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The influence of Artificial Intelligence on the Online Behaviour of Portuguese Consumers and Brands

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Acknowledgments

The conclusion of a Master thesis marks the end of an important chapter in the path of any student. To me, it not only represents the end of an academic achievement that I was fortunate to have access to, but most importantly, a moment of personal accomplishment, in which I believe to have developed as a human being, by being inspired by people whom I owe my deepest gratitude.

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Resumo

A Inteligência Artificial tem cada vez maior importância na sociedade atual, não só estando progressivamente mais presente nas interações e atividades diárias das pessoas, como também contribuindo crescentemente para a transformação de diversas indústrias, entre as quais o e-commerce.

Simultaneamente, o campo do comércio online está a experienciar um crescimento significativo em termos de volume e aceitação entre os clientes. A facilidade de acesso e maior variedade de produtos e serviços disponíveis online são fatores que têm contribuído para a mudança no comportamento dos compradores. No entanto, os sectores retalhistas ainda enfrentam algumas dificuldades na adoção do comércio eletrónico, particularmente relacionadas com a questão da conversão da experiência na loja para o ambiente online.

Para responder a estas questões, várias ferramentas baseadas na IA, nomeadamente Chatbots, Agentes de Recomendação e Sistemas de Virtual Try-On (VTOs), foram introduzidas no âmbito do comércio eletrónico a fim de melhorar a experiência online, proporcionar novas possibilidades de interação entre consumidores e marcas, e, em última análise, influenciar a intenção de compra dos clientes. Esta dissertação visa avaliar por que razão a IA deve tornar-se cada vez mais relevante para que as empresas compreendam e satisfaçam melhor as necessidades dos consumidores, através de experiências personalizadas, oferecendo uma possibilidade de obter vantagens competitivas.

Assim, o impacto destes Sistemas Inteligentes sobre a experiência online do cliente e subsequente intenção de compra foi examinado, utilizando uma abordagem mista de métodos quantitativos, considerando tanto uma perspetiva empresarial como uma perspetiva do consumidor. Os resultados salientam que a IA é vista como uma ferramenta promissora tanto entre as marcas portuguesas como entre os clientes que utilizam plataformas de retalho online. Em particular, foi possível concluir que o uso de ferramentas de IA permite uma melhor experiência do cliente quando faz compras online, levando em última análise os clientes a completar as suas compras.

Palavras-Chave: E-commerce; Inteligência Artificial; Intenção de Compra; Experiência Online do Consumidor; Chatbots; Agentes de Recomendação, VTOs.

Classificação JEL:

M31 – Marketing

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Abstract

Artificial Intelligence (AI) is intensifying its importance, being increasingly present in people's everyday interactions and activities, while shaping a variety of industries, among which is the field of online shopping, that is currently experiencing significant growth in terms of volume and acceptance among customers. A range of factors have contributed to the change in how shoppers behave, including the ease of access and a greater variety of products and services available online. Nonetheless, retail sectors still face some difficulties in adopting e-commerce, particularly related to the issue of converting the in-store experience to the online environment.

To answer these constraints, several AI-based tools, namely Chatbots, Recommendation Agents, and Virtual Try On Systems (VTOs) have been introduced in the e-commerce field in order to enhance the online experience. Ultimately these technologies promise to provide new possibilities for the field of online shopping, to increase the digital interaction between customers and brands, and to influence customers purchase behaviour. As so, this dissertation aims to assess why AI should become increasingly relevant for companies in order to better understand and meet consumers' needs through personalised experiences, offering a possibility to gain competitive advantages.

Hence, the impact of these AI-based tools on the online experience of the customer and subsequent purchase intention was examined using a mixed approach of quantitative methods, considering both a corporate and a consumer perspective. The results highlight that AI is seen as a promising tool among both Portuguese brands and customers using online retail platforms. In particular, it was possible to conclude that the use of AI tools enables a better customer experience when shopping online, ultimately leading customers to complete their purchases.

Keywords: E-commerce, Artificial Intelligence; Purchase Intention; Online Purchase Experience; Chatbots; Recommendation Agents, VTOs.

