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The acceptance and resistance factors influencing consumers' intention to use virtual shopping assistants and the role of relationship quality

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November, 2022

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Acknowledgements

I can finally say “I did it!”.

For a long time, I did not believe I would be able to get to this point and being honest it still feels surreal to be writing this part of my thesis. This was probably the hardest thing I have done in my academic journey, both physically and emotionally. However, I can finally say “I did it”. I am so proud of what I accomplished, I learned a lot, read a lot, wrote a lot, and most importantly I did not give up. This would not be possible without the support of so many amazing people around me.

First of all, I am so grateful to have Professor Ricardo Bilro as my thesis supervisor, this would 100% not be possible without his support, patience, and kind words. Thank you, professor, for never giving up on me and always believing we would get to this day.

To my friends, I am back! Thank you for your patience and support, you all know how much you mean to me. Special thanks to my academic better half, Sara, I am so grateful that I got to know you better and I cannot thank you enough for everything you did for me.

My grandparents may not read this, but I will make sure that I read it to them. Thank you for believing in me and rooting for me even if you did not completely understand what I was doing.

João, it is hard to express how grateful I am to have you in my life. Thank you for listening to me, for wiping my tears, for spoiling me, for watching a series with me when I needed distraction and thank you most of all for sticking with me through every step of this journey.

To my little brother, thank you for doing one or two dishes more so I could work on my thesis, I will do the same if you ever write a thesis. Jokes aside, I am thankful that you recognized I was going through something hard and tried to help.

To my parents, you are the best parents anyone could ask for. You are my biggest supporters, the cheerleaders of every chapter of my life. I want you to know that I am only the woman I am because of you. You both are an example of integrity, resilience, and hard work, you are my biggest inspiration. Above all, thank you for the transparency and open conversations, thank you for always expressing openly how proud you are of me. I love you so much for that.

This is it, I did it and I am so proud of myself.

Resumo

Com a crescente evolução da inteligência artificial e de tecnologias de localização indoor, os retalhistas são agora capazes de acrescentar características tipicamente humanas e capacidades de localização às suas aplicações. Com isto, estas aplicações estão a tornar-se Assistentes de Compras Virtuais (ACVs), capazes de ajudar os clientes ao longo de toda a sua experiência de compra, fornecendo recomendações de produtos, ajudando na navegação dentro da loja e verificando a disponibilidade dos produtos. O objetivo deste estudo é identificar os fatores que influenciam a intenção que os consumidores têm de utilizar as ACVs.

Ao estender o modelo TAM (technology acceptance model), um novo modelo conceptual foi desenvolvido. Para testar o modelo, foi desenvolvido um questionário online (pesquisa quantitativa) baseado na revisão de literatura, com uma amostra final de 267 participantes portugueses. Os dados recolhidos foram depois analisados utilizando o IBM SPSS.

Consistente com a literatura, os resultados confirmaram a relação positiva entre a atitude dos consumidores e a intenção de utilizarem as ACVs. Foi possível demonstrar que a satisfação, confiança e o compromisso promovem uma atitude positiva em relação às ACVs. A perceção de utilidade e de satisfação influenciam positivamente todas as variáveis relativas à qualidade da relação entre humanos e tecnologia, enquanto a perceção de facilidade de utilização e as preocupações com a privacidade apenas foram consideradas indicadores relevantes de confiança e compromisso. Estas conclusões contribuem para a literatura académica e fornecem conhecimentos relevantes para os gestores que pretendam implementar as assistentes de compras virtuais nas lojas portuguesas.

Palavras-chave: tecnologia inteligente, inteligência artificial, assistentes virtuais, adoção da tecnologia, retalho, digitalização, omnicanal, modelo TAM

Sistema de Classificação JEL:
M30 – Marketing and Advertising: General; M31 - Marketing and Advertising: Marketing

Abstract

Due to several developments in artificial intelligence and indoor location-tracking technologies, retailers are now capable of adding human-like features and location-based capabilities to their existent retail apps. With these enhancements, retail apps are evolving to become Virtual Shopping Assistants (VSAs), capable of assisting customers throughout their whole shopping experience by providing product recommendations, assisting navigation and check products' availability. The aim of this study is to identify the factors that influence consumers' intention to use VSAs in-store.

By extending the technology acceptance model (TAM), a conceptual model was developed. To test the model, an online questionnaire (quantitative research) based on the literature review was conducted with a final sample of 267 Portuguese respondents. The data collected was then analyzed using IBM SPSS.

Consistent with previous literature, the results confirmed the positive relationship between attitude and the customers' intention to use VSAs. Satisfaction, trust, and commitment promote a positive attitude towards VSAs. Perceived usefulness and perceived enjoyment positively influence all facets of relationship quality under study, while perceived ease of use and privacy concerns were only considered relevant predictors of trust and commitment. These findings contribute to the academic literature and provide relevant insights for managers that want to implement VSAs in Portuguese retail stores.

Keywords: smart technology, artificial intelligence, virtual assistants, technology adoption, retail, digitalization, omnichannel, technology acceptance model

JEL Classification System:
M30 – Marketing and Advertising: General; M31 - Marketing and Advertising: Marketing

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List of Abbreviations

AI	Artificial Intelligence
ATT	Attitude
COM	Commitment
INT	Intention to Use
PC	Privacy Concerns
PE	Perceived Enjoyment
PEOU	Perceived Ease of Use
PU	Perceived Usefulness
SAT	Satisfaction
TAM	Technology Acceptance Model
TRU	Trust
VSA	Virtual Shopping Assistant

CHAPTER 1

1. Introduction

1.1. Context and Relevance

The digital world is now part of our present and will certainly be part of our future. However, and against many raised concerns, physical stores are here to stay as well. This will require retailers to have a new mindset and be willing to adopt an omnichannel strategy, combining both the online and offline experience in-store (McKinsey, 2021), since today's consumers expect the ability to search for products and get the information they need very quickly, but also be able to experience products closely in a fun environment.

Having this and with the evolution of technologies, many innovative solutions are starting to be part of retail, such as chatbots, augmented reality, retail apps, virtual assistants and geo targeting. Retailers are working on expanding their use of existing technologies and implement new ones, with the goal of delivering a best-in-class omnichannel experience. One of the most recent advancements in technology is the use of artificial intelligence (AI) and automated technologies in retail, allowing brands to offer more personalized and efficient services, contributing to value creation (van Doorn *et al.*, 2017). With this, retailers are now able to provide services to consumers through smart devices that can interact in real-time through data collection, communication, and feedback (Wünderlich *et al.*, 2015). With the growing diffusion of mobile devices, these systems are frequently available to consumers in their own smartphones with the use of retail apps, assisting them during their in-store visits, allowing them to manage shopping lists, receive receipts, check products' availability, and use mobile payments (Saarijärvi *et al.*, 2014).

Additionally, there have been recent developments in indoor location-tracking technologies, which allows retailers to add location-based capabilities to existent retail apps, improving interactions with consumers by collecting not only personal information, but also consumers' location (Pentina *et al.*, 2016). Having this, retail apps are evolving to become Virtual Shopping Assistants (hereafter, VSA) that help consumers throughout their whole shopping experience.

The rise of these technologies is creating new and exciting opportunities for retailers around the world. However, there are long adoption processes and high costs associated with the implementation of smart retail technologies, creating a need to further study each technology, consumers perceptions and what drives their intention to use them in their shopping experiences. Furthermore, it is important to comprehend consumers' resistance to innovation (Laukkanen, 2016; Mani & Chouk, 2017) which retailers must overcome to successfully implement VSAs.

1.2. Research Objectives

This study examines consumers' perceptions regarding in-store virtual shopping assistants and how they act as drivers of acceptance and resistance to these technologies, through their influence on the user-technology relationship. Additionally, it studies how relationship quality, measured using three constructs (satisfaction, trust, and commitment) influences consumers' overall attitude, and finally how those attitudes influence the intention to use VSAs. Therefore, the following research questions were elaborated:

RQ1a: *What are the drivers of customers' acceptance of in-store virtual shopping assistants?*
RQ1b: *What are the drivers of customers' resistance to in-store virtual shopping assistants?*
RQ2: *How much does relationship quality (satisfaction, trust, and commitment) contribute to a positive attitude towards virtual shopping assistants?*

1.3. Dissertation Structure

With the objective of further developing this theme, the present dissertation is divided into six major chapters, as presented in Figure 1.1. The first chapter introduces the motivations behind the choice of the theme under study, including its practical and theoretical relevance. In the second chapter, a review of the relevant literature is presented covering the following topics: the new retail, artificial intelligence in retail, technology acceptance model, perceived usefulness, perceived ease of use, perceived enjoyment, privacy concerns, satisfaction, trust, and commitment.

The literature review serves as foundation for the conceptual model and research hypotheses presented in the third chapter. In chapter four, the methodology used in this study is explained, presenting the chosen method to collect and analyze data. After that, the analysis and discussion of the data collected together with hypothesis validation are presented in chapter five. Finally, the main theoretical contributions and managerial implications are summarized, as well as limitations and recommendation for future research.

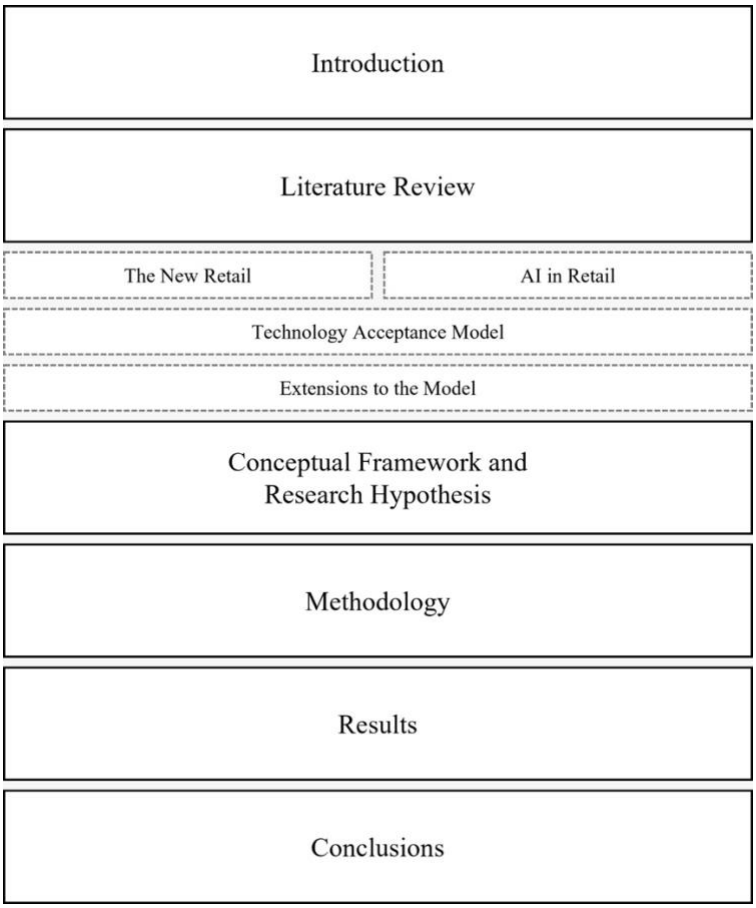

Figure 1.1 Dissertation's structure

CHAPTER 2

2. Literature Review

The literature review was written based on the analysis of previous research following a pyramid structure, meaning it started with the most general term, which is the new retail, explaining the rise of omnichannel retail and how several technologies, specifically artificial intelligence, contribute to that phenomenon, then it starts narrowing with the introduction of smart retail technologies and virtual assistants. Furthermore, the Technology Acceptance Model (TAM) is presented, as well as additional marketing related determinants, such as perceived enjoyment and privacy concerns, that are extensions to the model. Finally, the marketing related outcomes are explained, focusing on relationship quality (trust, commitment, and satisfaction), attitude towards the VSA and intention to use the VSA.

To review the literature, various sources of information were used, namely scientific articles, books, websites, conference papers, reviews, and thesis. The most frequently used were scientific articles, representing more than 80% of the information reviewed. These articles were taken from journals that had, on average, a rating of 1.5 according to SCImago Journal & Country Rank ratings, corresponding to the first and second quartiles. Having this, the performed literature review's quality was guaranteed.

2.1. The new retail

Retail is changing and brands must adapt to a new world where the share of e-commerce in total retail sales is increasing over the last years and is predicted to keep growing (eMarketer, 2022), resulting in higher visitor expectations based on the variety of offers online. This trend has been reinforced by the COVID-19 pandemic and the associated lockdowns since consumers got used to purchasing through the internet and taking advantage of e-commerce solutions even more. However, the wide range of products existent online results in choice overload, simply having too many options which in turn overwhelms consumers, leading to hesitation and choice avoidance (Kukar-Kinney *et al.,* 2022). Apart from this, the facilitated emersion of new products in online commerce increases competition regarding prices, forcing brands to find new ways to differentiate and connect with consumers.

Furthermore, research has shown that one behavior that characterizes many customers is the need for touch (Peck, 2011). Even though there has been a shift into the digital world, many consumers are still apprehensive when buying products without touching them first, as it increases uncertainty regarding whether there is an informed decision-making process (Peck & Childers, 2003). Such behavior supports the necessity of physical stores where consumers can have a full experience with the products before any purchase.

When e-commerce started growing, experts anticipated that traditional retail would eventually die-out, which became a considerable concern for brick-and-mortar retailers (3-Brands, 2021). Massive e-retailers opposed this view when they started having a footprint in physical- retail. However, their presence in the physical world is not static, it brings the online experience into the store. For instance, Amazon acquired Whole Foods and opened several Amazon Go stores in the United States, with an innovative checkout-free experience of "Just Walk Out Shopping" where people can simply take the products and leave the store, later receiving a receipt in their smartphones.

