Received: 14 January 2023 | Accepted: 9 September 2023

DOI: 10.1002/mar.21907

RESEARCH ARTICLE

Psychology & Marketing WILEY

# Smart speakers and customer experience in service contexts

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**Funding information**
Ministerio de Ciencia e Innovación (PID2020-113561RB-I00; PID2019-105468RB-I00; TED2021-129513B-C22) and European Social Fund and the Government of Aragon (Group "METODO" S20_20R; LMP51_21)

## Abstract

The use of artificial intelligence-based devices, such as smart speakers, is rising in frontline services, as such devices can perform several tasks for customers. However, little is known about customer responses to interactions with smart speakers that occur during service encounters. This research encompasses three studies intended to enhance our currently scarce knowledge of how customers respond to interactions with smart speakers during service encounters. Focusing on the hospitality industry, the first study shows that smart speakers improve evaluations of the hotels that use them in terms of customer ratings and positive affects. The second study demonstrates that automated social presence and psychological ownership feelings are key mechanisms that explain the development of valuable customer responses. The third study, which uses virtual reality, suggests that better actual behaviors are exhibited by people who appreciate the incorporation of smart speakers into services. Thus, the findings indicate that smart speakers improve service experiences, especially if used to carry out hedonic tasks usually performed by employees.

**KEYWORDS**

artificial intelligence, automated social presence, customer experience, customer responses, mixed method approach, psychological ownership, smart speakers

## 1 | INTRODUCTION

Artificial intelligence (AI)-based devices are increasingly being used due to their ability to carry out tasks that humans used to do (Huang & Rust, 2018). For instance, in business settings, some airlines use self-service kiosks for customers to check in (e.g., Iberia), while chatbots give financial advice in banks (e.g., Bank of America), and cruises use bionic barmen (e.g., aboard Royal Caribbean Ships). Voice assistants embedded in smart speakers or cell phones (e.g., Alexa in Amazon Echo Dot and Siri in Apple Homepod)—the focus of this research—recommend products to customers, help them write shopping lists, and play music through streaming services. Approximately 35% of Americans over 18 years old own at least one smart speaker and interact with brands/firms through these speakers (Edison Research, 2022), mirroring the growing relevance of these AI agents for individuals and their potential impact on marketing practices.

Academics have focused on understanding users' motivations for adopting voice and text assistants (chatbots) (e.g., Jiménez-Barreto et al., 2022) in different services, such as hospitality (e.g., Ruiz-Equihua et al., 2023), and advertising (e.g., Lee & Cho, 2020). Studies have analyzed the interactions between users and smart speaker assistants or other AI agents (e.g., Flavián et al., 2022; Ruiz-Equihua et al., 2023) and the factors affecting positive responses, such as favorable attitudes toward the usage of such agents (e.g., Mclean & Osei-Frimpong, 2019).

However, the use of a smart speaker in service contexts is different from use at home (Buhalis & Moldavska, 2022). Thus, improving our comprehension of the customer–smart speaker relationship in service encounters is paramount to providing managerial insights about how to incorporate smart speakers into services to ensure favorable attitudes toward the brand/firm and appropriate behavioral responses.

Hence, this research aims to contribute to the previous literature by trying to understand how and why customer–smart speaker interactions in services generate favorable customer responses. To do so, this research seeks to analyze the influence of smart speakers on customers' frontline service experiences in three different touchpoints of the customer journey (e.g., Lemon & Verhoef, 2016). First, there is a need to confirm whether customers have positive responses after having interacted with these devices. In this regard, online reviews represent an outstanding source of information to analyze customer responses in terms of evaluation (rating) and affect. Second, if customers respond to interactions with these devices, there is a need to understand the underlying mechanisms during the interaction with the smart speaker that make customers develop positive responses toward the service. In this respect, previous studies suggest that automated social presence and feelings of psychological ownership are crucial to developing positive customer responses toward AI-based services (e.g., van Doorn et al., 2017). Third, it is relevant to analyze whether smart speakers may also affect customer responses at earlier touchpoints—in particular, whether smart speakers are able to create value before they are interacted with. These research objectives led to three research questions: (1) Do smart speakers generate positive sentiments and value for customers? (2) If so, through which mechanisms do positive customer responses arise from the interaction with smart speakers? And (3) do smart speakers provoke positive customer responses before the interaction, thus generating value for firms?

To answer these research questions, this research conducted three studies grounded in the stimulus-organism-response framework (Roschk et al., 2017). Specifically, this research followed a mixed-method approach in hospitality services. The mixed-method approach, combining a quasi-experiment employing natural data, a conventional laboratory experiment, and an experiment with increased behavioral realism, allowed to obtain acceptable levels of internal and external validity (Viglia et al., 2021). Thus, this research first discusses the theoretical foundation on which all three studies rest and that supports the formulation of the hypotheses. Thereafter, the three studies are presented. Finally, findings are discussed, together with their implications and suggestions for further research.

## 2 | LITERATURE REVIEW: IMPLEMENTATION OF AI AND VOICE ASSISTANTS IN SERVICE CONTEXTS

AI can be defined as "the use of computational machinery to emulate capabilities inherent in humans, such as doing physical or mechanical tasks, thinking, and feeling; the multiple AI intelligence view considers that, rather than treating AI as a thinking machine, AI can be designed to have multiple levels of intelligence, as humans have, for different tasks" (Huang & Rust, 2021a, p. 31).

From a marketing perspective, AI is gaining attention as technological advances allow companies to incrementally introduce its usage (Huang & Rust, 2021a). For example, Spotify and Netflix provide highly personalized music and movie recommendations based on their customers' consumption behaviors, which are analyzed through AI (Longoni & Cian, 2022).

AI is different from general information technology, such as personal computers. AI can learn, connect, and adapt to new contexts or circumstances (Huang & Rust, 2021b). Huang and Rust (2021a) propose a three-stage framework for the strategic implementation of AI in marketing that consists of a cycle comprising marketing research to understand the firm's environment; a marketing strategy to develop segmentation, targeting, and positioning decisions; and marketing actions to achieve standardization, personalization, and relationalization benefits. Regarding the last, three different levels of AI intelligence can be leveraged in marketing actions, depending on the target tasks, namely mechanical, thinking, and feeling. Mechanical AI is designed for standardization, thinking AI is designed for personalization, and feeling AI is designed for relationalization, although the last of these is currently restricted to the identification of emotions (Davenport et al., 2020). The three levels of AI can be simultaneously present in AI-based devices, suggesting that they do indeed compose a fuzzy set (Huang & Rust, 2021b).

AI implementation in service contexts involves several types of decisions, such as which level of intelligence to employ, where the AI is embedded (Davenport et al., 2020), and, more importantly, whether it is replacing a human worker (Huang & Rust, 2018) in specific task types (Huang & Rust, 2021b; Longoni & Cian, 2022). Regarding the last of these aspects, human substitution makes more sense for activities that require a lower level of AI, and vice versa. Regarding the first, utilitarian tasks are more appropriate for machines with lower levels of AI, whereas hedonic tasks require higher levels (Huang & Rust, 2021a).