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Abbreviations List

AI	Artificial Intelligence
AVE	Average Variance
B2C	Business to Customer
CA	Cronbach Alphas
CR	Composite Reliability
DL	Deep Learning
ML	Machine Learning
NLP	Natural Language Processing
OCE	Online Customer Experience
RA	Recommendation Agents
TAM	Technology Acceptance Model
VTO	Virtual Try-On

Introduction

Contextualization

The rapid development of technology over the past decades has led towards drastic changes in the way societies operate, one of each being the web becoming a new place for interactions. Particularly shaping nowadays' digital transformation is the emergence of Artificial Intelligence (AI), a technology that is becoming progressively more predominant amid various fields and businesses. As a result, a new digital-oriented mindset is evolving in our society, posing both challenges and opportunities, among which is the expansion of online shopping.

Simultaneously, whilst the e-commerce industry is being equipped with new possibilities driven by AI, customers are also progressively seeking to be influenced by new technologies, demanding for new experiences, looking for new ways to search for products and consume, as well as increasingly requiring for accessible and highly rewarding multichannel interactions with brands. As so, it is becoming more relevant to explore potential digital strategies that can optimize the interaction between consumers and brands within the online context (Song et al., 2019).

Notably, with web-based interactions becoming more common, customers no longer see digital interactions as a practical means to acquire products, but as one that allows to obtain experiential value from the digital context (Bilgihan et al., 2016). Leveraging on these increasing demands, AI is able to provide customers with an enhanced experience when purchasing online, allowing them to access relevant product information, to increase their interaction and engagement, whilst also obtaining a more personalized service within a digital context (Campbell et al., 2020; Hoyer et al., 2020).

For the purpose of this dissertation, three AI technologies were considered, which promise to materialize the possibilities of enhancing the customer experience within the online retail sector, namely Chatbots (CB), Recommendation Agents (RAs), and Virtual Try On Systems (VTOs) (Pupillo, 2019). Moreover, with emerging technologies increasing their value, it has become crucial for companies to reinforce customer-centric strategies and invest in digital interactions, in order to remain competitive. In particular, AI offers opportunities for companies to create innovative and value-added experiences, which can ultimately drive the purchase intention of online users (Hoyer et al., 2020; Matarazzo et al., 2021).

Chatbots are perhaps the most commonly used tool when shopping online, consisting of conversational virtual agents that enable customers to interact with the brand, asking questions, and receive support during their online shopping. This tool enables the delivery of a more personalized service within the online context, whilst also reducing uncertainty and cart abandonment during the purchasing process, which often occurs due to potential lack of information and the fact that

customers seek immediate responses, not being eager to fill out a form request and wait for a response to a query (Dandörfer, 2019; Pupillo, 2019). Serving as a way to increase customer engagement and create experiential value, Chatbots also make it possible for companies to scale the first line of support, thus reducing operational costs and increasing operational efficiency (Przegalinska et al., 2019).

On the other hand, Recommendation Agents serve as a tool that tracks the online behaviour of customers in order to recommend products that match the user's preferences and needs (Song et al., 2019). As so, these systems are able to drive further purchases, whilst delivering customized recommendations and allowing customers to access relevant and adequate information, hence facilitating the process of searching for products online (Roudposhti et al., 2018).

Nowadays, a new AI-based technology is emerging, the VTO, which allows the customer to virtually try on the product, through the developments of computer vision and augmented reality (Pupillo, 2019). This enables the customer to surpass some of the barriers associated with online shopping, namely, the inability to assess whether the product matches the customer's needs. As so, it is claimed that this tool is able to drive the purchase intention of the customer, reduce the costs associated with returning items and customer dissatisfaction, as well as adding entertainment value to the shopping experience (Zhang et al., 2019).

Nonetheless, even though companies are increasingly aware of the importance of establishing their brand within the online context in order to create engagement with their customers, drive purchase intention and increase customer loyalty; the levels of AI adoption in e-commerce platforms are still low (Luce, 2018). That being said, the purpose of this study is to understand the current perception regarding the impact of AI towards creating a more compelling customer experience when shopping online, and consequently, driving the purchase intention of the customer. To achieve this goal, both Portuguese consumers' and brands' perspectives will be assessed, in order to bring a comprehensive view in regard to the research topic.