These experiences and technologies have been revolutionizing global retail, raising the concept of "New Retail" which was defined in 2016 by Jack Ma, Former Executive Chairman of Alibaba, as "an integrated retail delivery model where offline, online, logistics, and data, converge to enhance customer experience" (3-Brands, 2021). This concept is not completely new, brands have been working on shifting from a single channel to omnichannel experience for many years, providing customers with a fully integrated shopping experience by converging digital and offline experiences. To achieve that, retailers need to apply an omnichannel management, defined as "the synergetic management of the numerous available channels and customer touchpoints, in such a way that the customer experience across channels and the performance over channels are optimized" (Verhoef *et al.*, 2015).

In sum, traditional retailers must change their ways of doing and be able to provide consumers with an omnichannel experience where physical stores become a place for discovery, engagement, experience, and interaction (Accenture, 2017). It's about getting people out of their houses, by compelling them to go somewhere and do something. It's about providing a different elevated experience by giving customers something they cannot get from their homes (Deloitte, 2020).

2.2. Artificial Intelligence in Retail

With the need to reinvent physical stores, many innovative technologies have emerged, being one of the most recent advancements in technology the use of Artificial Intelligence (hereafter, AI) in retail. There has been an increasing adoption of AI applications and automated technologies, such as service robots, chatbots and virtual assistants, as the technology and the tasks that can be performed using AI improve (Gummerus *et al.*, 2019). According to a McKinsey report, out of nineteen industries the retail industry has the greatest potential to generate value out of autonomous technologies and AI, amounting to over USD 600 billion annually (Chui *et al.*, 2018).

Academic research presents several benefits for both consumers and companies regarding the use of AI, as companies are able to offer more personalized and efficient services, and thus contributing to value creation (van Doorn *et al.*, 2017). As a consequence of these benefits, there is an increase adoption of smart technologies in physical stores and researchers predict that these technologies may replace some traditional forms of consumer-employee interactions (Marinova *et al.*, 2017), as they start to perform the majority of tasks that are currently fulfilled by sales employees (Huang & Rust, 2018).

These technologies are interactive retail systems that provide services to consumers through a network of smart objects and devices that can sense the surroundings and interact in real-time through data collection, communication, and feedback (Wünderlich *et al.*, 2015). The growing diffusion of mobile devices has been creating new opportunities for interaction between retailers and customers (Bues *et al.*, 2017), increasing the in-store use of retail apps. Retail apps have the purpose of assisting customers during their visit to the store, allowing them to manage shopping lists, receive receipts, check products' availability, and use mobile payments (Saarijärvi *et al.*, 2014). Simultaneously, the implementation of these technologies is expected to bring substantial benefits for retailers, such as lower labor costs and increased efficiency, but also for customers, with greater convenience, accessibility, and increased interaction (Roy *et al.*, 2017; Wünderlich *et al.*, 2013).

At the same time, retailers have a new tool to extract personal information about their in-store customers and their visits to physical stores, which can improve the efficiency of promotions and existent loyalty programs (Roggeveen & Sethuraman, 2020). One of the most valuable information retailers can take from these technologies is customers' location, which facilitates Proximity Marketing, a communication strategy that marketers use to maximize engagement with consumers in real-time within a targeted location. Real-time communication used in proximity marketing will often consist of advertising campaigns, push notifications with reminders or rewards, customer support options, as well as other strategies that provide a personalized connection with the customer in "the right place, right time".

These campaigns are usually delivered to targeted audiences by utilizing their mobile devices, which can be used differently depending on the chosen strategy and has the main advantages of being present in most of consumers' lives all the time, allows for personalization based on user inputs and is in most cases connected to the internet (Levesque & Boeck, 2017). The amount of information retailers can get from mobile devices make it possible to have advertisements targeted with high precision and also have monetization of location data, since it will be valuable for many advertisers.

The addition of location-based capabilities to existent retail apps is now possible due to recent developments of indoor location-tracking technologies such as Beacons (Roggeveen & Sethuraman, 2020), which improves the communication with the customer by considering not only personal information, like gender, age, or preferences, but also customers' location data (Pentina *et al*., 2016).

With the evolution of these technologies and in combination with AI and location-based capabilities, retail apps are evolving to become Virtual Shopping Assistants (hereafter, VSA), capable of assisting consumers throughout their whole experience in-store and most likely replacing the traditional forms of consumer-employee interactions (Marinova *et al*., 2017). VSAs are now able to perform most tasks expected from service employees, such as providing product recommendations, assisting navigation and check products' availability, which allows consumers to have a more autonomous experience.

2.3. Technology Acceptance Model

Acceptance of in-store VSAs is considered information and communication technology adoption. Many theories and models have been developed to understand the reasons why individuals accept or reject technologies, being one of the most common the Technology

Acceptance Model (TAM), adapted from the Theory of Reasoned Action (Fishbein, 1967; Fishbein & Ajzen, 1977) and originally proposed by Davis (1985) with two major objectives: "improving the understanding of user acceptance processes, providing new theoretical insights into the successful design and implementation of information systems" and "providing the theoretical basis for a practical "user acceptance testing" methodology that would enable system designers and implementors to evaluate proposed new systems prior to their implementation". TAM includes three constructs: attitude toward the system (ATT), perceived ease of use (PEOU), and perceived usefulness (PU) which influence the actual usage of a particular system, explaining the user's motivation to adopt new technology. Later, Davis *et al.* (1989) added behavioral intention (INT) as a new construct, directly affected by attitude and indirectly by perceived usefulness and perceived ease of use, as presented in Figure 2.1.

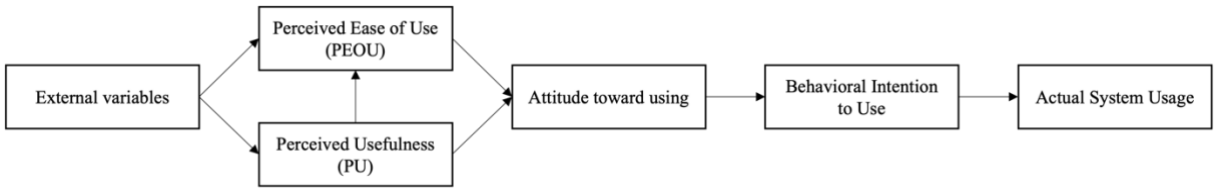

Figure 2.1 Technology Acceptance Model (TAM) – Source: Davis (1989)

Numerous studies have proven that TAM is an appropriate model to predict the adoption of new technologies by individuals and organizations in several contexts, including the retail setting (Evanschitzky *et al.*, 2015; Kallweit *et al.*, 2014). For instance, Alam *et al.* (2021) explored the factors affecting the adoption of artificial intelligence in the retail sector, while Canziani & MacSween (2021) studied the customer acceptance of voice-activated smart home devices for product information seeking and online ordering.

2.3.1. Perceived usefulness

PU refers to the degree to which an individual believes that using a particular system, in this study the in-store virtual assistant, would enhance his or her performance (i.e., improve the shopping experience). This derives from the definition of useful: "capable of being put to use, of a valuable or productive kind" (Merriam-Webster, n.d.). Having a higher degree of perceived usefulness means the user believes in the existence of a positive use-performance relationship (Davis, 1989). In this study, PU is the degree to which consumers perceive the VSA as useful to their in-store shopping experience.

Previous studies have explored the influence of PU in the context of technology adoption and the literature generally suggests that PU has a significant positive influence on customer's attitude (Luceri *et al*., 2022; Pitardi & Marriott, 2021) and behavioural intentions (Brusch & Rappel, 2020; Huang *et al.*, 2022). The role of PU in technology adoption has been studied in various contexts, such as augmented reality (Alam *et al*., 2021), smart retail technologies (Roy *et al*., 2018), voice assistants (Pitardi & Marriott, 2021), online grocery shopping (Driediger & Bhatiasevi, 2019), and in-store apps (Schrage *et al*., 2022).

2.3.2. Perceived ease of use

Davis (1989) defines PEOU as "the degree to which a person believes that using a particular system would be free of effort." This derives from the definition of "ease": "freedom from labor or difficulty" (Merriam-Webster, n.d.). Having this, Davis (1989) proposes that a system that is perceived as easier to use is more likely to be accepted by users. In the context of this study, PEOU is the degree to which consumers perceive the VSA as easy to use during their in-store shopping experience.

The role of PEOU in technology adoption has been extensively explored and the literature generally suggests that PEOU positively influences customer's trust (Pitardi & Marriott, 2021), attitude (Kim *et al*., 2017; Luceri *et al*., 2022) and behavioural intentions (Brusch & Rappel, 2020; Driediger & Bhatiasevi, 2019). For instance, Roy et al. (2018) explored the predictors of customer acceptance to smart retail technologies and found that PEOU has a significant positive influence on attitude toward technology.

2.3.3. Perceived enjoyment

Even though researchers have been extensively using TAM over the years, many criticized the simplicity of the model (San-Martín *et al*., 2013) as well as the fact that it was originally designed to explain the mandatory adoption of information technologies in a work environment (Venkatesh *et al*., 2012). With the goal of explaining the voluntary technology usage behavior, Venkatesh et al. (2012) presented the Unified Theory of Adoption and Use of Technology 2 (UTAUT2), and discovered that apart from extrinsic benefits, such as usefulness and ease of use, intrinsic benefits like enjoyment, joy, and fun influence the customer's intention to adopt technologies. Having this and following the recommendations of many researchers to expand TAM considering other variables such as system characteristics, individual differences, facilitating conditions, consumer traits and organization characteristics (Gelderman *et al*., 2011; Kwee-Meier *et al*., 2016; Rosenbaum & Wong, 2015; Venkatesh & Bala, 2008), we will add

the concept of Perceived Enjoyment (PE) to the proposed model to capture the hedonic motivation behind VSA usage.

Davis et al. (1992) defined PE as the extent to which using a certain technology is perceived as something enjoyable, putting aside any performance consequences that may occur. A more recent definition is provided in the context of mobile shopping by Agrebi & Jallais (2015) that define PE as the consumer's experience of pleasure and joy that comes directly from using their smartphone for shopping. In this study, PE is the extent to which a consumer perceives the VSA as enjoyable and can experience pleasure and joy using it, focusing on its emotional side apart from its functional side (measured by PU and PEOU).

Prior studies have explored the influence of hedonic motivations in the context of technology adoption and the literature suggests that enjoyment is a significant predictor of customer's satisfaction (Luceri *et al*., 2022; Pantano & Servidio, 2012; Roy *et al*., 2017), attitude (Kasilingam, 2020; Schrage *et al*., 2022; Teo & Noyes, 2011), and behavioral intentions (Huang *et al*., 2022; Pipitwanichakarn & Wongtada, 2019; Tarhini *et al*., 2019). The role of PE in technology adoption has been studied in various contexts, such as voice assistants (Jain *et al*., 2022), instant shopping (Brusch & Rappel, 2020), location-based apps (Chen *et al*., 2020), mobile shopping (Chopdar *et al*., 2018; Hubert *et al*., 2017), and in-store technology (Kim *et al*., 2017).

According to Kasilingam (2020) perceived enjoyment influences the intention to use chatbots indirectly through positive attitudes, as "consumers are willing to adopt a technology that is new and exciting, deemed as an enjoyable experience". In the specific context of virtual assistants, researchers found that higher levels of enjoyment have a positive influence on attitude, increasing satisfaction, and leading to a higher likelihood of consumers using virtual assistants in the future (Pitardi & Marriott, 2021). That is, when consumers perceive a virtual assistant as something fun and can see the benefits of the interaction, they are more likely to interact with it. Additionally, Schrage *et al.* (2022) investigated the influence of perceived enjoyment in the intention to adopt location-based retail apps in Germany and the results confirmed that PE promotes a positive attitude, which in turn has a positive relationship with customer's intention to use.

2.3.4. Privacy Concerns

With the continued growth of AI technologies and their enhanced features that allow them to make decisions and complete tasks on customers' behalf (de Bellis & Venkataramani Johar, 2020), several challenges arise, one of the most relevant regarding privacy concerns, which

researchers believe will increase over time with the development of smart products and services (Hsu & Lin, 2016; Wünderlich *et al*., 2015). Recent studies have shown that the tracking and collection of personal data by mobile services come with fundamental concerns regarding privacy (Xu *et al*., 2011).

In the existent literature, most of the studies on technology adoption have been focused on the drivers of acceptance leaving the barriers to adoption underexplored (Groß, 2015). In this regard, Schrage *et al*. (2022) added privacy concerns (PC) to their conceptual model as a potential barrier of a favorable attitude toward the adoption of location-based retail apps during in-store shopping and concluded that PC was negative related to customers' attitudes. PC have also been studied in the context of virtual assistants and researchers also found a significant negative relationship between PC and customers' attitudes towards virtual assistants (Pitardi & Marriott, 2021).

Moreover, researchers have found that perceived privacy concerns have a negative impact on individuals' trust development (Chang *et al*., 2017), which is especially relevant in the interaction between humans and virtual assistants since humans are aware of privacy consequences of using them (McLean & Osei-Frimpong, 2019).

2.4. Trust, Satisfaction and Commitment

With the increased use of AI technologies and their enhanced human-like features, the way people perceive and interact with these technologies has changed. It is uncommon that someone would refer to a mobile device as "he" or "she" when using it, yet this personification behavior occurs when using a virtual assistant in those same devices (Pitardi & Marriott, 2021). Having that, it seems relevant to further study the human-technology relationship and how it affects the intention to use VSAs specifically.

The existent research in social psychology focuses on individuals' relationships and attachment behaviors, exposing the factors that affect relationship quality (Davis & Rusbult, 2001), which is defined by Palmatier (2008) as "a higher-order, holistic view of a relational exchange composed of multiple facets", being some of the most commonly considered trust, satisfaction, and commitment (Itani *et al.,* 2019). Loureiro *et al.* (2021) add to this and argue that people can have a relationship with a virtual assistant, developing a sense of trust, satisfaction, and commitment to staying together.