Voice assistants, a specific form of AI, are voice sensors that allow people to communicate and give voice-activated commands (Buhalis & Moldavska, 2022). Smart speakers employing voice assistants can perform daily tasks in which they substitute for humans other than their users by, for example, recommending products or services or reporting weather forecasts (Romero et al., 2021). Additionally, these devices can perform tasks that substitute for the users themselves, such as playing music or setting an alarm (Buhalis & Moldavska, 2022). Some of the activities performed by smart speakers are principally hedonic in nature (telling a joke, playing a game, etc.), while others are more utilitarian (booking a taxi, turning the lights on/off, etc.). Extant research analyzing human–smart speaker interactions does not explain which of these types of activities is most valued by users in service contexts (e.g., Buhalis & Moldavska, 2022 Jiménez-Barreto et al., 2022; Romero et al., 2021). The level of automated social presence might shed light on this regard.

Automated social presence refers to the degree to which a machine makes people feel that they are in the company of a social entity (Heerink et al., 2010). The automated social presence might be a key determinant of customer responses to interactions with AI in frontline services (e.g., van Doorn et al., 2017). Smart speakers are designed to connect with customers, being able to recognize human speech and learn from their interactions with humans (Loureiro et al., 2021). In this way, their behavior creates the illusion that humans are interacting with other beings, forming links that occur in human-to-human interactions (Belanche, et al., 2021). Thus, a highly automated social presence provokes in users a sense of control, an ability to understand or express their self-identity, and a sense of belongingness (van Doorn et al., 2017). This sense of belongingness, known as psychological ownership, is related to the degree to which a person perceives themselves as owning a target of ownership (material or immaterial) (Pierce et al., 2001). Psychological ownership generates customer responses, such as attitudes regarding AI—favorable or unfavorable evaluations (Ajzen, 1991)—or behavioral intentions concerning a firm (e.g., Ruiz-Equihua et al., 2023).

## 3 | RESEARCH OVERVIEW

Today's customer journey is shaped by its interaction with several technologies that can influence customer responses (Ameen et al., 2022). In this respect, this research, which is focused on the use of smart speakers in frontline services, is based on three studies carried out using multiple methods applied to the hotel industry (Viglia et al., 2021). Study 1, employing a sentiment analysis technique, analyzes the impact of the implementation of smart speakers in a service setting on customer evaluation (i.e., ratings) and the development of positive feelings. Study 2 implements an experimental design to understand how customer responses arise from customer–smart speaker interactions. Study 3 employs virtual reality to understand how the presence of smart speakers in hotels may influence potential customers' actual behaviors. The three studies are based on the well-known stimulus-organism-response framework (Roschk et al., 2017). Study 1 proposes that the presence of a smart speaker in a hotel room, compared with its absence, is a stimulus that induces positive customer responses, such as the decision to write reviews and show positive affect (research question 1). Study 2 proposes that the tasks smart speakers can perform for hotel customers are the stimuli that provoke valuable customer responses. Additionally, Study 2 deepens our understanding of how the aforementioned relationship arises by analyzing two underlying mechanisms related to the organism, namely automated social presence and psychological ownership (research question 2). Finally, Study 3, an experiment with increased behavioral realism employing virtual reality, attempts to analyze how a smart speaker's presence (stimulus) elicits actual behaviors (research question 3), such as information searching and opinion writing about the service (responses) before interacting with the speaker. Figure 1 depicts the proposed research models, contextualized within the stimulus-organism-response framework.

## 4 | STUDY 1: THE ROLE OF SMART SPEAKERS IN CUSTOMER EVALUATIONS OF HOTELS

### 4.1 | Method

#### 4.1.1 | Data collection

Study 1 aimed to provide an answer to research question 1 by exploring whether smart speakers—acting as stimuli—can generate responses such as positive feelings among customers and improve individuals' satisfaction with services. Specifically, Study 1 evaluated whether customers rate a hotel better after it implements smart speakers. To perform this task, Study 1 employed Cyotek WebCopy to collect data from the popular worldwide hotel review platform TripAdvisor.

Specifically, hotels that offer smart speakers in guests' rooms were identified. Smart speaker-related terms were searched on the English version of TripAdvisor, such as their brand names (Fuentes Moraleda et al., 2020). After ensuring that the hotels had actually installed smart speakers in their rooms, the initial list was expanded by conducting a search in online reviews oriented toward AI and hospitality sector practitioners. This process led to identify 26 hotels for data crawling (see the Appendix A). The following information was extracted from their reviews: the hotel name, date of the stay, date of the review, overall rating (from 1 to 5), and review text. As the first mentions of smart speakers were made in 2017, reviews between 2012 and 2022 were selected (thus analyzing the 5 years before and after the first comments about smart speakers were made). A total of 61,441 reviews were used in our analysis.

The reviews were classified depending on whether they mentioned smart speakers (using the following strings: Alexa, Amazon- and Google-related terms [Amazon Echo, Amazon Dot, Google Nest, Google Home, etc.], and smart speaker). Additionally, the reviews were categorized into two groups: those left before or after each hotel installed smart speakers. Given that the date of installation in each hotel was not available, the date of the first review mentioning a smart speaker was taken as a proxy. These two classifications allowed a comparison between reviews that do and do not mention smart speakers, both in general and after each hotel installed such speakers.

#### 4.1.2 | Textual analysis

The R package tidytext was used to conduct the textual analysis. Tidytext matches words in a text within lexicons, assigning sentiment punctuation to terms. Specifically, the Bing dictionary (Hu & Liu, 2004; Liu, 2012) was employed. This lexicon categorizes terms as either positive or negative. Sentiment measures were computed as the percentage of positive words over total words in each review, with 0% corresponding to all negative and 100% to all positive.

