability to observe evolving attitudes toward service robots over time. Moreover, the study relied solely on a questionnaire, which, despite its structured nature, does not capture in-depth behavioral insights that qualitative methods such as interviews or field observations might provide.

Second, the study utilized a convenience sample, which, while effective for exploratory research, may introduce biases. The fact that most respondents had never interacted with a service robot means that their perceptions were likely influenced by the specific image shown in the survey. This introduces potential variability in how respondents interpreted the concept of service robots, necessitating caution when generalizing the findings.

Third, the study focused on four key variables—cuteness, perceived humanness, perceived usefulness, and performance expectancy—based on their relevance in the literature. However, other psychological, social, or technological factors may also significantly influence consumers' interest and acceptance of service robots. The exclusion of these factors presents a limitation that future research should address.

Fourth, the lack of geographic data on respondents means that regional or cultural differences in service robot acceptance could not be analyzed. Given that cultural factors can significantly shape technology acceptance, future studies should incorporate geographically diverse samples to enhance the generalizability of findings.

6. Conclusions

6.1. Theoretical Contributions

This study provides some theoretical contributions, enhancing the literature on tourism marketing and the consumer acceptance of service robots in this field and undertaking further tests and developments on the main models related with the subject (TAM, SRAM and UTAUT) [4,12,29].

While TAM has traditionally focused on perceived usefulness and perceived ease of use as predictors of technology acceptance, this research determines the most relevant one and integrates it, alongside the other constructs, in a two-stage acceptance process by the consumer: interest and acceptance. This distinction between initial interest and acceptance

bridges a gap in the literature about service robots, as it covers the emotion of interest, which in itself is not very studied, and provides a better understanding of which phase exactly these functional factors have the most impact, seeing as there are also (although not yet definitely established) initial hedonic motivations (cuteness for people who have not yet interacted with a service robot). This study shows that, when transitioning to a later stage of acceptance, people seem to indulge in more functional considerations.

By adapting the SRAM of Wirtz et al. [4] to a touristic context, this study contributes to the growing literature on service robots in the various touristic fields. By studying two constructs from each of the main factors in SRAM we contradict, for this sample and this demographic, the notion that social–emotional elements have an impact on the acceptance of service robots. A new variable—cuteness—was also introduced into the model, and this was in fact the only variable that had a significant result regarding these social–emotional elements, proving it to be one of the most fundamental influencers of human behavior [15]. In addition, we studied this construct with different consumer groups, something for which there is very little in the literature in terms of service robots. As for the functional factors, the integration of performance expectancy led to the idea that further studies should use this construct as a development of perceived usefulness, as proposed by Venkatesh et al. [28], having more significant results both in garnering initial interest and on the overall acceptance of service robots then perceived usefulness.

Our findings also suggest that, while cuteness may generate initial curiosity—especially among those who have not previously interacted with a service robot—practical considerations such as perceived usefulness and performance expectancy ultimately drive acceptance. This insight has critical implications for service providers, as it emphasizes the need for a balanced approach in service robot design and deployment: leveraging aesthetic appeal to attract engagement while ensuring functionality for acceptance. Beyond theoretical advancements, these findings inform strategic decision-making for hospitality managers, encouraging them to align their marketing and operational strategies with consumer expectations at different stages of the acceptance process. Future research should explore cross-cultural influences, conduct longitudinal studies to track evolving perceptions over time, and examine how robot–human interaction quality impacts customer satisfaction and brand loyalty. By addressing these aspects, future studies can provide a more comprehensive roadmap for the integration of service robots in tourism and other service industries.

6.2. Managerial Implications

The findings of this study also offer several practical insights for tourism managers, businesses and marketing professionals considering the integration of service robots into their operations. By understanding the factors that drive interest and acceptance of service robots, managers can align their strategies in a better way, enhancing customer experiences and operational efficiency.

The study shows that cuteness (for people who have not interacted with service robots) and perceived usefulness/performance expectancy are the drivers of interest, but that it is only perceived usefulness/performance expectancy that leads to long-term acceptance. Managers can use this knowledge in robot design, focusing mainly on the functional factors of the robot, but still keep a level of cuteness that is adequate to attract interest from people who have not yet interacted with a service robot. For example, marketing professionals who work in digital marketing campaigns can create target audiences, impacting only people that they know have not interacted with their service robot, therefore taking advantage of its cuteness in this aspect. This can be a factor in drawing in visitors to their tourism-related services. Managers have, therefore, an option on how to communicate, being able to even create customized communications strategies for different stages of consumer acceptance.

However, and as mentioned before, when we move from client acquisition to client retention, functional factors are the only ones that play a role. In other words, it is all about the robot's performance and how the clients perceive its practical use. Therefore, managers should focus on the practical advantages of robots, ensuring that tourists see a continued value in their interactions with these technologies beyond the initial novelty phase.

For tourism managers, these findings highlight the importance of balancing aesthetics and functionality when deploying service robots in hospitality settings. While cuteness can attract initial interest, long-term acceptance is driven by perceived usefulness and performance expectancy. This suggests that hotels, restaurants, and other tourism businesses should focus on designing service robots that not only appear engaging but also provide tangible value to guests. Additionally, marketing strategies can leverage cuteness to generate curiosity, particularly among first-time users, while ensuring that the robots' functional capabilities enhance customer satisfaction and streamline service operations.

6.3. Future Research Directions

To build upon the findings of this study and address its limitations, several areas warrant further exploration. First, future studies should consider using a longitudinal approach to track how consumer perceptions of service robots evolve over time, especially as exposure and familiarity increase. Additionally, multi-method approaches, such as combining surveys with in-depth interviews or observational studies, could provide a more comprehensive understanding of user attitudes and behaviors.

Second, future research should aim for a more diverse and representative sample, ensuring that respondents include individuals with varying degrees of prior interaction with service robots. Studies could also investigate whether demographic variables—such as age, gender, and profession—act as moderating factors in shaping acceptance and interest in service robots.

Third, given that this study identified cuteness as a significant factor for interest but not for long-term acceptance, future research should explore additional emotional and psychological factors that may impact service robot acceptance, such as trust, empathy, or perceived intelligence. Furthermore, investigating the negative importance result for cuteness (for those who have interacted with service robots) in the IPMA test could provide deeper insights into whether initial attraction fades with experience and why.

Fourth, to address the lack of geographic data, future studies should conduct cross-cultural research to examine potential variations in service robot acceptance across different regions and cultural contexts. Understanding these differences could help tailor robot design and marketing strategies to specific cultural preferences.

Finally, as service robot technology continues to evolve, long-term industry studies could examine how robot design, functionality, and service integration influence consumer loyalty, brand perception, and business performance.

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