Trust is defined by Huang *et al.* (2022), in the context of the relationship between consumers and virtual agents, as the consumers' beliefs in the reliability of this technology. This derives from the common definition of "trust": "assured reliance on the character, ability, strength, or truth of someone or something" (Merriam-Webster, n.d.). Trust is frequently recognized as a powerful determinant of the relationship between partners (Palmatier *et al.*, 2006), and of technology adoption and use (van Pinxteren *et al.*, 2019; Wirtz *et al.*, 2018). On top of this, trust has the potential to lower perceived risks of the interaction with technology, facilitating consumers' intentions and behaviors towards VSAs (Gefen & Straub, 2004).

The importance of trust and its crucial role in technology acceptance and adoption has been studied by many researchers (Fernandes & Oliveira, 2021; Kasilingam, 2020; Pitardi & Marriott, 2021; Zhang *et al.*, 2021). The results of previous studies identify trust as a determinant of attitude (Hsieh & Lee, 2021) and behavioral intention (Kwee-Meier *et al.*, 2016). According to the findings of Pitardi & Marriott (2021), trust positively and directly affects the overall attitude but has a more indirect effect on intention to use, this indirect effect happens through the positive effect that attitude has on intention to use which is consistent with the literature on the effect of attitude in behavioral intentions in technology settings (Roy *et al.*, 2018).

Satisfaction refers to the balance between positive and negative evaluations of the relationship partner and corresponds to the relationship's emotional element (Palmatier *et al.*, 2006). When there is a positive balance of evaluations, meaning there are more positive than negative evaluations of the relationship partner, he/she can reach a sense of fulfillment (Oliver, 1999). Another relevant definition of satisfaction is provided by Luceri *et al.* (2022) that describes it as the "psychological or emotional state resulting from a cognitive assessment of the gap between expectations and actual performance after an experience with a product or service". In this context, if the consumer has more positive than negative perceptions of the VSA, he/she will be satisfied.

Having this, it seems relevant to study the effect that consumers' perceptions of VSAs, both positive (PEOU, PU and PE) and negative (PC), have on their overall satisfaction and how this affects their attitude and consequently intention to use VSAs. These effects have been explored in the past and researchers have found that various factors, such as high levels of perceived enjoyment (Tarhini *et al.*, 2019) and perceived quality (Loureiro *et al.*, 2021), lead to increased satisfaction. Satisfaction as an individual's attitude-related factor and its influence on behavioral intentions have been widely explored (Alnawas & Aburub, 2016; Ebrahimi *et al.*, 2022; Huang & Chueh, 2021). Other studies show that both consumers' positive and negative feelings and their overall satisfaction toward technology will influence not only their intention to use but also the intention to continue using the technology (Luceri *et al.*, 2022).

As stated before, with the evolution of AI technologies and their ability to develop humanlike interactions, human-technology relationship is also evolving. As consumers get satisfied with the interactions and start placing more trust in virtual assistants, it is likely that they will also get committed to these devices, which is supported by previous literature that establishes trust as a driver of commitment (Palmatier *et al.*, 2006). Brand commitment is defined as an emotional attachment feeling resulting from positive past experiences and interactions, which makes the customer willing to use the brand over time, contributing to a valuable relationship with the brand (Hsiao *et al.*, 2015). In a more general view, commitment occurs when there is a shared motivation from both parties in a relationship to sustain and keep it since they perceive this relationship as valuable for both (Loureiro *et al.*, 2021). In the context of this study, commitment refers to the customer willingness and desire to keep using the VSA in the future.

Previous literature regarding commitment argued that this can be both an antecedent of loyalty (Mathew *et al.*, 2012) and purchase intentions (Shuv-Ami, 2012). Aligned with this, there will be a shift in customers' commitment and loyalty from a trusted brand to a trusted AI assistant (Dawar, 2018), which reinforces the relevance of studying the adoption of these technologies, since it will affect the future forms of interactions and relationships between customers and brands.

Although previous studies have investigated the relationship between humans and technology, there is a shortage of contributions on how consumers can relate to AI assistants and what factors motivate individuals' behavioral attitudes and intentions toward these technologies (McLean & Osei-Frimpong, 2019).

CHAPTER 3

3. Conceptual Model and Research Hypothesis

3.1. Conceptual Model

With the objective of studying the drivers of acceptance and resistance to virtual shopping assistants, a conceptual model and research hypothesis were formulated. The Technology Acceptance Model (TAM) was used as a foundation to the proposed conceptual model, presented in Figure 3.1. Based on the TAM, we have two drivers of acceptance (Perceived ease of use and Perceived usefulness) that influence the attitude towards VSAs, which in turn affects the intention to use. To capture the hedonic motivations behind VSA usage, we added another driver of acceptance to the model, the concept of Perceived enjoyment. Additionally, to follow the recommendations of many researchers to expand the TAM considering not only the drivers of acceptance but also the barriers to adoption, we included Privacy concerns as an inhibitor of adoption. Finally, to further study the human-technology relationship and how it affects the intention to use VSAs specifically, we added three of the most frequently used facets of relationship quality: Satisfaction, Trust, and Commitment.

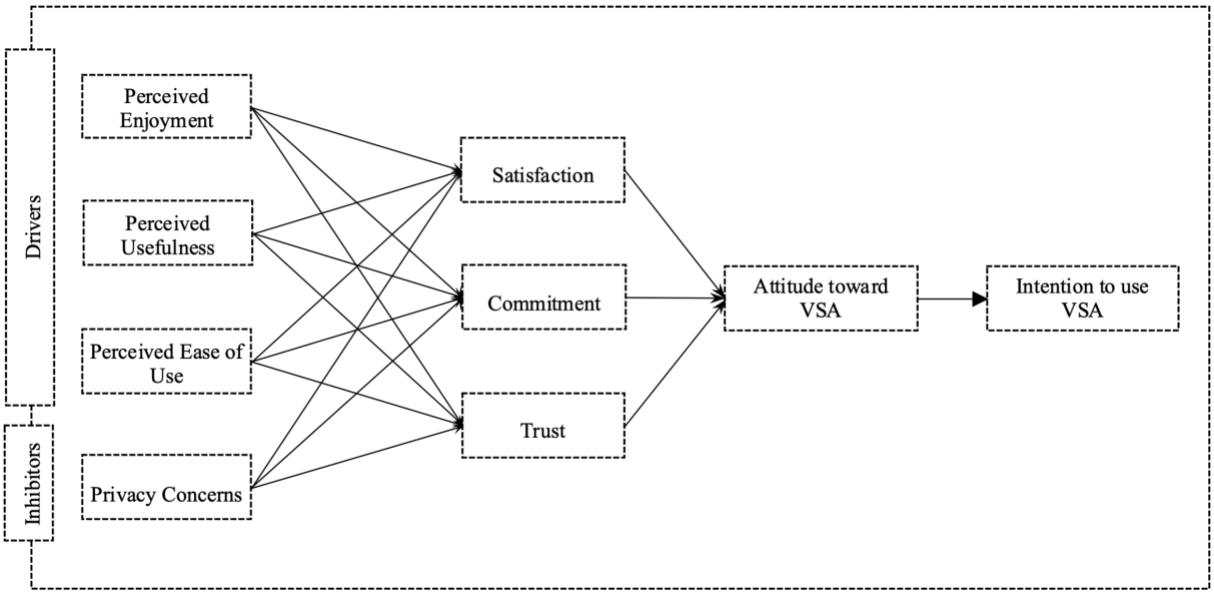

Figure 3.1 Conceptual Model – Source: author's elaboration (2022)

3.2. Research Hypotheses

Based on the previous literature and the conceptual model presented in Figure 3.1, the following hypothesis can be established and will be tested to check if those are confirmed or refuted by the analysis of the data collected through the online questionnaire.

H1a): *Perceived ease of use positively influences satisfaction*
H1b): *Perceived ease of use positively influences commitment*
H1c): *Perceived ease of use positively influences trust*

H2a): *Perceived usefulness positively influences satisfaction*
H2b): *Perceived usefulness positively influences commitment*
H2c): *Perceived usefulness positively influences trust*

H3a): *Perceived enjoyment positively influences satisfaction*
H3b): *Perceived enjoyment positively influences commitment*
H3c): *Perceived enjoyment positively influences trust*

H4a): *Privacy concerns negatively influence satisfaction*
H4b): *Privacy concerns negatively influence commitment*
H4c): *Privacy concerns negatively influence trust*

H5): *Satisfaction positively influences Attitude towards VSA*
H6): *Commitment positively influences Attitude towards VSA*
H7): *Trust positively influences Attitude towards VSA*
H8): *Attitude towards VSA positively influences Intention to use*

CHAPTER 4

4. Methodology

To carry out this research, both primary and secondary data were collected. Secondary data, included in the literature review chapter, provides a solid background for the research, summarizing and synthesizing the existing research and debates relevant to the areas of interest. Moreover, it gathers essential models, concepts, and correlations, previously tested that consist of a strong foundation for the study and give support to determine key variables of the research (Greenhoot & Dowsett, 2012). From there on, it was important to find support for the previously proposed hypothesis by conducting a quantitative methodology, which allows to draw conclusions and recommendations for future market development. Hence, this chapter intends to disclose the methods used to gather and analyze this primary data.

4.1. Research Approach

The research goal of this dissertation is to analyze customers' intention to use a virtual shopping assistant in their in-store shopping by analyzing its relationship quality and examining three possible drivers of customer acceptance (perceived ease of use, perceived usefulness, and perceived enjoyment) and one possible inhibitor (privacy concerns) to increase the predictive power of the proposed model.

This thesis uses the Technology Acceptance Model (TAM), adapted from the Theory of Reasoned Action (Ajzen & Fishbein, 1980) and originally proposed by Davis (1985), as a foundation to the model to understand what drives consumers to use a virtual shopping assistant. To do so, primary research was developed.

4.2. Research Method and Design

Descriptive research was conducted through a quantitative methodology to collect information and test the research model and hypothesis. An online questionnaire was prepared using the Qualtrics Software, as it allows collecting knowledge from a larger sample, measuring data, generalizing results, reveal patterns, and provide guidance in decision-making (Malhotra *et al.*, 2016).

4.3. Sample

4.3.1. Population and Sample Size

To facilitate the gathering of responses and to get more generalized insights from the population, we will not establish a target population based on the characteristic variables of the individuals who classify for the study. A convenience sampling method was chosen since the questionnaire was spread through different personal online networks. Although this method may not collect the most representative sample of the population, it facilitates the gathering of data efficiently (Lavrakas, 2008). Thus, to overcome this limitation and conduct a more rigorous study, the sampling intended to achieve the maximum amount and diversity of responses regarding demographic characteristics (i.e., age, gender, and nationality).

4.4. Measurement Scales

The questionnaire was developed with a deductive scale development with multi-item scales, meaning that the scales used in the questionnaire were drawn from the extant literature to measure each of the proposed constructs. Table 4.1 provides further details on the scales and items used in the questionnaire.

First, to analyze the respondent's perceptions of the VSA, three variables were measured: perceived ease of use (PEOU) was measured through a four-item scale adapted from Agarwal and Karahanna (2000) and Venkatesh and Bala (2008), perceived usefulness (PU) and perceived enjoyment (PE) were measured through a three-item and four-item scale, respectively, adapted from Nysveen *et al.* (2005). Privacy concerns was measured through a five-item scale adapted from Son and Kim (2008) and with one item based on the work of Xu and Teo (2004). All the variables were measured with a seven-point Likert-scale ranging from 1 = "Totally disagree" to 7 = "Totally agree".

Satisfaction and commitment were measured through a two-item scale adapted from Itani *et al.* (2019) and trust was measured through a two-item scale adapted from Morgan and Hunt (1994), also with the same seven-point Likert-scale.

Finally, the variables for attitude towards the VSA (ATT) and intention to use a VSA (INT) were measured through a three-item scale adapted from Alam *et al.* (2018) and Alam *et al.* (2021), respectively, both with the same seven-point Likert-scale.

Table 4.1 List of constructs, items and sources used

Constructs	Codes	Items	Sources
Perceived Usefulness	PU_1	Using the shopping app for in-store shopping would make me save time	Nysveen et al. (2005)
	PU_2	Using the shopping app for in-store shopping would improve the efficiency of my shopping trip	
	PU_3	Using the shopping app for in-store shopping would be useful to me	
Perceived ease of use	PEOU_1	The app is clear and understandable	Agarwal and Karahanna (2000); Venkatesh and Bala (2008)
	PEOU_2	I think it would be easy for me to become skillful using the app	
	PEOU_3	Using the app would require a lot of my mental effort	
	PEOU_4	The app would be easy to use	
Perceived enjoyment	PE_1	I think using the shopping app for in-store shopping would be entertaining	Nysveen et al. (2005)
	PE_2	I think using the shopping app for in-store shopping would be pleasant	
	PE_3	I think using the shopping app for in-store shopping would be exciting	
	PE_4	I think using the shopping app for in-store shopping would be fun	
Privacy Concerns	PC_1	I would be concerned that my personal information could be misused	Son and Kim (2008), Xu and Teo (2004)
	PC_2	I would be concerned that my personal information could be found on the internet	
	PC_3	I would be concerned that my personal information could be shared with third parties	
	PC_4	I would be concerned that my personal information can be used for purposes I was not expecting	
	PC_5	I would be concerned that my private location information is kept in a non-secure manner	
Satisfaction	SAT_1	I would be happy to use this service	Itaniet al.(2019)
	SAT_2	Overall, I would be satisfied with this service	
Commitment	COM_1	I think I would use this service in the future	Itaniet al.(2019)
	COM_2	I would keep using this service on a regular basis	
Trust	TRU_1	I would trust the Shopping Virtual Assistant	Morgan and Hunt (1994)
	TRU_2	I would rely on the recommendations of the Shopping Virtual Assistant	
Attitude towards VSAs	ATT_1	I like the idea of in-store shopping with the help of a Virtual Shopping Assistant	Alam et al. (2018)
	ATT_2	I think it would be a good idea to use a Virtual Shopping Assistant	
	ATT_3	I have a favorable attitude towards shopping with a Virtual Shopping Assistant	
Intention to use na VSA	INT_1	I would consider using it for my in-store shopping	Alam et al. (2021)
	INT_2	I think it would be worth it for me to use it while shopping in-store.	
	INT_3	I would use it regularly when shopping in-store.	