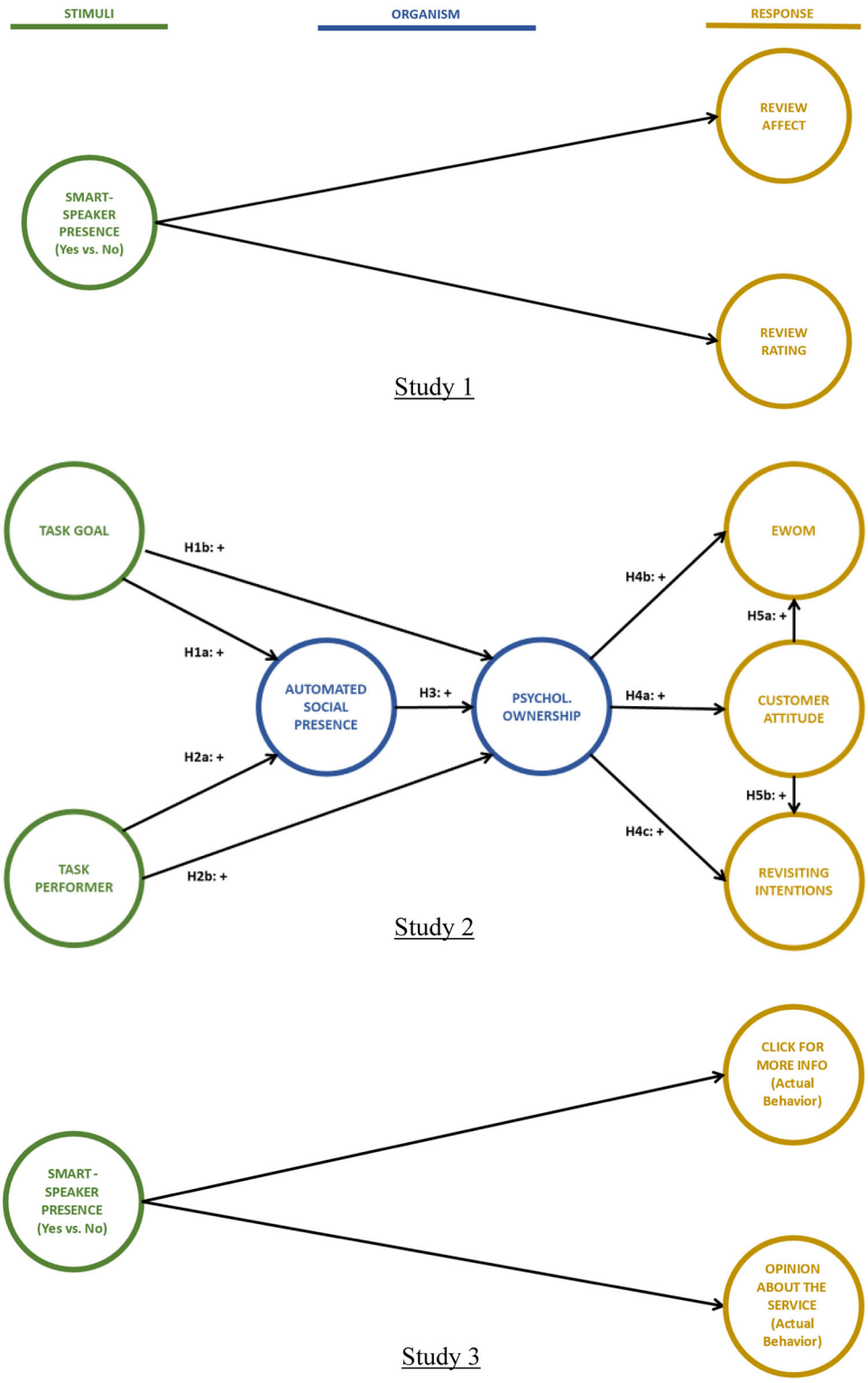


**FIGURE 1** Research overview. Study 1: Gives answer to research question 1; type of study: sentiment analysis; nature: exploratory. Study 2: Gives answer to the research question 2; type of study: 2 × 2 between subjects experiment design; nature: confirmatory. Study 3: Gives answer to the research question 3; type of study: VR-based experiment; nature: exploratory.

### 4.1.3 | Results

Among the 61,441 reviews collected, 28,480 opinions were left after smart speakers had been installed in each hotel. Of these, 1236 reviews mention smart speakers. These reviews show that, in many cases, the smart speakers had a "wow effect" on customers (e.g., "I loved having Amazon Alexa in the room!"). Additionally, these reviews reveal that some individuals mainly used the smart speakers

to perform tasks that they would otherwise have carried out on their own (e.g., [the smart speaker] "makes super easier for us to play music from Spotify, turn on/off all lights"). In contrast, other subjects employed the devices for services usually delivered by company employees (e.g., "Cool technology in the room, such as Alexa [like Siri] whom you can talk to and she can order to have coffee delivered to your room, clean your room or make any additional requests—really neat feature."). The presence of hedonic versus utilitarian tasks is also noteworthy (e.g., "As someone who likes music the added Alexa in each room to listen to my favorite music" vs. "having an Echo with the use of Alexa for weather, news, alarms…").

Regarding review sentiment, *t*-tests revealed that sentiment is more positive in those online reviews that mention smart speakers than in those that do not ($M_{\text{do not mention}} = 85.08$; $M_{\text{mention}} = 86.41$; $p < 0.01$). When focusing on reviews left after the smart speakers were installed, the same results were obtained: reviews were more positive when mentioning smart speakers ($M_{\text{do not mention after}} = 85.53$; $M_{\text{mention after}} = 86.41$; $p < 0.05$). In line with previous research (e.g., Micu et al., 2017; Rains, 2007), the results for overall ratings follow those concerning review sentiments. Ratings were higher for online reviews that mention smart speakers than for those that do not, both in general ($M_{\text{do not mention}} = 4.53$; $M_{\text{mention}} = 4.58$; $p < 0.05$) and after smart speakers were installed ($M_{\text{do not mention after}} = 4.52$; $M_{\text{mention after}} = 4.58$; $p < 0.01$).

As a robustness check, the analysis was replicated using the NRC lexicon (Mohammad & Turney, 2013) for other time windows (with no time restrictions) and reached the same conclusions. Thus, Study 1 results suggest that the incorporation of AI-based smart speakers into service contexts provides value to customers and slightly increases customers' global satisfaction with companies.

## 5 | STUDY 2: THE EFFECT OF VOICE ASSISTANTS' AUTOMATED SOCIAL PRESENCE AND PSYCHOLOGICAL OWNERSHIP ON CUSTOMER RESPONSES TOWARD THE SERVICE PROVIDER

### 5.1 | Theoretical model and hypothesis development

This study aimed to answer research question 2 and understand the mechanisms that explain why interacting with smart speakers may lead to positive customer responses.

Although consumption experiences may involve both hedonic and utilitarian considerations, customers tend to evaluate experiences as either predominantly hedonic or utilitarian (Longoni & Cian, 2022). Hedonic experiences are affectively and emotionally driven, while utilitarian experiences are cognitively driven (Botti & McGill, 2011). By nature, people tend to prefer hedonic experiences over utilitarian ones (Okada, 2005). Services can also provide both hedonic and utilitarian experiences: for example, a spa can offer a relaxing massage (hedonic) or a healing massage for a specific physical problem (utilitarian).

Service providers are currently replacing their frontline employees with AI-based devices with human abilities (Belanche et al., 2021), such as having conversations with customers (Fan et al., 2022). AI-based devices can interact with customers and act as social agents in frontline services (van Doorn et al., 2017). Previous research suggests that customer affective interactions with AI generate stronger feelings of being with a social entity, in the form of automated social presence (Chattaraman et al., 2019). Additionally, psychological ownership, which is related to feelings of ownership regarding material or immaterial objects, occurs, among other mechanisms, when people are affectively tied to the target object (Pierce et al., 2003). Thus, due to the greater affective nature of hedonic experiences, it is reasonable to think that, when performed by a smart speaker, these experiences would generate higher levels of automated social presence and psychological ownership than utilitarian experiences. Therefore, the following hypothesis is proposed:

**H1** A voice assistant performing hedonic tasks generates higher (a) automated social presence and (b) psychological ownership than one performing utilitarian tasks.

Some service settings traditionally require customers to interact with employees to perform specific tasks, but others do not. For example, customers must interact with waiters to order a drink in some restaurants (e.g., some McDonald's establishments), whereas in others, they refill their beverages on their own from self-service machines (e.g., Five Guys). Employee-administered tasks involve interacting with other social entities, whereas self-administered tasks do not.

AI-based devices incorporated into services assist customers in performing both employee-administered and self-administered tasks. For example, as shown in Study 1, smart speakers implemented in some hotels allow guests to order a meal from room service, which is traditionally an employee-administered task, and turn the lights on or off, which is usually a self-administered task.