Regarding demographic constructs, age, gender, and nationality were measured. Age was divided into six groups: under 18 years old, 18-24 years old, 25-34 years old, 35-49 years old, 50-64 years old and over 65 years old. Gender was measured between female, male and non-binary. Lastly, nationality was measured according to a list of the 195 countries of the world.

4.5. Data Collection

4.5.1. Procedure

Based on the prior relevant research, the different constructs were selected and properly adjusted to rely with the scope of the study and guarantee the validity and reliability of the research. The questionnaire was developed using Qualtrics Survey Software, published solely online, and shared through social networking platforms, particularly WhatsApp, Instagram, Facebook, and LinkedIn, and an online research platform (https://www.surveycircle.com).

The questionnaire was shared with a personalized invitation by using the recipient's name in the salutation of the invitation text with the purpose of achieving a higher response rate (Heerwegh et al., 2005).

The study was distributed in English and Portuguese to increase the number of individuals that can respond and reduce misunderstandings and misinterpretations of questions. Both versions of the questionnaire can be found in Annexes A and B.

4.5.2. Questionnaire's Design

The questionnaire design was developed in accordance with a commonly adopted structure, composed of three main parts: cover letter, instructions, and main body (Lavrakas, 2008). To increase the response rate and avoid cognitive burden, the survey was kept simple, avoiding biased and vague questions, and having a proper question ordering (Fan & Yan, 2009).

The cover letter consisted of a brief introduction of the research, explaining the main objective of the questionnaire, and securing respondents' anonymity and confidentiality. The concept of Virtual Shopping Assistant was presented, explaining the technology, how it works and its main functions. To ensure its complete understanding, respondents were asked to carefully watch a small video of a similar example from IKEA. The main body section was composed of five parts. The first part included questions to get respondents' perceptions of the VSA and intention to use based on the video they previously watched. The second part presented questions to evaluate respondents previous experience with in-store apps (to search for products, make payments, access promotions, etc.) asking respondents how often they used in-store apps in the last 12 months.

In the third part, respondents evaluated their level of expertise regarding in-store apps from not experienced to very experienced. In the fourth part, respondents had to answer one attention question (e.g., What color is the snow? If you are paying attention answer "orange") to ensure data quality, and in the last part, fill out demographic data (age, gender, and nationality).

4.5.3. Pre-Test

Before releasing the final version, a pre-test of the questionnaire was elaborated (i.e., to pilot the questionnaire with a small group of respondents in the real-life situation) with a total of 16 responses (7 respondents answered in English and 9 in Portuguese). The objective of this pre-test was to assess the quality of the questionnaire before its actual use and avoid potential errors and misleading questions (Fan & Yan, 2009). After this step, the final questionnaire was published and shared online through a link with data collected from the 20th of July to the 31st of August of the present year.

4.6. Data Treatment

After collecting all the responses from the online questionnaire and exporting them from Qualtrics, the collected data was analyzed using IBM SPSS (Statistical for the Social Sciences) Software version 27. The variables were recoded, treated, and then introduced to build the research database. Initial filtering was conducted to identify and remove responses that were not complete or failed the attention question. Additionally, 4 responses were removed based on the nationality of the respondents, to guarantee a cohesive sample with 100% of the responses from Portugal. A total of 267 responses were collected and considered valid.

The statistical analysis and results obtained are presented in the next chapter. These findings were essential to discuss the study's major implications and contributions, as well as to draw the main conclusions and recommendations for future research, presented in the following chapters.

4.7. Respondent Profile

The target population of the study should include a good mix of female, male and diverse individuals from Portugal. Spreading the study through social media, a wide area of respondents with different ages was reached.

From the total 267 people that participated in the survey, the analysis of the first variable gender shows 149 are female and 118 are male participants. Thus, the sample is composed by 56% of females and 44% of males (Figure 4.1), which corresponds to an acceptable balance of the variable gender.

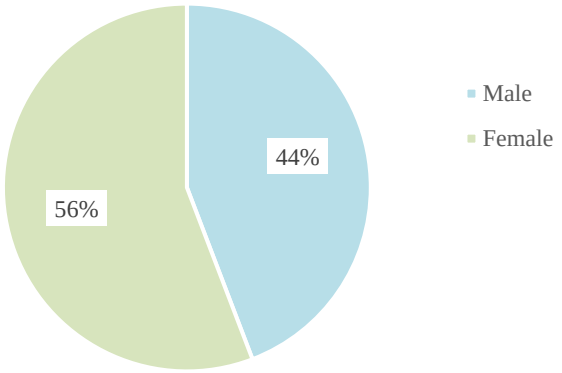

Figure 4.1 Gender Pie Chart – Source: author's elaboration (2022)

By analyzing the variable age according to the defined age groups, we can observe that a significant majority of 161 (60.3%) respondents are between 18 and 25 years old, followed by 17.2% of the sample that belongs to the age group 50 to 64 years old, corresponding to 46 respondents. This is followed by 11.6% aged 35-49 years old, 8.2% between 25-34 years old, 1.5% who are 65 years or older, and only 1.1% who are under 18 years old (Figure 4.2).

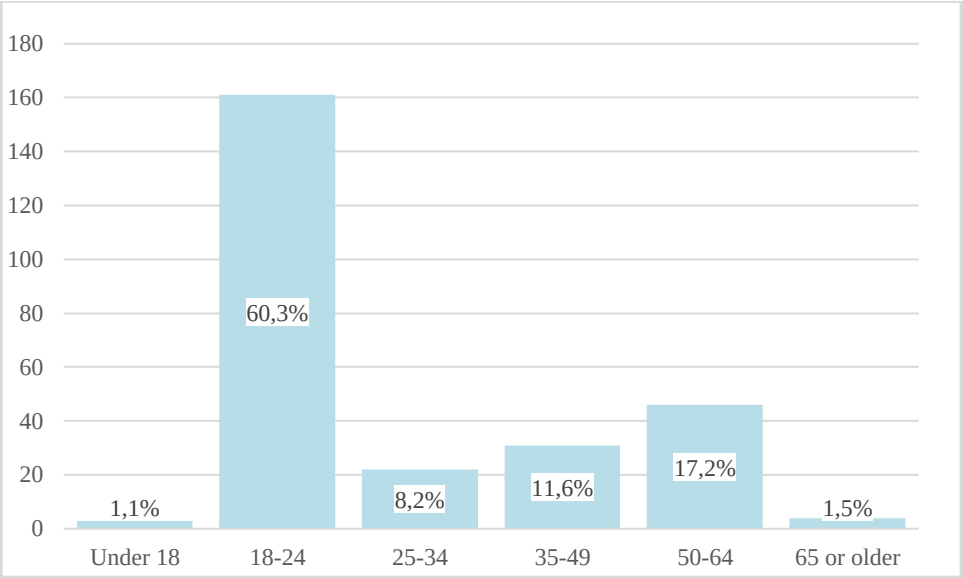

Figure 4.2 Age Bar Chart – Source: author's elaboration (2022)

CHAPTER 5

5. Results

5.1. Descriptive Statistics

The following section provides the results of the Descriptive Analysis computed using SPSS Statistics 27.

Perceived Ease of Use (PEOU)

Perceived Ease of Use was composed by 4 variables. PEOU_3 was "negatively phrased" in the questionnaire and thus it was necessary to reverse its score so that all variables are consistent. The values for the Mean and Standard Deviation of each item are displayed in Table 5.1.

The item with the highest mean value of 6.06 was PEOU_2 – *I think it would be easy for me to become skillful using the app.* The construct PEOU representing Perceived Ease of Use was obtained through computing the mean of the items PEOU_1, PEOU_2, PEOU_3 and PEOU_4. PEOU has mean value of 5.8118 and Standard Deviation of 0.8029. The Mean value is higher than the middle value in the Likert Scale from 1 to 7, indicating that the respondents tend to reveal high levels of Perceived Ease of Use i.e., having the video and description presented in the questionnaire respondents perceived the Virtual Shopping Assistant as easy to use.

Table 5.1 Descriptive Statistics for PEOU

		Min	Max	Mean	Std. Deviation
PEOU_1	The app is clear and understandable	1	7	5.91	.961
PEOU_2	I think it would be easy for me to become skillful using the app	1	7	6.06	1.083
PEOU_3	Using the app would not require a lot of my mental effort	1	7	5.43	1.262
PEOU_4	The app would be easy to use	3	7	5.85	.911
PEOU		3.25	7.00	5.8118	.80291

Source: author's elaboration, SPSS Data

Perceived Usefulness (PU)

Perceived Usefulness was evaluated through 3 items. The values for the Minimum, the Maximum, the Mean, and the Standard Deviation for each item are presented in the Table 5.2 below.

As shown in Table 5.2, the item PU_2 - *Using the shopping app for in-store shopping would improve the efficiency of my shopping trip* corresponds to the highest Mean, having the value 5.70. The construct PU representing Perceived Usefulness was obtained through computing the mean of the items PU_1, PU_2 and PU_3. PU has a mean value of 5.6404 and Standard Deviation of 1.07126. Having a higher Mean value than the middle value in the Likert Scale from 1 to 7 indicates that the respondents tend to reveal high levels of Perceived Usefulness i.e., having the video and description presented in the questionnaire respondents perceived the Virtual Shopping Assistant as a useful tool for their shopping experiences.

Table 5.2 Descriptive Statistics for PU

		Min	Max	Mean	Std. Deviation
PU_1	Using the shopping app for in-store shopping would make me save time	1	7	5.68	1.256
PU_2	Using the shopping app for in-store shopping would improve the efficiency of my shopping trip	1	7	5.70	1.117
PU_3	Using the shopping app for in-store shopping would be useful to me	1	7	5.54	1.248
	PU	1.67	7.00	5.6404	1.07126

Source: author's elaboration, SPSS Data

Perceived Enjoyment (PE)

Perceived Enjoyment was measured using 4 different items. In Table 5.3, the values for the Minimum, the Maximum, the Mean, and the Standard Deviation for each item are presented.

The item with the highest mean value is PE_1 - *I think using the shopping app for in-store shopping would be entertaining* with the value of 5.50. By computing the mean of the items PE_1, PE_2, PE_3 and PE_4 the construct PE was obtained, representing Perceived Enjoyment. The mean for PE is equal to 4.9401 with a Standard Deviation of 1.12523. These values indicate that respondents tend to agree that they would enjoy using the Virtual Shopping Assistant.

Table 5.3 Descriptive Statistics for PE

		Min	Max	Mean	Std. Deviation
PE_1	I think using the shopping app for in-store shopping would be entertaining	1	7	5.50	1.273
PE_2	I think using the shopping app for in-store shopping would be pleasant	1	7	5.31	1.156
PE_3	I think using the shopping app for in-store shopping would be exciting	1	7	4.30	1.504
PE_4	I think using the shopping app for in-store shopping would be fun	1	7	4.65	1.428
PE		1.00	7.00	4.9401	1.12523

Source: author's elaboration, SPSS Data

Privacy Concerns (PC)

In the questionnaire, there were 5 items intended to analyze Privacy Concerns. The values for both the Mean and the Standard Deviation for each item are presented in Table 5.4.

From the table, it is possible to see that PC_4 - *I would be concerned that my personal information can be used for purposes I was not expecting* corresponds to the highest Mean, with the value 4.66. Through computing the Means of the 5 items, the construct PC corresponding to Privacy Concerns was created. The Mean for this variable is then 4.3558 and the Standard Deviation 1.63053. The Mean value is close to the middle value in the Likert Scale from 1 to 7, indicating that respondents are quite neutral in what regards the extent to which they demonstrate privacy concerns toward the Virtual Shopping Assistant.

Table 5.4 Descriptive Statistics for PC

		Min	Max	Mean	Std. Deviation
PC_1	I would be concerned that my personal information could be misused	1	7	4.08	1.765
PC_2	I would be concerned that my personal information could be found on the internet	1	7	4.06	1.856
PC_3	I would be concerned that my personal information could be shared with third parties	1	7	4.39	1.808
PC_4	I would be concerned that my personal information can be used for purposes I was not expecting	1	7	4.66	1.756

PC_5	I would be concerned that my private location information is kept in a non-secure manner	1	7	4.58	1.786
PC		1.00	7.00	4.3558	1.63053

Source: author's elaboration, SPSS Data

Satisfaction (SAT)

Satisfaction was measured using 2 items. In Table 5.5, the values for the Minimum, the Maximum, the Mean, and the Standard Deviation for each item are presented.

The item with the highest mean value is SAT_2 - *Overall, I would be satisfied with this service* with the value of 5.30. By computing the mean of the items SAT_1 and SAT_2 the construct SAT was obtained, representing Satisfaction. The mean for SAT is equal to 5.1517 with a Standard Deviation of 1.08581. Having a mean value higher than the middle of the Likert Scale from 1 to 7, these values indicate that respondents tend to agree that they would be satisfied using the Virtual Shopping Assistant.

Table 5.5 Descriptive Statistics for SAT

		Min	Max	Mean	Std. Deviation
SAT_1	I would be happy to use this service	1	7	5.00	1.237
SAT_2	Overall, I would be satisfied with this service	1	7	5.30	1.073
SAT		1.00	7.00	5.1517	1.08581

Source: author's elaboration, SPSS Data

Commitment (COM)

In the questionnaire, there were 2 items intended to analyze Commitment. The values for both the Mean and the Standard Deviation for each item are presented in Table 5.6.

From the table, it is possible to see that COM_1 - *I think I would use this service in the future* corresponds to the highest Mean, with the value 5.38. Through computing the Means of the 2 items, the construct COM corresponding to Commitment was created. The Mean for this variable is then 5.1367 and the Standard Deviation 1.23508. The Mean value is higher than the middle value in the Likert Scale from 1 to 7, indicating that respondents tend to demonstrate high levels of commitment toward the Virtual Shopping Assistant, i.e., having the possibility to do so respondents would commit to this service and use it on a regular basis in their future shopping experiences.

Table 5.6 Descriptive Statistics for COM

		Min	Max	Mean	Std. Deviation
COM_1	I think I would use this service in the future	1	7	5.38	1.267
COM_2	I would keep using this service on a regular basis	1	7	4.89	1.387
	COM	1.00	7.00	5.1367	1.23508

Source: author's elaboration, SPSS Data

Trust (TRU)

Trust was composed by 2 variables. The values for the Mean and Standard Deviation of each item are displayed in Table 5.7.

The item with the highest mean value of 5.21 was TRU_1 – *I would trust the Shopping Virtual Assistant.* The construct TRU representing Trust was obtained through computing the mean of the items TRU_1 and TRU_2. TRU has a mean value of 5.1217 and Standard Deviation of 1.03926. The Mean value is higher than the middle value in the Likert Scale from 1 to 7, indicating that the respondents tend to reveal high levels of Trust, meaning they tend to believe they would trust the Virtual Shopping Assistant.

Table 5.7 Descriptive Statistics for TRU

		Min	Max	Mean	Std. Deviation
TRU_1	I would trust the Shopping Virtual Assistant	1	7	5.21	1.107
TRU_2	I would rely on the recommendations of the Shopping Virtual Assistant	1	7	5.03	1.184
	TRU	1.00	7.00	5.1217	1.03926

Source: author's elaboration, SPSS Data

Attitude toward the VSA (ATT)

Attitude toward the Virtual Shopping Assistant was measured using 2 items. In Table 5.8, the values for the Minimum, the Maximum, the Mean, and the Standard Deviation for each item are presented.

The items with the highest mean values are ATT_2 - I think it would be a good idea to use a Virtual Shopping Assistant and ATT_3 - I have a favorable attitude towards shopping with a Virtual Shopping Assistant both with the mean value of 5.42. By computing the mean of the items ATT_1, ATT_2 and ATT_3 the construct ATT was obtained, representing Attitude toward the VSA. The mean for ATT is equal to 5.3820 with a Standard Deviation of 1.22956. Having a mean value higher than the middle of the Likert Scale from 1 to 7, these values indicate that respondents tend to have a positive attitude toward the Virtual Shopping Assistant.

Table 5.8 Descriptive Statistics for ATT

		Min	Max	Mean	Std. Deviation
ATT_1	I like the idea of in-store shopping with the help of a Virtual Shopping Assistant	1	7	5.30	1.380
ATT_2	I think it would be a good idea to use a Virtual Shopping Assistant	1	7	5.42	1.252
ATT_3	I have a favorable attitude towards shopping with a Virtual Shopping Assistant	1	7	5.42	1.302
ATT		1.00	7.00	5.3820	1.22956

Source: author's elaboration, SPSS Data

Intention to use the VSA (INT)

Intention to use the Virtual Shopping Assistant was composed by 3 variables. The values for the Mean and Standard Deviation of each item are displayed in Table 5.9.

The item with the highest mean value of 5.32 was INT_1 – *I would consider using it for my in-store shopping.* The construct INT representing Intention to use the VSA was obtained through computing the mean of the items INT_1, INT_2 and INT_3. INT has a mean value of 5.1323 and Standard Deviation of 1.26912. The Mean value is higher than the middle value in the Likert Scale from 1 to 7, indicating that the respondents tend to reveal high levels of Intention to use the Virtual Shopping Assistant.

Table 5.9 Descriptive Statistics for INT

		Min	Max	Mean	Std. Deviation
INT_1	I would consider using it for my in-store shopping	1	7	5.32	1.354
INT_2	I think it would be worth it for me to use it while shopping in-store.	1	7	5.27	1.311
INT_3	I would use it regularly when shopping in-store.	1	7	4.81	1.482
INT		1.00	7.00	5.1323	1.26912

Source: author's elaboration, SPSS Data

5.2. Exploratory Analysis

In this section, SPSS 27 was used to perform the following tests: reliability analysis, validity analysis, and multiple regression analysis. Afterwards, the output will be analyzed and described to create the statistical ground for conclusions.

5.2.1. Reliability and Validity Analysis

A reliability test was performed to assess the reliability and validity of the sample. The analysis has been conducted through the statistical program SPSS 27 through the Cronbach's alpha test, computed for all items and constructs. This statistical measure aims to provide a numerical value for the internal consistency of a collection of data, that is, how closely related a set of items are as a group. The Cronbach's alpha can assume any value between 0 and 1, but the higher the value of the alpha, the higher is the reliability. Therefore, if the alpha is below 0.5 the value is not acceptable, a score between 0.7 and 0.79 is acceptable, between 0.8 and 0.89 means that the consistency is right and equal to 0.9 or above is excellent.

The results of this analysis can be found in Table 5.10 below. The alpha coefficients for all constructs are above 0.7, suggesting that all constructs have items with high internal consistency. The constructs with the lowest values are Perceived ease of use and Trust, with Cronbach's Alphas of 0.749 and 0.784 respectively. There are 3 constructs with Cronbach's Alphas above 0.9, Privacy Concerns (Cronbach's Alpha = 0.947), Attitude toward VSA (Cronbach's Alpha = 0.930) and Intention to use the VSA (Cronbach's Alpha = 0.905), thus indicating high reliability values.

Table 5.10 Reliability Analysis for all items

Construct	*Items*	*Cronbach's Alpha*
Perceived Ease of Use	PEOU_1 PEOU_2 PEOU_3 PEOU_4	0.749
Perceived Usefulness	PU_1 PU_2 PU_3	0.863
Perceived Enjoyment	PE_1 PE_2 PE_3 PE_4	0.856
Privacy Concerns	PC_1 PC_2 PC_3 PC_4 PC_5	0.947
Satisfaction	SAT_1 SAT_2	0.863
Commitment	COM_1 COM_2	0.843
Trust	TRU_1 TRU_2	0.784
Attitude toward VSA	ATT_1 ATT_2 ATT_3	0.930
Intention to use the VSA	INT_1 INT_2 INT_3	0.905

Source: author's elaboration, SPSS Data

5.3. Multiple Regression

5.3.1. Assumption of the Multiple Regression

The research conceptual model under study was analyzed through a Multiple Linear Regression analysis using SPSS 27. To proceed with the multiple regression analysis, it is necessary to test the basic assumptions, which will be presented throughout the following sections. If all the assumptions hold, it is possible to use the model for statistical inference, if at least one of the assumptions fails it is not possible to generalize the conclusions from the sample to the population.

5.3.1.1 Linearity of the model

The multiple regression model is the following:

$$\text{Intention to use the VSA} = \beta 0 + \beta 1 \times \text{Attitude toward VSA} + \beta 2 \times \text{Satisfaction} + \beta 3 \times \text{Commitment} + \beta 4 \times \text{Trust} + \beta 5 \times \text{Perceived Ease of Use} + \beta 6 \times \text{Perceived Usefulness} + \beta 7 \times \text{Perceived Enjoyment} + \beta 8 \times \text{Privacy Concerns} + \varepsilon$$

By construction, the model assumes linearity, and thus the assumption holds.

5.3.1.2. Mean of the residuals

When the mean of the residual components is equal to 0, it is possible to conclude that the mean of the fitted value is the same as the mean of the observed value. In the present study, the mean of the residual is 0, as presented in Table 5.11, and thus the assumption holds.

Table 5.11 Descriptive Statistics of the Residuals

	Minimum	Maximum	Mean	Std. Deviation
Predicted Value	1.0021	7.0664	5.1323	1.12505
Residual	-3.80736	2.31822	.00000	.58730
Std. Predicted Value	-3.671	1.719	.000	1.000
Std. Residual	-6.385	3.887	.000	.985

Source: author's elaboration, SPSS Data

5.3.1.3. Correlation between the independent variables and the residuals

This assumption states that the independent variables are not correlated with the residual terms. As shown in Table 5.12, all constructs have a Pearson correlation equal to 0.000, and thus are not correlated with the residuals. The assumption holds.

Table 5.12 Correlations

	Residual	PEOU	PU	PE	ATT	PC	TRU	SAT	COM
Residual	1								
PEOU	.000	1							
PU	.000	.538**	1						
PE	.000	.342**	.650**	1					
ATT	.000	.484**	.737**	.707**	1				
PC	.000	-.085	-.040	-.113	-.125*	1			
TRU	.000	.403**	.530**	.497**	.628**	-.239**	1		
SAT	.000	.426**	.675**	.718**	.806**	-.127*	.661**	1	
COM	.000	.453**	.678**	.671**	.822**	-.164**	.573**	.778**	1

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

Source: author's elaboration, SPSS Data

5.3.1.4. Correlation among the residual terms

To perform a multiple regression analysis, it is necessary that there is no correlation among the residual terms. According to the results presented in Table 5.13, the Durbin-Watson value is very close to 2, and thus the residuals are assumed to be independent. The assumption holds.

Table 5.13 Model Summary (Dependent Variable: INT)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.886a	.786	.779	.59634	1.870

a. Predictors: (Constant), COM, PC, PEOU, TRU, PE, PU, SAT, ATT

Source: author's elaboration, SPSS Data

5.3.1.5. Variance of the random term

Another important requirement is that the variance of the random term is constant, as it should be assumed that a model should make equally good predictions across all values. For equality of variance to exist, the points in the scatterplot must be evenly distributed across the horizontal axis. In Figure 5.1, the residuals do not seem to be randomly and evenly distributed horizontally. For this study, the assumption fails.

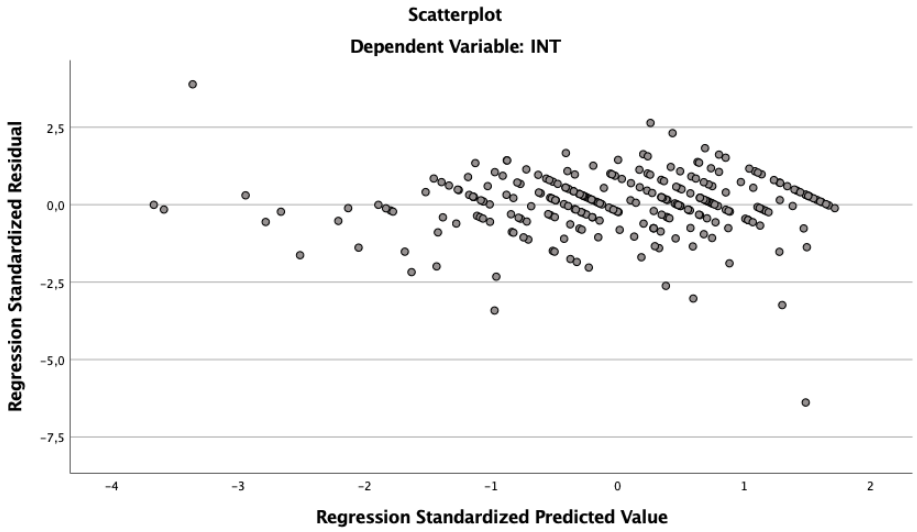

Figure 5.1 Scatterplot: Distribution of the residuals – Source: author's elaboration, SPSS Data

5.3.1.6. Normality of the residuals

As shown in Figure 5.2, it is possible to see that the residuals do not follow a normal distribution. Furthermore, from Figure 5.3, it is possible to understand that residuals are not randomly distributed along the 45º line. Thus, this assumption possibly fails.

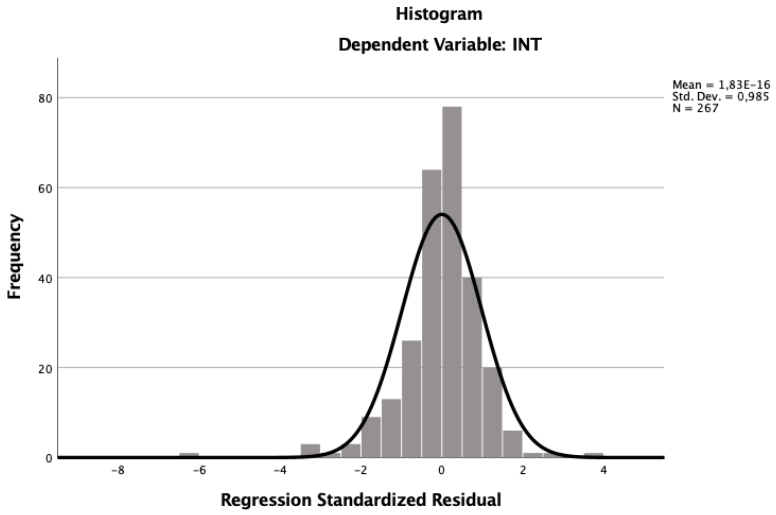

Figure 5.2 Histogram: Distribution of the residuals – Source: author's elaboration, SPSS Data

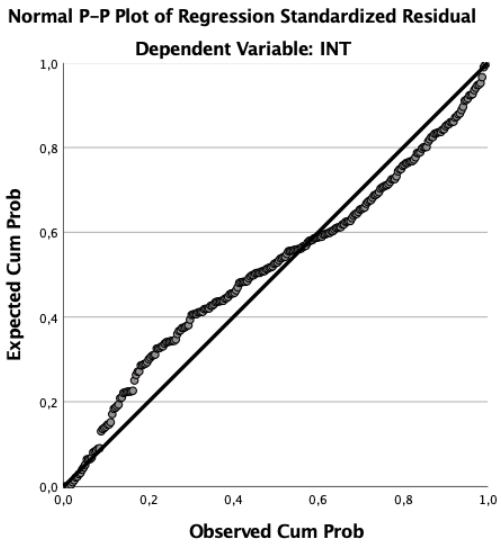

Figure 5.3 P-Plot: Distribution of the residuals – Source: author's elaboration, SPSS Data

5.3.1.7. Correlation among the explanatory variables

There can be a problem for the research when the variables under study are strongly correlated. It is essential to have explanatory variables with low levels of correlation between them, as this supports the idea that they are in fact explaining the dependent variable. To verify whether this happens for the variables under study, it is necessary to analyze the value of Tolerance, as well as the VIF, Variance Inflator Factor. Since Tolerance > 0.1 for all independent variables and VIF < 10 for all explanatory variables (Table 5.14), it can be concluded that there is no serious correlation among the variables and therefore the assumption holds.