We posit that employing smart speakers to carry out those tasks commonly considered to be employee-administered is associated with interacting with a social entity, thus generating stronger perceptions of being with another social being even though the employee is not present, whereas self-administered tasks are not associated with social interactions. Additionally, employee-administered tasks might incline customers to perceive their interactions with a smart speaker as a relationship, making them feel that they know the smart speaker intimately and are more willing to invest in this relationship, hence leading to stronger psychological ownership. Therefore, we propose the following hypothesis:

**H2** Employee-administered tasks performed by voice assistants will generate greater (a) automated social presence and (b) psychological ownership than self-administered tasks.

AI-based devices in service settings are changing service processes and customer experiences (Schepers et al., 2022). When it is present, AI can engage customers on a social level that can frame the service experience (van Doorn et al., 2017). To enable this to happen, firms are introducing AI machines with human-like characteristics, such as robots with human bodies (e.g., Ruiz-Equihua et al., 2023) or voices (e.g., Loureiro et al., 2021). This humanization generates perceptions of being with another social entity (Heerink et al., 2010). Social perceptions, such as those included in social cognition, positively influence the psychological perception of ownership regarding a target (e.g., a robot waiter [Ruiz-Equihua et al., 2023]). Thus, it is reasonable to think that the degree of automated social presence might influence psychological ownership feelings. In line with this reasoning, the following hypothesis is proposed:

**H3** The perceived automated social presence of a voice assistant has a positive effect on psychological ownership.

Previous research suggests that psychological ownership, in turn, might generate positive customer responses regarding a service provider (e.g., van Doorn et al., 2017; Kirk et al., 2015). In this regard, Kumar and Nayak (2019) find that feelings of psychological ownership of a destination influence revisiting intentions and recommendation intentions. In a similar vein, Ruiz-Equihua et al. (2023) suggest that psychological ownership of a robot waiter influences positive restaurant-revisiting intentions. Thus, the interaction between customers and AI devices or objects can generate psychological ownership feelings that, in turn, influence positive customer responses regarding the service provider. Specifically, this research proposes that psychological ownership feelings might influence three valuable customer responses regarding service providers, namely customer attitudes, electronic word-of-mouth (eWOM), and revisiting intentions. Thus, this research proposes the following hypothesis:

**H4** Psychological ownership positively influences customer responses toward a hotel that implements voice assistants in terms of (a) customer attitudes, (b) eWOM, and (c) revisiting intentions.

According to Davis (1989), individuals form intentions to perform certain behaviors toward those objects about which they have a positive attitude. This relationship between attitudes and intentions has been widely assessed in several frameworks, such as the technology acceptance model (Davis, Bagozzi, et al., 1989), the theory of reasoned action (Fishbein & Ajzen, 1975), and the theory of planned behavior (Ajzen, 1991). In this regard, previous research regarding human–AI interactions shows that attitudes are a key antecedent of customer behavioral intentions. For instance, Romero and Lado (2021) find that positive attitudes toward being attended by a robot elicit stronger booking intentions in hotels. Similarly, Romero et al. (2021) show that attitudes regarding a restaurant recommendation made by a smart speaker positively influence customer intentions to visit the recommended restaurant. Hence, in line with previous research, we posit that attitudes positively influence other customer responses, specifically eWOM and revisiting intentions. Thus, the following hypothesis is proposed:

**H5** The better the customer attitudes toward hotels that implement voice assistants, the higher the (a) positive eWOM about the hotel and (b) hotel revisiting intentions.

The hypotheses development is in line with the well-known stimulus-organism-response framework (Roschk et al., 2017). This research proposes that task goal and task performer are the stimuli that can induce responses (attitudes, eWOM, and hotel revisiting intentions), which arise as a consequence of changes in the organism in terms of automated social presence and psychological ownership.

For the sake of completeness, the research model included gender and age as control variables. First, women and men may process information in different ways (e.g., Venkatesh & Morris, 2000). Second, customers of different ages may also process information differently (e.g., Ruiz-Equihua et al., 2021). Figure 1 depicts the research model used in Study 2.

## 5.2 | Method

### 5.2.1 | Data collection and sample

Data were collected through a questionnaire implemented in Qualtrics. The sample consisted of 322 Spanish participants and was balanced in terms of gender, being 53.1% female ($n = 171$) and 46.9% male ($n = 151$). The respondents were aged 18–20 (31.4%), 20–24 (64.6%), 25–34 (3.4%), and 35–44 (0.6%). They were recruited through convenience sampling. The questionnaire described a travel situation in which the respondent finds a smart speaker on their hotel room night table upon arrival. They activate the smart speaker, which introduces itself and explains the tasks that it can perform for the participant, following a $2 \times 2$ design (utilitarian vs. hedonic; self-administered vs. employee-administered tasks), through an audio message lasting approximately 26 s. Table 1 displays the tasks included in the four audio communications. Subsequently, the respondents answered the questions related to our research variables.

### 5.2.2 | Measurement scales and validation

The research model was tested through the partial least square (PLS) method using SmartPLS 3.0 statistical software (Ringle et al., 2015). Automated social presence, customer attitudes, and revisiting and eWOM intentions were measured as first-order

**TABLE 1** Description of the task included in the experiment audios.

| Task goal | | |
|---|---|---|
| **Task performer** | **Utilitarian** | **Hedonic** |
| Self-administered | • Switch on/off the lights.<br>• Turn on/off the air conditioning.<br>• Check the weather forecast.<br>• Check what time is.<br>• Check your personal agenda. | • Play your favorite music.<br>• Switch on/off the TV.<br>• Read a poem for you.<br>• Call a friend by phone.<br>• Send a message to a friend. |
| Employee-administered | • Booking a taxi.<br>• Set up a wake-up alarm.<br>• Ask for a booking extension in the hotel.<br>• Ask for laundry service.<br>• Ask for a toothbrush. | • Book a relaxing massage at the hotel.<br>• Ask for a drink.<br>• Ask to fulfill the minibar service.<br>• Give you a restaurant recommendation.<br>• Buy tickets for a touristic attraction. |

reflective constructs, following previous research. Task goal (hedonic vs. utilitarian) and task performer (self-administered vs. employee-administered) were measured with a semantic differential scale of one item. Following psychological ownership theory (Pierce et al., 2001, 2003), psychological ownership was measured as a Type II reflective-formative second-order construct (Hair et al., 2022), that is, a second-order formative construct composed of reflective first-order constructs, namely perceived control, intimate knowledge, and self-investment. The measurement scales were taken and adapted from previous research, as can be seen in Table 2.

### 5.2.3 | Realism and manipulation checks

The realism and credibility of the situations presented to participants were assessed on a 7-point Likert scale adapted from Ruiz-Equihua et al. (2023). *T*-tests confirmed the questionnaire's realism and credibility ($M_{\text{realism and credibility}} = 5.61$, significantly above the midpoint scale, $t = 32.07$, $p < 0.01$). Additionally, this research evaluated whether the situations presented to participants had the intended differences in terms of task goal (utilitarian vs. hedonic tasks) and task performer (self-administered vs. employee-administered). Hedonic task ($M_{\text{hedonic}} = 3.31$) situations differed from the utilitarian task ($M_{\text{utilitarian}} = 2.78$) situations in terms of task goal perceptions: the former were perceived as more hedonic and the latter as more utilitarian ($F = 6.94$, $p < 0.01$). Employee-administered situations ($M_{\text{employee-administered}} = 4.46$) differed from self-administered situations ($M_{\text{self-administered}} = 2.57$) in terms of who was considered the most common task performer ($F = 70.10$, $p < 0.01$), according to our intended manipulation.

## 5.3 | Results

### 5.3.1 | Measurement model

Psychological ownership was measured as a reflective–formative second-order construct, following a two-stage approach (Hair et al., 2022). First, the reliability and validity of the research first-order constructs included in the model were confirmed (Table 2). The Cronbach's $\alpha$ of the constructs fluctuated from 0.76 to 0.96, surpassing the 0.70 threshold (Nunnally, 1994). The composite reliability, which ranged between 0.87 and 0.97, was also higher than the 0.70 thresholds and supported the construct's reliability. Moreover, the average variance extracted (AVE) was higher than the cut-off value, varying from 0.65 to 0.92 (Hair et al., 2022) and thus assuring the convergent validity of the measures. The discriminant validity of the constructs was assessed using two criteria (Table 3): the square root AVE of each construct was higher than their correlations with other constructs (Fornell & Larcker, 1981), and the heterotrait–monotrait ratio of correlations between constructs was below the 0.85 threshold (Henseler et al., 2015).

Second, the model was reestimated by including perceived control, intimate knowledge, and self-investment latent scores as formative indicators of psychological ownership. These indicators were significant at a 95% level, except for intimate knowledge (bootstrapping: 10,000 subsamples). Despite its lack of significance, intimate knowledge was retained due to its theoretical relevance in forming psychological ownership (Jussila et al., 2015; Pierce et al., 2001): nonsignificant indicators must be retained if suggested by theory-driven conceptualizations of the variable (Hair et al., 2022). Finally, the variance inflation factors were

**TABLE 2** Measurement items.

| Items | *M* | SD | EK | *S* | FL |
|---|---|---|---|---|---|
| ASP (Delgosha & Hajiheydari [2021]; Gefen & Straub [2003]) ($\alpha$ = 0.87; CR = 0.90; AVE = 0.65) | | | | | |
| When interacting with this smart speaker, I would say that there is a sense of… | | | | | |
| Human contact | 1.96 | 1.23 | 0.55 | 1.22 | 0.78 |
| Personalness | 2.89 | 1.51 | −0.79 | 0.44 | 0.81 |
| Sociability | 2.50 | 1.49 | 0.10 | 0.89 | 0.79 |
| Human warmth | 2.04 | 1.23 | 1.35 | 1.30 | 0.83 |
| Human sensitivity | 1.88 | 1.18 | 2.33 | 1.60 | 0.80 |
| PO—perceived control (Delgosha & Hajiheydari [2021]) ($\alpha$ = 0.76; CR = 0.87; AVE = 0.69) | | | | | |
| If I interacted with this smart speaker … | | | | | |
| I would feel I have control over this smart speaker | 4.89 | 1.68 | −0.48 | −0.61 | 0.87 |
| When I consider this smart speaker, I would feel in control | 4.15 | 1.44 | −0.54 | −0.12 | 0.72 |
| In general, I would have control over this smart speaker | 4.93 | 1.57 | −0.36 | −0.58 | 0.87 |
| PO—intimate knowledge (Delgosha & Hajiheydari [2021]) ($\alpha$ = 0.91; CR = 0.94; AVE = 0.79) | | | | | |
| If I interacted with this smart speaker … | | | | | |
| I would be intimately familiar with what is going on regarding this smart speaker | 4.32 | 1.59 | −0.69 | −0.19 | 0.85 |
| I would have a depth of knowledge as it relates to this smart speaker | 3.61 | 1.58 | −0.74 | 0.14 | 0.91 |
| I would have comprehensive understanding of this smart speaker | 3.75 | 1.63 | −0.90 | 0.08 | 0.90 |
| I would have a broad understanding of this smart speaker | 3.99 | 1.64 | −0.82 | −0.09 | 0.89 |
| PO—self-investment (Delgosha & Hajiheydari [2021]) ($\alpha$ = 0.88; CR = 0.92; AVE = 0.80) | | | | | |
| If I interacted with this smart speaker … | | | | | |
| I would feel very involved in my relationship with this smart speaker–like if I had put a great deal into it | 2.83 | 1.65 | −0.49 | 0.68 | 0.89 |
| I would have invested a great deal in my relationship with this smart speaker | 2.42 | 1.48 | 0.01 | 0.90 | 0.93 |
| The time I would have spent on this smart speaker would be significant | 2.87 | 1.56 | −0.66 | 0.56 | 0.86 |
| Customer attitudes (Romero & Lado [2021]) ($\alpha$ = 0.96; CR = 0.97; AVE = 0.85) | | | | | |
| I would have a positive opinion of this hotel | 5.23 | 1.31 | 0.08 | −0.61 | 0.91 |
| I think that visiting this hotel would be a good idea | 5.17 | 1.32 | 0.12 | −0.61 | 0.93 |
| I think that visiting this hotel would be a wise idea | 4.95 | 1.42 | −0.27 | −0.46 | 0.92 |
| I think that visiting this hotel would be an appropriate idea | 4.98 | 1.38 | 0.05 | −0.53 | 0.93 |
| Visiting this hotel would be a pleasant experience | 5.08 | 1.36 | 0.29 | −0.71 | 0.89 |
| eWOM intentions (Wen et al. [2018]) ($\alpha$ = 0.90; CR = 0.93; AVE = 0.72) | | | | | |
| I would recommend this hotel in social networking sites | 4.63 | 1.64 | −0.63 | −0.32 | 0.84 |
| When asked in social networking sites, I would say good things about this hotel | 5.07 | 1.40 | 0.05 | −0.56 | 0.88 |
| I would say positive things about this hotel via my personal social networks (e.g., Facebook, twitter, Instagram) | 4.17 | 1.80 | −0.97 | −0.10 | 0.80 |
| I would recommend this hotel in social networking sites | 4.85 | 1.52 | −0.42 | −0.43 | 0.88 |
| When I see questions about this hotel online, I would say good things about the hotel | 4.63 | 1.62 | −0.54 | −0.36 | 0.81 |
| Customer revisiting intentions (Abubakar et al. [2017]) ($\alpha$ = 0.91; CR = 0.96; AVE = 0.92) | | | | | |
| I would intend to revisit this hotel soon | 4.68 | 1.46 | −0.40 | −0.31 | 0.95 |
| It would be very likely that I revisited this hotel | 4.69 | 1.46 | −0.39 | −0.36 | 0.96 |
| Task goal ($\alpha$ = N/A; CR = N/A; AVE = N/A) | | | | | |
| The tasks that the smart speaker can do are… | | | | | |
| Utilitarian—Hedonic | 3.06 | 1.82 | −0.65 | 0.62 | 1.00 |
| Task performer ($\alpha$ = N/A; CR = N/A; AVE = N/A) | | | | | |
| The tasks that the smart speaker can do are usually performed by… | | | | | |
| Hotel customers—Hotel staff | 3.55 | 2.23 | −1.43 | 0.29 | 1.00 |

*Note*: All items are measured with a 7-point Likert scale ranging from *strongly disagree* (1) to *strongly agree* (7) except for task goal and task performer, which are measured with semantical differential scales. Task goal: one utilitarian task to seven hedonic tasks. Task performer: one hotel customer to seven hotel staff.