Table 5.14 Correlation between explanatory variables and INT

		Unstandardized		Stand.	Collinearity Statistics	
Model		B	Std. Error	Beta	Tolerance	VIF
1	(Constant)	-.435	.320			
	PEOU	-.009	.055	-.006	.675	1.482
	PU	.067	.056	.057	.368	2.716
	PE	.067	.051	.059	.408	2.450
	ATT	.334	.064	.324	.214	4.663
	PC	.043	.023	.055	.917	1.090
	TRU	.057	.050	.047	.504	1.983
	SAT	.031	.067	.026	.253	3.951
	COM	.481	.056	.468	.275	3.636

Source: author's elaboration, SPSS Data

5.3.1.8. Evaluation of the model

After checking all the requirements for the multiple regression analysis, it can be finally determined how suitable the model is, that is how well the model can predict the observed values. As presented in Table 5.15, the value of $R^2 = 0.786$ indicates that 78.6% of the variation of the dependent variable (Intention to use the VSA) is explained by the explanatory variables in the model (PEOU, PU, PE, PC, SAT, COM, TRU, and ATT). The adjusted R^2 for the overall model was 0.779, indicative of a high goodness-of-fit.

Table 5.15 Model Summary (Dependent Variable: INT)

Model	R	R Square	Adjusted R Square
1	.886a	.786	.779

a. Predictors: (Constant), COM, PC, PEOU, TRU, PE, PU, SAT, ATT

Source: author's elaboration, SPSS Data

Since at least one of the previous assumptions fail, the model can only be used to characterize the sample under analysis and no generalizations can be make for the whole population. It will not be possible to use the model for inference.

5.3.2. Multiple Regression – PEOU, PU, PE, PC as independent, SAT as dependent variables

With the conceptual model in mind, it can be determined the role each variable takes. To evaluate how the constructs PEOU, PU, PE, and PC influence the construct SAT (H1a, H2a, H3a, H4a), the first are the independent variables and Satisfaction is the dependent variable. From the regression unstandardized coefficients presented in Table 5.16 it is possible to calculate the adjusted regression equation:

$$\mathbf{SAT} = 0.534 + 0.120 \times \mathbf{PEOU} + 0.320 \times \mathbf{PU} + 0.460 \times \mathbf{PE} - 0.035 \times \mathbf{PC} + \varepsilon$$

In this model we have four predictors (PEOU, PU, PE, and PC) with the criterion Satisfaction. The constant regression coefficient of 0.534 represents the estimated level of satisfaction if all explanatory variables were to take the value zero.

The variable PEOU has a regression coefficient of 0.089, meaning that every unit increase in PEOU leads to an increase of 0.089 in SAT. PU has a regression coefficient of 0.316, which translates into a 0.316 increase in SAT for every unit increase in PU. The variable PE has a regression coefficient of 0.476, which means that every unit increase in PE leads to an increase of 0.476 in SAT. PC has a negative regression coefficient of 0.053, meaning that for every unit increase in PC the construct SAT decreases 0.053.

Both PU and PE (sig = 0.000 < 0.050) show a linear correlation to SAT and therefore are well suited for prediction. These results support the hypothesis:

- H2a: Perceived usefulness positively influences satisfaction
- H3a: Perceived enjoyments positively influences satisfaction

PEOU has a low significance level (sig = 0.058 > 0.050) and PC (sig = 0.178 > 0.050) was not found significant in the relationship with Satisfaction. Therefore, the following hypothesis are not supported:

- H1a: Perceived ease of use positively influences satisfaction
- H4a: Privacy concerns negatively influences satisfaction

Table 5.16 Coefficients of the Multiple Regression, SAT as dependent variable

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.534	.355		1.505	.134
	PEOU	.120	.063	.089	1.904	.058
	PU	.320	.058	.316	5.497	.000
	PE	.460	.050	.476	9.202	.000
	PC	-.035	.026	-.053	-1.349	.178

Source: author's elaboration, SPSS Data

5.3.3. Multiple Regression – PEOU, PU, PE, PC as independent, COM as dependent variables

To evaluate if the constructs PEOU, PU, and PE positively influence the construct COM (H1b, H2b, H3b), and if the construct PC negatively influences the construct COM (H4b), the first constructs are the independent variables and Commitment is the dependent variable. From the regression unstandardized coefficients presented in Table 5.17 it is possible to calculate the adjusted regression equation:

$$\textbf{COM} = -0.050 + 0.186 \times \textbf{PEOU} + 0.413 \times \textbf{PU} + 0.424 \times \textbf{PE} - 0.072 \times \textbf{PC} + \varepsilon$$

In this model we have four predictors (PEOU, PU, PE, and PC) with the criterion Commitment. The constant regression coefficient of - 0.050 represents the estimated level of commitment if all explanatory variables were to take the value zero.

The variable PEOU has a regression coefficient of 0.121, meaning that every unit increase in PEOU leads to an increase of 0.121 in COM. PU has a regression coefficient of 0.358, which translates into a 0.358 increase in COM for every unit increase in PU. The variable PE has a regression coefficient of 0.386, which means that every unit increase in PE leads to an increase of 0.386 in COM. PC has a negative regression coefficient of 0.095, meaning that for every unit increase in PC the construct SAT decreases 0.095.

All independent variables show a linear correlation to COM (sig < 0.050) and therefore are well suited for prediction. These results support the hypothesis:

- H1b: Perceived ease of use positively influences commitment
- H2b: Perceived usefulness positively influences commitment
- H3b: Perceived enjoyment positively influences commitment
- H4b: Privacy concerns negatively influences commitment

Table 5.17 Coefficients of the Multiple Regression, COM as dependent Variable

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-.050	.417		-.119	.905
	PEOU	.186	.074	.121	2.514	.013
	PU	.413	.069	.358	6.021	.000
	PE	.424	.059	.386	7.212	.000
	PC	-.072	.031	-.095	-2.337	.020

Source: author's elaboration, SPSS Data

5.3.4. Multiple Regression – PEOU, PU, PE, PC as independent, TRU as dependent variables

To evaluate how the constructs PEOU, PU, PE, and PC influence the construct TRU (H1c, H2c, H3c, H4c), the first are the independent variables and Trust is the dependent variable. From the

regression unstandardized coefficients presented in Table 5.18 it is possible to calculate the adjusted regression equation:

$$\textbf{TRU} = 1.848 + 0.197 \times \textbf{PEOU} + 0.276 \times \textbf{PU} + 0.221 \times \textbf{PE} - 0.120 \times \textbf{PC} + \varepsilon$$

In this model we have four predictors (PEOU, PU, PE, and PC) with the criterion Trust. The constant regression coefficient of 1.848 represents the estimated level of trust if all explanatory variables were to take the value zero.

The variable PEOU has a regression coefficient of 0.152, meaning that every unit increase in PEOU leads to an increase of 0.152 in TRU. PU has a regression coefficient of 0.285, which translates into a 0.285 increase in TRU for every unit increase in PU. The variable PE has a regression coefficient of 0.239, which means that every unit increase in PE leads to an increase of 0.239 in TRU. PC has a negative regression coefficient of 0.188, meaning that for every unit increase in PC the construct TRU decreases 0.188.

All independent variables show a linear correlation to TRU (sig < 0.050) and therefore are well suited for prediction. These results support the hypothesis:

- H1c: Perceived ease of use positively influences trust
- H2c: Perceived usefulness positively influences trust
- H3c: Perceived enjoyment positively influences trust
- H4c: Privacy concerns negatively influences trust

Table 5.18 Coefficients of the Multiple Regression, TRU as dependent Variable

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.848	.424		4.360	.000
	PEOU	.197	.075	.152	2.621	.009
	PU	.276	.070	.285	3.972	.000
	PE	.221	.060	.239	3.698	.000
	PC	-.120	.031	-.188	-3.806	.000

Source: author's elaboration, SPSS Data

5.3.5. Multiple Regression – SAT, COM, TRU as independent, ATT as dependent variables

To evaluate how the constructs SAT, COM, and TRU influence the construct ATT (H5, H6, H7), the first are the independent variables and Attitude toward the VSA is the dependent variable. From the regression unstandardized coefficients presented in Table 5.19 it is possible to calculate the adjusted regression equation:

$$\mathbf{ATT} = 0.142 + 0.404 \times \mathbf{SAT} + 0.474 \times \mathbf{COM} + 0.142 \times \mathbf{TRU} + \varepsilon$$

In this model we have three predictors (SAT, COM, and TRU) with the criterion Attitude. The constant regression coefficient of 0.142 represents the estimated level of attitude toward the VSA if all explanatory variables were to take the value zero.

The variable SAT has a regression coefficient of 0.356, meaning that every unit increase in SAT leads to an increase of 0.356 in ATT. COM has a regression coefficient of 0.476, which translates into a 0.476 increase in ATT for every unit increase in COM. The variable TRU has a regression coefficient of 0.120, which means that every unit increase in TRU leads to an increase of 0.120 in ATT.

All independent variables show a linear correlation to ATT (sig < 0.050) and therefore are well suited for prediction. These results support the hypothesis:

- H5: Satisfaction positively influences Attitude towards VSA
- H6: Commitment positively influences Attitude towards VSA
- H7: Trust positively influences Attitude towards VSA

Table 5.19 Coefficients of the Multiple Regression, ATT as dependent Variable

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.142	.204		.696	.487
	SAT	.404	.061	.356	6.656	.000
	COM	.474	.049	.476	9.702	.000
	TRU	.142	.049	.120	2.918	.004

Source: author's elaboration, SPSS Data

5.3.6. Single Regression – ATT as independent, INT as dependent variable

To test if high levels of attitude lead to high levels of intention (H8), ATT is the independent and Intention to use the VSA is the dependent variable. From the regression unstandardized coefficients presented in Table 5.20 it is possible to calculate the adjusted regression equation:

$$\mathbf{INT} = 0.502 + 0.860 \times \mathbf{ATT} + \varepsilon$$

The variable ATT has a regression coefficient of 0.833. This means that every unit increase in ATT leads to a 0.833 increase in Intention to use the VSA. Furthermore, ATT (sig = 0.000 < 0.050) shows a linear correlation to INT and therefore is well suited for prediction. The hypothesis is supported by the results:

- H8: Attitude towards VSA positively influences Intention to use

Table 5.20 Coefficients of the Simple Regression, INT as dependent Variable

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	.502	.193		2.598	.010
	ATT	.860	.035	.833	24.552	.000

Source: author's elaboration, SPSS Data

From the 16 hypothesis proposed in the conceptual model, all except H1a and H4a were supported by the results of this study, as demonstrated in Table 5.21.

Table 5.21 List of Hypothesis and Validation

Hypothesis	Relationship			Standardized regression weight	p value	Supported?
H1a	Perceived ease of use	⟶	Satisfaction	.089	.058	No
H1b	Perceived ease of use	⟶	Commitment	.121	.013 **	Yes
H1c	Perceived ease of use	⟶	Trust	.152	.009 **	Yes
H2a	Perceived usefulness	⟶	Satisfaction	.316	.000 *	Yes
H2b	Perceived usefulness	⟶	Commitment	.358	.000 *	Yes
H2c	Perceived usefulness	⟶	Trust	.285	.000 *	Yes
H3a	Perceived enjoyment	⟶	Satisfaction	.476	.000 *	Yes
H3b	Perceived enjoyment	⟶	Commitment	.386	.000 *	Yes
H3c	Perceived enjoyment	⟶	Trust	.239	.000 *	Yes
H4a	Privacy concerns	⟶	Satisfaction	-.053	.178	No
H4b	Privacy concerns	⟶	Commitment	-.095	.020 **	Yes
H4c	Privacy concerns	⟶	Trust	-.188	.000 *	Yes
H5	Satisfaction	⟶	Attitude	.356	.000 *	Yes
H6	Commitment	⟶	Attitude	.476	.000 *	Yes
H7	Trust	⟶	Attitude	.120	.004 **	Yes
H8	Attitude	⟶	Intention to use	.833	.000 *	Yes

* $p < 0.001$; ** $p < 0.05$

Source: author's elaboration, SPSS Data

CHAPTER 6

6. Conclusions

Due to widespread adoption and benefits of smart retail technologies, extant literature suggests more in-depth research on this topic. For instance, Roy *et al.* (2018) suggests that there is space for further research on customers' acceptance of specific technologies since they vary in terms of their interactivity, presence, and risk perceptions. Having that, this study's main objective was to explore the customers' adoption of VSAs, focusing not only on the drivers of adoption but also of resistance to this technology.

With this goal in mind, a conceptual model was built, using the TAM as foundation, together with other relevant constructs from the literature. The model was then evaluated using an online survey, gathering a sample of 267 Portuguese respondents mainly between the ages of 18 and 24 years old. After analyzing the survey, we concluded that the various measures for assessing validity and reliability support the model and the research hypotheses could be accepted.