Abbreviations: AVE, average variance extracted; CR, composite reliability; ES, exceeded kurtosis; eWOM, electronic word-of-mouth; FL, factor loading; M, mean; S, Skewness; SD, standard deviation; α, Cronbach's alpha.

assesed, which ranged from 1.30 to 1.48, indicating that multicollinearity was not a problem in our measurement of psychological ownership. In summary, the psychological ownership construct covered all the crucial elements for index construction (Hair et al., 2022).

**TABLE 3** Discriminant validity analysis.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| 1. ASP | **0.81** | 0.32 | 0.22 | 0.17 | 0.48 | 0.26 | 0.16 | 0.07 | 0.27 |
| 2. Attitude | 0.30 | **0.92** | 0.24 | 0.34 | 0.3 | 0.84 | 0.11 | 0.02 | 0.79 |
| 3. PO intimate knowledge | 0.19 | 0.22 | **0.89** | 0.53 | 0.53 | 0.2 | 0.06 | 0.02 | 0.24 |
| 4. PO perceived control | 0.14 | 0.29 | 0.46 | **0.83** | 0.43 | 0.28 | 0.04 | 0.08 | 0.34 |
| 5. PO self-investment | 0.42 | 0.27 | 0.48 | 0.35 | **0.90** | 0.25 | 0.05 | 0.19 | 0.32 |
| 6. Revisit intentions | 0.24 | 0.78 | 0.19 | 0.24 | 0.23 | **0.96** | 0.12 | 0.03 | 0.83 |
| 7. Task goal | 0.14 | −0.11 | 0.02 | −0.04 | 0.05 | −0.11 | **1.00** | 0.07 | 0.11 |
| 8. Task performer | 0.07 | −0.01 | 0.02 | 0.01 | 0.18 | 0.03 | 0.07 | **1.00** | 0.05 |
| 9. eWOM | 0.25 | 0.74 | 0.22 | 0.28 | 0.28 | 0.75 | −0.10 | 0.04 | **0.85** |

*Note*: Bold numbers on the diagonal show the square root of the AVE values; numbers below the diagonal represent construct correlations; numbers above the diagonal represent the HTMT radio.

Abbreviations: AVE, average variance extracted; eWOM, electronic word-of-mouth; HTMT, heterotrait−monotrait ratio of correlations.

### 5.3.2 | Hypothesis testing

The standardized root mean square residual (SRMR = 0.06) and normed-fit index (NFI = 0.86) demonstrated an acceptable fit for the research model (Hair et al., 2022). The adjusted $R^2$ values of the research model constructs were 0.03 for automated social presence, 0.18 for psychological ownership, 0.55 for eWOM, 0.61 for revisiting intentions, and 0.11 for attitudes. A bootstrapping procedure (10,000 subsamples and no sign change) was employed to test the path coefficient significance (Table 4). First, the task goal positively influenced automated social presence levels ($\beta = 0.14$, $p < 0.05$), supporting H1a. Specifically, hedonic tasks generate higher social presence than utilitarian tasks. However, the task goal effect on psychological ownership was nonsignificant ($\beta = -0.04$, $p > 0.05$), which did not support H1b. Second, the task performer influenced psychological ownership ($\beta = 0.12$, $p < 0.05$) but not automated social presence ($\beta = 0.06$, $p > 0.05$), thus failing to support H2a and supporting H2b. In other words, employee-administered tasks generate greater psychological ownership than guest-administered tasks. Third, the automated social presence positively influenced psychological ownership ($\beta = 0.39$, $p < 0.01$), supporting H3; that is, greater automated social presence elicits higher psychological ownership feelings. Fourth, psychological ownership positively influenced attitudes ($\beta = 0.03$, $p < 0.01$) and eWOM ($\beta = 0.10$, $p < 0.05$), but not revisiting intentions ($\beta = 0.01$, $p > 0.05$). Thus, the results support H4a and H4b, but not H4c. Finally, the results indicate that attitudes positively influenced eWOM and revisiting intentions, supporting H5a ($\beta = 0.70$, $p < 0.01$) and H5b ($\beta = 0.78$, $p < 0.01$). Regarding indirect effects, customer attitude mediated the influence of psychological ownership on revisiting intentions (Table 4). In addition, several other indirect influences appeared in the research model, indicating that automated social presence and psychological ownership are key mediating variables in developing positive customer responses. Finally, the results indicate that age and gender, included as control variables, do not influence automated social presence and psychological ownership.

## 6 | STUDY 3. TOURIST BEHAVIORAL RESPONSES TO SMART SPEAKERS IN HOTELS

### 6.1 | Method

Study 3 aimed to answer research question 3 and analyze whether actual behaviors may arise (as responses) before interacting with a smart speaker (the stimulus), which may help improve the external validity and generalizability of the results. To do so, a total of 33 Portuguese participants (55.9% male, 41.2% female) recruited through convenience sampling took part in a virtual reality experiment, which allowed to develop a more realistic setting. Oculus Rift S virtual reality hardware and software were used for the experiment. Study 3 followed the recommendations made by Viglia et al. (2021) and presented the participants with a situation in which they had to make a choice (i.e., to click yes/no to look for more information about a company) and detail their first impressions of the service provided before interacting with the speaker. Doing so allowed Study 3 to differentiate between those who considered the presence of the smart speaker important and those who did not.

First, the participants were located in front of a smart speaker, received a brief introduction regarding its functioning, and were informed about the research purpose. Second, the participants were asked to imagine themselves arriving at a hotel room for a stay, where a smart speaker like the one in front of them was on the night table. Next, using Oculus Rift S virtual reality glasses, the participants were immersed in a 360° virtual reality video displaying a hotel room. While the participants were immersed in the virtual reality, the smart speaker introduced itself through the audio used in Study 2 regarding

**TABLE 4** Results of the structural equation analysis.

| | | | | Bias corrected confidence interval | |
|---|---|---|---|---|---|
| | PC | $f^2$ | *t* | Lower bound | Upper bound |
| Direct effects | | | | | |
| Task goal → ASP | 0.14 | 0.02 | 2.22* | 0.01 | 0.27 |
| Task goal → PO | −0.04 | 0.00 | 0.75 | −0.16 | 0.07 |
| Task performer → ASP | 0.06 | 0.00 | 1.00 | −0.06 | 0.16 |
| Task performer→ PO | 0.12 | 0.02 | 2.00* | 0.01 | 0.24 |
| ASP → PO | 0.39 | 0.17 | 7.18*** | 0.28 | 0.49 |
| PO → customer attitudes | 0.33 | 0.13 | 5.94*** | 0.22 | 0.45 |
| PO → eWOM intentions | 0.10 | 0.02 | 2.41* | 0.02 | 0.18 |
| PO → Revisiting intentions | 0.01 | 0.00 | 0.38 | −0.06 | 0.09 |
| Customer attitudes → eWOM intentions | 0.70 | 0.98 | 20.91*** | 0.63 | 0.77 |
| Customer attitudes → Revisiting intentions | 0.78 | 1.40 | 24.85*** | 0.71 | 0.84 |
| Total indirect effects | | | | | |
| ASP → Attitude | 0.13 | n/a | 4.22*** | 0.07 | 0.19 |
| ASP → eWOM | 0.13 | n/a | 3.75*** | 0.07 | 0.19 |
| ASP → Revisiting intention | 0.11 | n/a | 4.22*** | 0.05 | 0.16 |
| PO → Revisiting intentions | 0.25 | n/a | 5.44*** | 0.14 | 0.33 |
| PO → eWOM | 0.23 | n/a | 5.61*** | 0.13 | 0.30 |
| Task goal → PO | 0.05 | n/a | 1.99* | 0.01 | 0.11 |
| Task goal → Attitude | 0.00 | n/a | 0.17 | −0.04 | 0.04 |
| Task goal → Revisiting intentions | 0.00 | n/a | 0.16 | −0.03 | 0.03 |
| Task goal → eWOM | 0.00 | n/a | 0.17 | −0.04 | 0.04 |
| Task performer → PO | 0.02 | n/a | 0.94 | −0.02 | 0.07 |
| Task performer → Attitude | 0.04 | n/a | 2.16* | 0.01 | 0.09 |
| Task performer → Revisiting intentions | 0.03 | n/a | 2.06* | 0.01 | 0.08 |
| Task performer → eWOM | 0.04 | n/a | 2.09* | 0.01 | 0.09 |
| Control variables | | | | | |
| Age → ASP | 0.03 | 0.00 | 0.48 | −0.09 | 0.15 |
| Age → PO | 0.07 | 0.01 | 1.24 | −0.04 | 0.18 |
| Gender → ASP | 0.02 | 0.00 | 0.06 | −0.09 | 0.12 |
| Gender → PO | −0.01 | 0.00 | 0.05 | −0.01 | 0.10 |

| Constructs | $Q^2$ (=1− SSE/SSO) | Variance explained ($R^2$) |
|---|---|---|
| ASP | 0.01 | 0.02 |
| PO | 0.07 | 0.16 |
| Customer attitudes | 0.09 | 0.11 |
| eWOM | 0.39 | 0.55 |
| Revisiting intentions | 0.56 | 0.61 |
| Model fit | | |
| SRMR | | 0.06 |
| d_ULS | | 0.08 |
| d_G | | 0.38 |

**TABLE 4** (Continued)

| Constructs | $Q^2$ (=1– SSE/SSO) | Variance explained ($R^2$) |
|---|---|---|
| $\chi^2$ | | 743.44 |
| NFI | | 0.86 |
| rms Theta | | 0.16 |

*Note*: Task goal from one utilitarian to seven hedonic. Task performer from one hotel customer to seven hotel employees.

Abbreviations: eWOM, electronic word-of-mouth; NFI, normed-fit index; ns, not significant; PC, path coefficient; SRMR, standardized root mean square residual.

$^{*}p < 0.05$, $^{***}p < 0.001$.

the tasks that the device could make for them (with one audio recording randomly assigned to each participant). Third, the participants were asked to explain in detail their first impressions of the hotel upon arrival, as if they were reporting to their family or friends via multiplatform messaging such as WhatsApp. Additionally, a banner was shown to the participants, who had to choose whether they wanted to be redirected to the hotel's Instagram profile for more information by clicking on the banner. If participants clicked yes, the next screen showed a message letting them know that the hotel's web page was unavailable at the moment.

### 6.2 | Results

Research results showed that 33.33% of the participants mentioned the smart speaker in their comments, in most cases associating the device with positive comments, such as

- "Even had a speaker to help me enhance my stay. I can ask her anything and she will help."
- "They had Alexa! Super cool!"
- "Has an Alexa that lets you control a lot of stuff in the room."

Additionally, 81.81% of those who mentioned the smart speaker clicked the banner to visit the Instagram profile of the hotel to receive more information. In turn, only 27.27% of those who did not mention the device in their comments clicked the banner. Thus, a greater percentage of information-searching behaviors emerged among those who reported the presence of the smart speaker in the hotel room.

## 7 | DISCUSSION

Across three complementary studies, this research analyzed the customer–smart speaker relationship in a service context. Based on sentiment analysis of actual customer reviews, research results first showed that smart speakers provoke positive feelings among service customers, which affect customer assessments of service quality after interacting with these devices, thus answering research question 1. Smart speakers probably enhance the level of satisfaction with a brand/firm, which is an important loyalty driver (e.g., Loureiro et al., 2014). These AI-based devices provide value to customers because, beyond the tasks they can perform, it is possible that interacting with a smart speaker can induce confidence, pleasure, and other positive outcomes.

This research unveiled, through an experimental design, the key mechanism that explains the development of valuable customer responses and analyzed how the goal of the task (hedonic vs. utilitarian) and the task performer (self-administered vs. employee-administered) affect this process during customer interaction with smart speakers in services, thus answering research question 2. The task goal performed by smart speakers influences automated social presence but not psychological ownership feelings. As smart speakers develop more hedonic tasks, they are more likely to be perceived as social entities. Hedonic service tasks are more sensorial and induce pleasure for customers (Botti & McGill, 2011; Huang, 2005), which contributes to the sensation of having a social companion. This result is in line with previous research pointing out that people generally prefer hedonic tasks to utilitarian ones (e.g., Okada, 2005). Additionally, the task performer influences psychological ownership but not automated social presence feelings. Employee-administered tasks performed by the smart speaker develop customers' tendencies to have a relationship with the smart speaker. In turn, this relationship can induce in customers a stronger sense of intimate knowledge of the smart speaker and a greater propensity to invest in this relationship.

The current research corroborates Ruiz-Equihua et al.'s (2023) findings demonstrating the positive effect of social elements attributed to AI-based devices on psychological ownership, which subsequently generates positive outcomes for firms. Customers perceive that an AI device, such as a smart speaker, belongs to them (Pierce et al., 2001, 2003) and are interested in continuing the relationship not only with the AI device, as previous studies suggest (Delgosha & Hajiheydari, 2021), but also with the firm using it (as our research shows). Interestingly, psychological ownership feelings toward the smart speaker develop appropriate behavioral intentions (recommending the hotel in the future). In this vein—and answering the second research question—the psychological ownership felt by the customer is at the core of the mechanism by which positive customer responses arise from the customer–smart speaker relationship. Thus, when the smart speaker is able to perform employee-administered tasks, customers perceive it as warm, sensitive, sociable, and owned by them, developing positive evaluations and recommendations about the company that installed it.

Finally, this research showed that the incorporation of smart speakers into services can also influence actual customer behaviors before individuals interact with this technology (answering research question 3). Specifically, research results indicated that those who emphasize the existence of a smart speaker in their first impressions of a service tend to look for information about the service provider. This finding not only corroborates findings of past research concerning the behavioral intentions that arise from the interaction with smart speakers (e.g., Fan et al., 2022; Flavián et al., 2022) but also extends them to a stage before the interaction.

## 7.1 | Theoretical implications

This research contributes to extant literature regarding the employment of AI in service contexts—specifically the use of smart speakers in hospitality services—in several ways. First, the three studies were grounded on the stimulus-organism-response framework, helping to extend it to the context of the use of smart speakers in hospitality services. To date, most studies have focused on consumers' motivations for using voice or text assistants (e.g., Jiménez-Barreto et al., 2022; Lee & Cho, 2020), AI–user interactions (e.g., Flavián et al., 2022; Loureiro et al., 2021; Ruiz-Equihua et al., 2023), and drivers of positive attitudes toward AI (Mclean & Osei-Frimpong, 2019). This research considered whether using smart speakers as stimuli can develop positive feelings among customers. Thus, this research contributes to the theory by demonstrating the favorable effect of smart speaker stimuli on customers' responses.