Although TAM has been extensively used in the literature and various extensions have been presented, to our best knowledge there is no other study that explores both drivers (PEOU, PU, PE) and inhibitors (PC) of adoption as influence of the relationship quality (SAT, COM, TRU) between consumers and VSAs and consequently its impact on attitude and intention to use. Thus, the present study contributes to the literature with new insights regarding the relationship between these constructs.

In this chapter, we will recall the research objectives to better explain the theoretical and managerial contributions of the present study. To do this, the key findings of the literature review and of the quantitative methodology analysis are presented, together with the conclusions regarding the hypothesis and research questions under study. Finally, the limitations of this dissertation are summarized, and opportunities for future research are suggested.

6.1. Theoretical contributions

The results confirm a positive relationship between ATT and INT to use virtual shopping assistants (H8), which is consistent with prior findings of the TAM (Davis *et al.*, 1989) as well as other recent studies (Alam et al., 2021; Driediger & Bhatiasevi, 2019; Kasilingam, 2020). Having that, retailers must know that consumers need to have a positive attitude towards VSAs to use them. Additionally, we proposed that the quality of the relationship between individuals and VSAs, represented by SAT, COM, and TRU, affect the attitude that consumers have toward VSAs. Our findings confirmed the positive relationship between all three facets of relationship quality (SAT, COM, TRU) and ATT towards VSAs (H5, H6, H7), indirectly having a positive influence on INT as well. The results suggest that the positive relationship between customers and VSAs influence the overall attitude they develop towards these technologies, which is consistent with other studies on the role of satisfaction (Ebrahimi et al., 2022; Huang & Chueh, 2021; Luceri et al., 2022; Roy et al., 2017) and trust (Hsieh & Lee, 2021; Kwee-Meier et al., 2016; Pitardi & Marriott, 2021; Tarhini et al., 2019) in technology adoption. More specifically, it helps understanding that customers' satisfaction, trust in VSAs and commitment to keep interacting with them, significantly influences the attitude they form.

Regarding the drivers and inhibitors of SAT, the positive influence of PE and PU was supported (H2a, H3a). Our findings reveal PE as the strongest of driver of SAT, indicating that customers who perceive the use of VSAs as fun and enjoyable tend to be satisfied with this interaction. It supports previous studies demonstrating that hedonic motivations have a relevant role on satisfaction (Alnawas & Aburub, 2016), overall attitude (Kasilingam, 2020) and ultimately customers' adoption intention (Brusch & Rappel, 2020). Surprisingly, our study indicates that PEOU and PC do not influence customers' satisfaction regarding the use of VSAs (H1a, H4a). These results are in contrast with previous research (Huang & Chueh, 2021; Pantano & Servidio, 2012).

Moreover, the findings of this study confirm the positive influence of PEOU, PU and PE on COM (H1b, H2b, H3b), suggesting that customers are more likely to be committed to using a VSA if they perceive the interaction with it as something easy, useful, and enjoyable. On the opposite side, this study supported the negative relationship between PC and COM (H4b). Having this, retailers should be aware of customers' concerns and find ways to address them in their marketing strategies to avoid negative attitudes.

Finally, our findings also demonstrated the positive relationship between the three drivers of adoption under study (PEOU, PU and PE) and TRU (H1c, H2c, H3c), having PU as the strongest driver of TRU. These results are consistent with the findings of Zhang et al. (2021) that found a significant effect of functionality and social emotions on consumers' trust. Importantly, our results confirmed the negative relationship between PC and TRU (H4c), indicating that if customers are concerned that their privacy might be compromised, they are less likely to trust the VSA.

With these findings, the theoretical contribution of this study is threefold. First, our study contributes to the existent literature on technology adoption in the context of retail by investigating the customers' intention to adopt VSAs. Second, since most studies on technology adoption have focused more on the drivers of acceptance than of resistance, this study responds to the need to further explore the barriers to adoption. Third, previous research on in-store virtual assistants and smart technologies has mostly investigated data from non-European countries, including frequently Chinese or American samples (Canziani & MacSween, 2021; Chen et al., 2020; Chopdar et al., 2018), less is known regarding the perception and adoption intentions of European consumers. Although previous studies have investigated European samples, from our best knowledge, these included mostly German samples, which differ a lot in cultural dimensions when compared to Portugal. For instance, a study compared various countries in terms of innovative capacities based on cultural characteristics and Germany was considered an innovation leader while Portugal was considered a moderate innovator (Moonen, 2017). By using empirical data of a Portuguese sample, this study provides new insights from a European perspective extending the literature on this topic.

6.2. Managerial implications

As explained before, there is a new concept of retail where brands must connect the online and offline worlds, providing an omnichannel experience to their customers. Technology and innovation are a big part of this, providing new opportunities for brands to interact with their customers. However, long adoption processes and high costs are usually associated with the implementation of smart retail technologies, creating a need to further study the customer adoption of these technologies. In that sense, the results of this study fulfill that need and provide important managerial implications especially relevant for managers implementing new retail technologies in Portugal.

- *Be aware of customers' privacy concerns and address them in marketing strategies*

This research shows that consumers' privacy concerns negatively influence their trust and commitment, impacting their attitude and intention to use VSAs. If customers do not consider the virtual assistant secure and are concerned that their privacy is at risk, they will not trust the interaction and will not use it in the future. Hence, retailers should proactively address these concerns in their communication with consumers to avoid negative attitudes towards VSAs. The literature suggests that letting consumers have more control over their privacy settings can reduce privacy concerns (Zhang & Sundar, 2019), thus managers could eliminate some barriers of adoption with the use of transparent communication, giving consumers more knowledge on how VSAs work, so they feel more in control of their decision to adopt.

- *Create ease to use and useful interactions between customers and VSAs*

To incentivize intention to use, retailers need to be aware that customers must build a positive attitude towards VSAs, as well as a good user-technology relationship. According to the findings, retailers can achieve these outcomes if they are able to highlight the attributes of VSAs related to usefulness and easiness to use. When compared to PEOU, we observe that PU has a greater influence on all constructs related to relationship quality (i.e., trust, satisfaction, and commitment). Hence, retailers should prioritize the usefulness attributes in their services.

Previous studies show that in terms of PU, users perceive value mostly in the timesaving and convenience aspects of retail services (Driediger & Bhatiasevi, 2019). Having this, managers could stress the time convenience provided by VSAs, through indoor navigation and recommendations, in their marketing strategies.

- *Create a fun and enjoyable experience*

The in-store experience is not just about shopping anymore. The existent literature shows that consumers nowadays want to go to a physical store and find more than just a place to shop, they are looking for an entertainment experience as well. Consistent with this, we observed in our study that hedonic motivations are the most influential driver of intention to use VSAs. With this knowledge, retailers could integrate more gamification and entertainment features to their virtual assistants, as well as develop better visuals and design aesthetics to enhance PE.

6.3. Limitations and Recommendations for Future Research

Despite its several important contributions to both academic literature and retail management, this study is not free from limitations, which may provide suggestions for future research.

The first limitation is related to the methodology applied. Researchers have agreed that experimental studies, in which respondents are instructed to imagine they are present in a specific written scenario, are valuable to collect accurate data. However, other authors have raised the concern that experimental studies may not represent completely how respondents would feel and respond in real life (Orsingher & Wirtz, 2018). To face this limitation, a pre-test was conducted, and all misleading information was removed to improve the survey's precision. Despite our best efforts, field experiments in a store environment could obtain better results, evaluating customers' reactions and examining to what extent their perceptions influence to use VSAs. Additionally, due to the lack of time and resources, this survey was only scheduled at a single point in time and distributed in a convenience sampling, which makes it harder to have a representative result. Using a different sampling method, such as random sampling, and a longitudinal study would provide more reliable results and allow us to monitor changes in variables and their correlation with time. It could be relevant to observe these changes in perceptions and attitude as consumers get more familiar with VSAs. Another limitation arises from the sample size. Although 515 answers were collected, only 267 were considered valid for this study after eliminating errors and uncomplete answers. Thus, the final sample is quite small, restricting generalization of this study.

Moreover, this study focusses exclusively on Portugal and although it brings relevant insights for this specific geographical area, it could be interesting to replicate this conceptual model in other countries to get a more comprehensive understanding of VSAs' acceptance, including other cultures and realities.

Finally, it could be interesting to study how consumers' personal characteristics and experiences influence their intentions to use VSAs. This could be achieved by adding different moderators, such as age, gender, past experience, and technology expertise, to the conceptual model.

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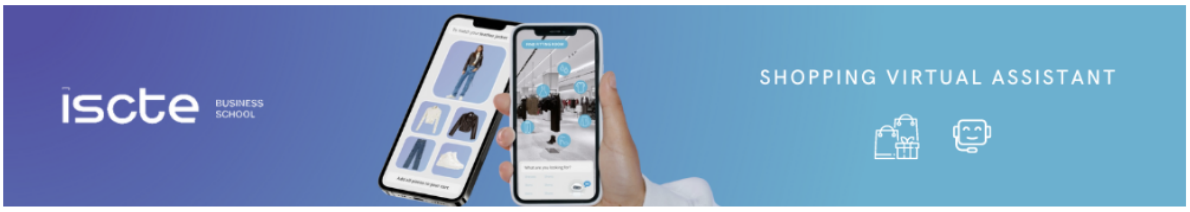
Annexes

Annex A: Online Survey (English Version)



English - United Kingdom

Dear participant,

Thank you in advance for agreeing to participate in this survey.
As part of my master's thesis, this questionnaire was developed and should not take more than 5 minutes to complete. Please answer all questions honestly, there are no right or wrong answers. The information collected will be used for academic purposes only and all responses are anonymous.

Thank you very much for your cooperation!
Any questions or clarifications, do not hesitate to contact me: lmcaa@iscte-iul.pt

Leonor Moura
Prof. Ricardo Godinho Bilro

Do you agree to participate in this survey voluntarily?

Yes

No

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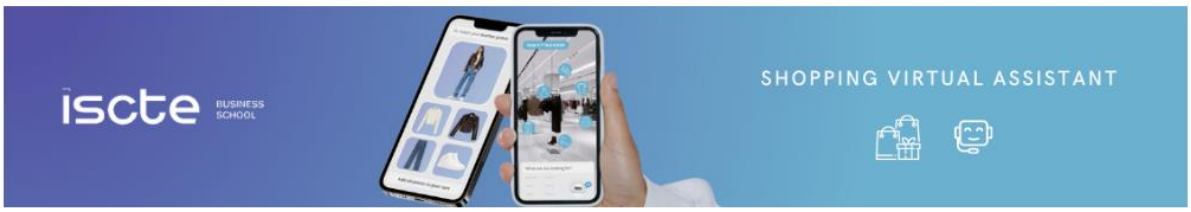


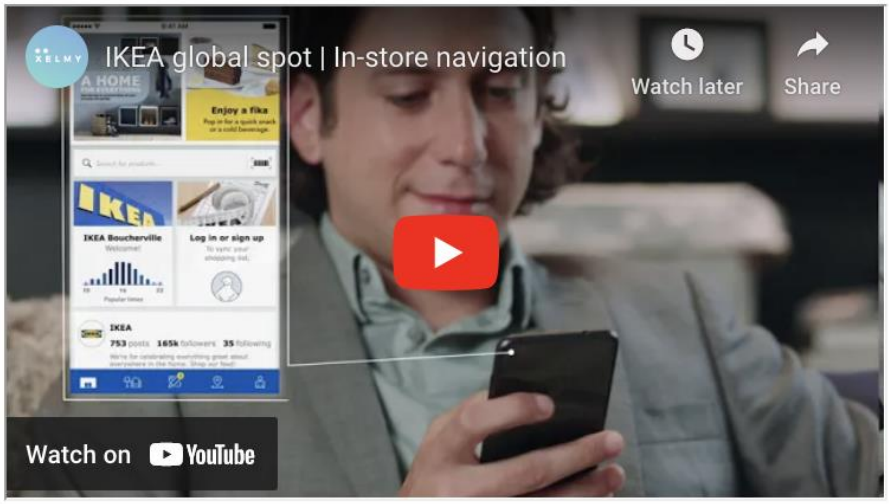
English - United Kingdom

The main objective of this questionnaire is to evaluate the potential of a new assistive technology for purchases in physical stores, based on the opinion of consumers.

This technology consists of a Virtual Shopping Assistant whose functions include **answering questions**, making **product recommendations**, providing **information about products**, facilitating **payments** and assisting the n**avigation of stores**, indicating the best route to reach products.

This technology would be available through the free app of the store as a feature to improve the customer experience.

To better understand how the Virtual Shopping Assistant would work, please watch carefully this small video of a similar example from IKEA. You can turn-on the auto-translate subtitles if needed.



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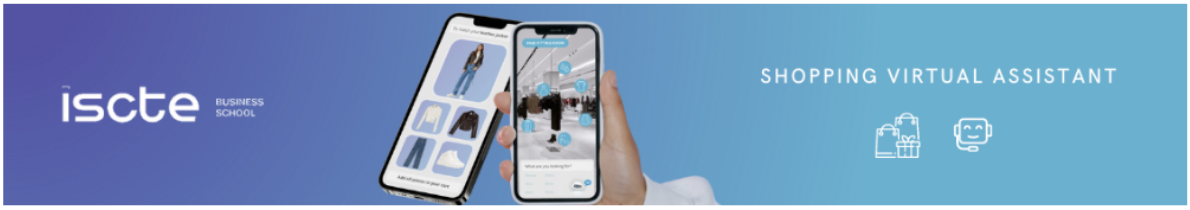

English - United Kingdom

Based on the video you just saw regarding the usage of the IKEA Store App and knowing that a Virtual Shopping Assistant would work similarly, rate your level of agreement with each statement:

	1 - Strongly Disagree	2	3	4 - Neither agree or disagree	5	6	7 - Strongly Agree
The app is clear and understandable	○	○	○	○	○	○	○
I think it would be easy for me to become skillful using the app	○	○	○	○	○	○	○
Using the app would require a lot of my mental effort	○	○	○	○	○	○	○
The app would be easy to use	○	○	○	○	○	○	○

Using the Virtual Shopping Assistant for in-store shopping would...