Second, the extant research introduces automated social presence and psychological ownership feelings to understand how they affect customer attitude, eWOM, or revisiting intentions. Thus, automated social presence and psychological ownership feelings (Chattaraman et al., 2019; Pierce et al., 2003) operate as emotional components of the organism. The AI–customer interaction can develop the feeling of being with a social entity, which, in turn, creates in humans a feeling of ownership toward the AI. The link between automated social presence and psychological ownership brings to the theory the mechanism by which customers interiorize the stimuli of the different tasks performed by the AI. Therefore, this research integrates the psychological ownership theory into the stimulus-organism-response framework. Hence, this research contributes to psychological ownership theory (Pierce et al., 2001, 2003) by enhancing knowledge of how ownership feelings arise.

Third, this research exposes how the type of tasks—goal or performer—influence automated social presence and psychological ownership feelings. Task goal stimuli influence more automated social presence levels, and the task performer mainly affects psychological ownership feelings. Task goals can create in customers the sensation of being in the presence of a social entity (Heerink et al., 2010). Specifically, hedonic tasks can lead to positive responses by the customer—for instance, a positive attitude or eWOM. The employee-administered task can provoke in customers the feeling of owning the smart speaker (AI) (Ruiz-Equihua et al., 2023), being effectively tied to it. Such ownership feelings can also lead to positive responses from customers. Thus, this research deepens our understanding of human substitution by AI and the tasks (i.e., utilitarian or hedonic) it must perform.

Finally, the presence of smart speakers as stimuli can provoke customers to search for information and provide an opinion about services. Consequently, the employment of smart speakers in services improves customer ratings and generates more positive emotions and valuable customer responses, such as information searching. Smart speakers are, in fact, good stimuli to be interiorized by customers and elicit positive responses.

## 7.2 | Managerial implications

This research has interesting practical implications for service managers. First, the main contribution of this research is to indicate that service providers must consider the implementation of AI devices, such as smart speakers. The results of this research demonstrate that the presence of smart speakers improves customer ratings and generates stronger positive emotions among hotel customers. Thus, accommodation providers should consider installing smart speakers to enhance their customers' satisfaction, as previous studies also seem to suggest (e.g., Loureiro et al., 2021).

Second, focusing on the tasks that smart speakers can perform for hotel customers, the research results show that the task type affects customer responses. To generate more positive customer responses, accommodation providers should implement smart speakers that can perform more hedonic than utilitarian tasks. Additionally, accommodation providers must consider that smart speakers are more valuable for customers if they can substitute for frontline employees in some activities. The research results suggest that customers develop more positive responses when the smart speaker performs employee-administered tasks.

Third, it is common in our era to find virtual reality videos about services such as hotel rooms on the internet. For example, Novotel, a franchise owned by Accor, has virtual reality videos on YouTube exhibiting their hotel rooms. Service providers placing virtual reality videos on the internet and employing smart speakers in their services must ensure that smart speakers are included in the video. The research results demonstrate that customers exhibit better behaviors (i.e., information searching and sharing) when the smart speaker is included than when it is not. Therefore, service providers that do not post virtual reality videos about their companies on the internet should consider doing so. The research results demonstrate that real customer behaviors arise when customers are immersed in virtual reality.

## 7.3 | Limitations and further research

Despite its interesting results, this research is not exempt from limitations that offer potential avenues for further research. First, this

research focused on a specific service, namely hotels, and a specific form of AI, namely voice assistants. Further research might replicate this research using different service settings and applications with a range of intelligence levels, as implementation acceptance is situation-dependent (Schepers et al., 2022). Second, Study 2 of this research considered the relationship between automated social presence, psychological ownership, and customer responses. Further research, in line with van Doorn et al.'s (2017) proposals, might consider the role of social cognition when analyzing the automated social presence on AI implementation in services. Additionally, this research considered two specific antecedents of automated social presence and psychological ownership: the task goal and task performer. Further research might replicate our model while including other variables that might affect customer responses. On the one hand, variables related to the design of the smart speaker, such as perceived ease of use (Kowalczuk, 2018), may have a crucial influence on its initial stages of adoption (e.g., Davis, 1989). On the other hand, individual characteristics, such as the user's technical knowledge and experience with the product or technology readiness (Parasuraman, 2000), may also be crucial in this context. (Kowalczuk, 2018). Third, this research considered three specific customer responses: attitude, eWOM intentions, and revisit intentions. Further research might replicate our model by considering other valuable customer responses, such as engagement or subjective well-being (van Doorn et al., 2017). Finally, Studies 2 and 3 results were circumscribed to samples from two specific countries, namely Spain and Portugal. Further research might replicate Studies 2 and 3 with samples from other countries, such as the United States, to provide a more general point of view and detect cultural elements that might affect how customers interact with smart speakers.

## 8 | CONCLUSION

To enhance the understanding of the influence of AI technology on customer responses in services, this research encompassed three different studies. Study 1, employing a sentiment analysis technique, showed that the presence of smart speakers enhances customer satisfaction with and positive feelings toward frontline services after interaction with this technology. Study 2, through an experimental design and structural equation modeling, showed that customer responses depend on the tasks that the smart speaker can perform for customers during the interaction between the device and the customer. Specifically, in the hotel context, customers seem to prefer smart speakers that perform hedonic tasks, which make them feel as if they are in the presence of another social entity, and tasks traditionally associated with frontline employees. Additionally, the research findings show that automated social presence and psychological ownership are the two key mechanisms that explain the development of valuable customer responses. Finally, Study 3, through an experimental design employing virtual reality, showed that smart speakers also affect actual behaviors before interacting with this technology: customers who noticed the presence of a smart speaker in the virtual room generated more significant information-searching and -sharing behaviors than those who did not report the presence of a smart speaker.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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**How to cite this article:** Ruiz-Equihua, D., Romero, J., Casaló, L. V., & Loureiro, S. M. C. (2023). Smart speakers and customer experience in service contexts. *Psychology & Marketing*, 1–15. https://doi.org/10.1002/mar.21907

## APPENDIX A: Study 1: Data collection

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|---|---|
| Hotels: | ACME Hotel Company (US), Aleva Villa (Bali), Astera Villa Seminyak (Indonesia), Charlotte Marriott City Center (US), Copperleaf Boutique Hotel & Spa (US), Elliot Park Hotel Autograph Collection (US), Embassy Suites by Hilton Seattle Downtown Pioneer Square (US), Encore at Wynn Las Vegas (US), Encore Boston Harbor (US), Hotel Century Southern Tower (Japan), Hotel EMC2 Autograph Collection (US), Hotel Walloon (US), Hotel Zena A Viceroy Urban Retreat (US), Hotel Zetta San Francisco a Viceroy Urban Retreat (US), JA Lake View Hotel (United Arab Emirates), Marriott Irvine Spectrum (US), Park Inn By Radisson New Delhi IP Extension (India), Spring Hotel Vulcano (Spain), The Alan (United Kingdom), The Alexis Royal Sonesta Hotel Seattle (US), The Grand (US), The Woolstore 1888 by Ovolo (Australia), theLAB Cape Town (South Africa), Village Hotel Bristol (United Kingdom), Wynn Las Vegas (US) |