	1 - Strongly Disagree	2	3	4 - Neither agree or disagree	5	6	7 - Strongly Agree
make me save time	○	○	○	○	○	○	○
improve the efficiency of my shopping trip	○	○	○	○	○	○	○
be useful to me	○	○	○	○	○	○	○

I think using the Virtual Shopping Assistant for in-store shopping would be...

	1 - Strongly Disagree	2	3	4 - Neither agree or disagree	5	6	7 - Strongly Agree
entertaining	○	○	○	○	○	○	○
pleasant	○	○	○	○	○	○	○
exciting	○	○	○	○	○	○	○
fun	○	○	○	○	○	○	○

Based on the description and video presented previously, rate your level of agreement with each statement.

	1 - Strongly Disagree	2	3	4 - Neither agree or disagree	5	6	7 - Strongly Agree
I like the idea of in-store shopping with the help of a Virtual Shopping Assistant	○	○	○	○	○	○	○
I think it would be a good idea to use a Virtual Shopping Assistant	○	○	○	○	○	○	○
I have a favorable attitude towards shopping with a Virtual Shopping Assistant	○	○	○	○	○	○	○

When using the Shopping Virtual Assistant, I would be concerned...

	1 - Strongly Disagree	2	3	4 - Neither agree or disagree	5	6	7 - Strongly Agree
that my personal information could be misused	○	○	○	○	○	○	○
that my personal information could be found on the internet	○	○	○	○	○	○	○
that my personal information could be shared with third parties	○	○	○	○	○	○	○
that my personal information can be used for purposes I was not expecting	○	○	○	○	○	○	○
that my private location information is kept in a non-secure manner	○	○	○	○	○	○	○

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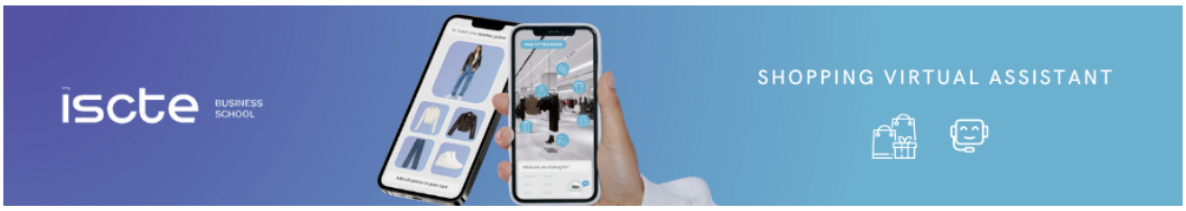


English - United Kingdom

From 1 to 7 rate your level of agreement with each statement, based on the description and video presented previously.

	1 - Strongly Disagree	2	3	4 - Neither agree or disagree	5	6	7 - Strongly Agree
I would trust the Shopping Virtual Assistant	○	○	○	○	○	○	○
I would rely on the recommendations of the Shopping Virtual Assistant	○	○	○	○	○	○	○
I would be happy to use this service	○	○	○	○	○	○	○
Overall, I would be satisfied with this service	○	○	○	○	○	○	○
I think I would use this service in the future	○	○	○	○	○	○	○
I would keep using this service on a regular basis	○	○	○	○	○	○	○

Given the chance to use a Virtual Shopping Assistant...

	1 - Strongly Disagree	2	3	4 - Neither agree or disagree	5	6	7 - Strongly Agree
I would consider using it for my in-store shopping	○	○	○	○	○	○	○
I think it would be worth it for me to use it while shopping in-store.	○	○	○	○	○	○	○
I would use it regularly when shopping in-store.	○	○	○	○	○	○	○

What color is the snow?

	White	Orange	Black	Blue
If you are paying attention answer "Orange"	○	○	○	○

English - United Kingdom

How old are you?

- Under 18
- 18-24
- 25-34
- 35-49
- 50-64
- 65 or older

What gender do you identify with?

- Male
- Female
- Non-binary

Where are you from?

Annex B: Online Survey (Portuguese Version)

Português

Caro(a) participante,

Antes de mais, obrigada por aceitar participar neste estudo.
Este questionário foi desenvolvido como parte da minha tese de mestrado, e não deve demorar mais de 5 minutos a ser preenchido. Por favor, responda a todas as perguntas honestamente, não há respostas certas ou erradas. A informação recolhida será utilizada apenas para fins académicos e todas as respostas são anónimas.

Muito obrigado pela sua cooperação!
Qualquer dúvida ou esclarecimento, não hesite em contactar-me: lmcaa@iscte-iul.pt

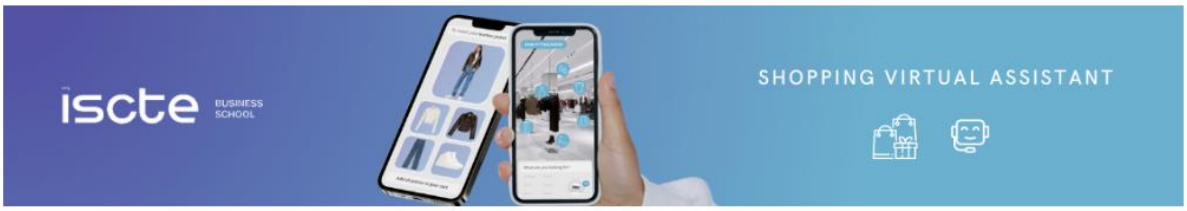
Leonor Moura
Prof. Ricardo Godinho Bilro

Aceita participar voluntariamente neste estudo?

Sim

Não

→



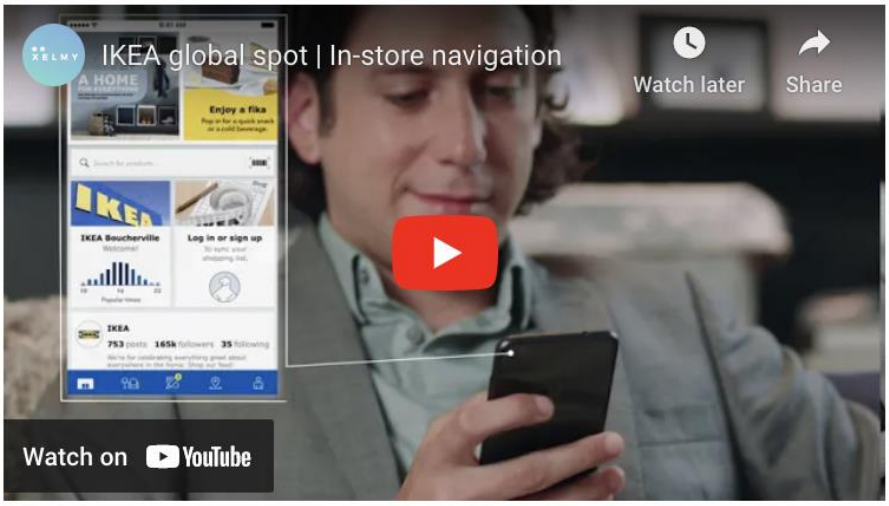
Português

O principal objetivo deste estudo é avaliar o potencial de uma nova tecnologia para compras em lojas físicas, com base na opinião do consumidor.

Esta tecnologia consiste numa Assistente de Compras Virtual, cujas funções incluem **responder a questões**, fazer **recomendações de produtos**, fornecer **informações sobre os produtos**, facilitar **pagamentos** e auxiliar na **navegação das lojas**, indicando o melhor caminho para chegar a cada produto.

Esta tecnologia estaria disponível através da app gratuita da loja, sendo um recurso extra para melhorar a experiência do cliente.

Para entender melhor como funcionaria a Assistente de Compras Virtual, veja com atenção este pequeno vídeo de um exemplo semelhante da IKEA. Se necessário, pode ativar as legendas de tradução automática.



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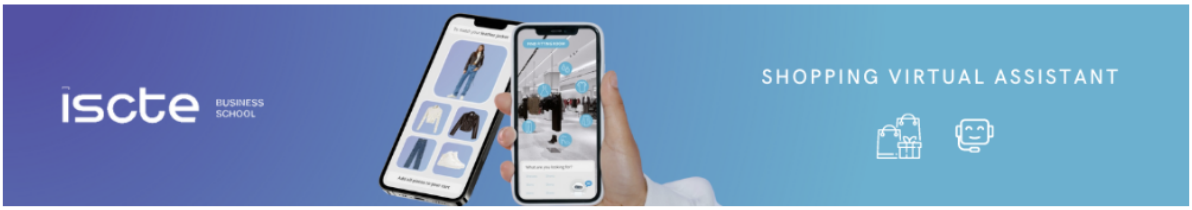


Português

Com base no vídeo que acabou de ver sobre o uso da IKEA Store App e tendo em conta que a Assistente de Compras Virtual funcionaria de forma semelhante, avalie seu nível de concordância com cada afirmação:

	1 - Discordo Totalmente	2	3	4 - Não concordo nem discordo	5	6	7 - Concordo Totalmente
A app é clara e fácil de compreender	○	○	○	○	○	○	○
Eu acho que me ia adaptar facilmente a usar a app	○	○	○	○	○	○	○
Considero que usar esta app ia exigir um elevado esforço mental	○	○	○	○	○	○	○
A app ia ser fácil de usar	○	○	○	○	○	○	○

Utilizar uma Assistente de Compras Virtual para compras em lojas físicas ia...

	1 - Discordo Totalmente	2	3	4 - Não concordo nem discordo	5	6	7 - Concordo Totalmente
fazer-me poupar tempo	○	○	○	○	○	○	○
melhorar a eficiência das minhas compras	○	○	○	○	○	○	○
ser útil para mim	○	○	○	○	○	○	○

Usar uma Assistente de Compras Virtual ia ser...

	1 - Discordo Totalmente	2	3	4 - Não concordo nem Discordo	5	6	7 - Concordo Totalmente
interessante	○	○	○	○	○	○	○
agradável	○	○	○	○	○	○	○
emocionante	○	○	○	○	○	○	○
divertida	○	○	○	○	○	○	○

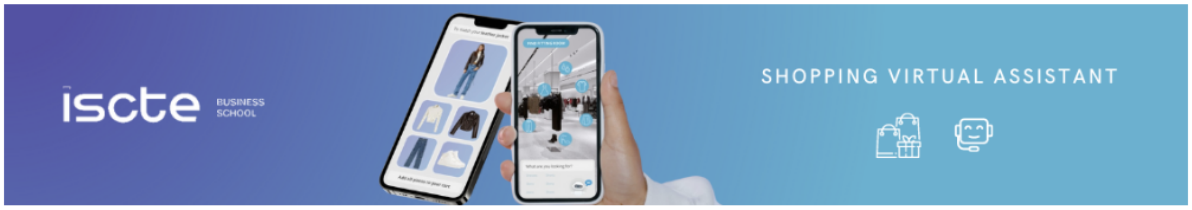
Com base na descrição e no vídeo apresentado anteriormente, indique o seu nível de concordância com cada afirmação:

	1 - Discordo Totalmente	2	3	4 - Não concordo nem discordo	5	6	7 - Concordo Totalmente
Eu gosto da ideia de fazer compras em loja física com a ajuda de um Assistente de Compras Virtual	○	○	○	○	○	○	○
Eu acho que seria uma boa ideia usar um Assistente de Compras Virtual	○	○	○	○	○	○	○
Eu tenho uma atitude favorável em relação a fazer compras com uma Assistente de Compras Virtual	○	○	○	○	○	○	○

Ao usar a Assistente de Compras Virtual, eu ia ficar preocupado/a...

	1 - Discordo Totalmente	2	3	4 - Não concordo nem Discordo	5	6	7 - Concordo Totalmente
que as minhas informações pessoais sejam usadas indevidamente	○	○	○	○	○	○	○
que as minhas informações pessoais possam ser encontradas na internet	○	○	○	○	○	○	○
que as minhas informações pessoais possam ser partilhadas com terceiros	○	○	○	○	○	○	○
que as minhas informações pessoais sejam usadas para fins que eu não esperava	○	○	○	○	○	○	○
que as minhas informações de localização privada sejam guardadas de uma forma não segura	○	○	○	○	○	○	○

← →



Português

De 1 a 7 indique o seu nível de concordância com cada afirmação, com base na descrição e no vídeo apresentado anteriormente.

	1 - Discordo Totalmente	2	3	4 - Não concordo nem discordo	5	6	7 - Concordo Totalmente
Eu ia confiar na Assistente de Compras Virtual	○	○	○	○	○	○	○
Eu ia confiar nas recomendações da Assistente de Compras Virtual	○	○	○	○	○	○	○
Eu ia ficar feliz por usar este serviço	○	○	○	○	○	○	○
No geral, eu ia ficar satisfeito/a com este serviço	○	○	○	○	○	○	○
Eu acho que ia usar este serviço no futuro	○	○	○	○	○	○	○
Eu acho que ia continuar a usar este serviço regularmente	○	○	○	○	○	○	○

Tendo a possibilidade de usar uma Assistente de Compras Virtual...

	1 - Discordo Totalmente	2	3	4 - Não concordo nem discordo	5	6	7 - Concordo Totalmente
Eu ia considerar usar este serviço nas minhas compras em loja física	○	○	○	○	○	○	○
Eu acho que ia valer a pena usar este serviço para fazer compras em loja física.	○	○	○	○	○	○	○
Eu o usaria regularmente ao fazer compras na loja.	○	○	○	○	○	○	○

De que cor é a neve?

	Branca	Laranja	Preta	Azul
Se está a prestar atenção, responda "Laranja"	○	○	○	○

Português

Qual a sua idade?

- Menos de 18
- 18-24
- 25-34
- 35-49
- 50-64
- 65 ou mais

Qual o seu género?

- Masculino
- Feminino
- Não-binário

Qual é a sua nacionalidade?