Problem Discussion

The advent of online shopping is exponentially increasing its market value over the past years, with the current pandemic contributing towards accelerating the predominance of this trend (OECD, 2019). Particularly, within the retail sector in 2020, online shopping accounted for \$4.28 trillion worldwide, with revenues projected to grow to \$5.4 trillion by 2022 (Sabanoglu, 2021).

Nonetheless, whilst the growing popularity of e-commerce amongst the retail sector is widely accepted, it is still claimed that customers opt for shopping online purely seeking added convenience and lower opportunity costs, which often influences companies to underestimate the potential of this new marketplace. On the contrary, recent research points towards the fact that customers increasingly seek to obtain experiential value from shopping online, nonetheless still encountering several

constraints in their experiences, when compared to shopping in stores (Beck & Cri , 2018; Bilgihan et al., 2014).

As so, it is important to assess in which ways, not only companies can facilitate the shopping task within the online context, but also deliver a compelling experience under this environment, enabling the user to perceive entertainment value as well as emotional engagement during the customer journey.

Moreover, even though customers are increasingly seeking to execute their shopping tasks online, several barriers are still perceived, namely, the lack of access to customer support, difficulties in finding relevant information, or the inability to try the product before purchasing (Katawetawaraks & Wang, 2011). Considering the fact that AI tools as Chatbots, Recommendation Agents, and VTOs promise to surpass these challenges, it becomes relevant to assess its impact upon the customer experience and its consequent ability to drive purchases.

In addition, despite the fact that several studies have focused on understanding the customer experience (Bilgihan et al., 2014; Bleier et al., 2019; Novak et al., 2000) or the relationship between an enhanced customer experience and the purchase behaviour (Hasran et al., 2013; Maitlo et al., 2017; Pe a-Garc a et al., 2020a), up to date, there is still limited empirical research relating AI with the field of the customer experience (Dand rfer, 2019; Hoyer et al., 2020).

Hence, taking into consideration the recent nature of the present issue, this dissertation aims to contribute to the research in the field by taking a comprehensive approach. Firstly, seeking to understand in which way can Chatbots, Recommendation Agents, and VTO Systems enhance the customer experience when purchasing online. In addition, the authors will seek to understand whether these tools can drive the purchase intention of the customer. Lastly, this research will contribute towards raising awareness in regard to the current interaction of consumers with Intelligent Systems (IS) and the availability of firms to adopt these tools.

Research Objectives

Considering the context presented above, the primary objective of this dissertation is to determine the impact of three intelligent systems, namely Chatbots, RA, and VTO systems, on creating an enhanced experience for the online customer and its consequent ability to drive the purchase intention.

Thus, this thesis will seek to understand the perceived value of AI tools in the Portuguese market, by considering a comprehensive view of both consumers and firms as well as the current availability of Portuguese firms in adopting these tools with the purpose of increasing the shopping experience for the end-user.

As so, the present study aims to contribute to the development of the literature combining the field of AI and the online customer experience, ultimately closing some of the perceived gaps in

currently available research, namely the need to provide empirical evidence to existing theoretical constructs in this field.

Investigation Structure

In order to achieve the proposed objectives, this dissertation is presented with the following structure: in the present chapter, the introduction was presented in which the research topic was defined based on the contextualization of the research problem and its current relevance. Subsequently, the objectives of the present study were identified.

The second chapter pertains to the Literature Review, in which several theories and points of view related to the topic of AI, the e-commerce context, and the online customer experience, are discussed. Following the Literature Review, the research questions that will guide this investigation will be further discussed through the Theoretical Approach. Chapter 4 presents the Methodology employed, including the presentation of the approach selected for this investigation as well as the data analysis methods employed. This chapter also includes the sample characterisation and the content of the developed surveys, in order to further facilitate the analysis of the results.

In Chapters 5 and 6, the Results are presented, along with a critical Discussion upon the data collected, allowing to answer the research questions and confirming the hypothesis formulated. The final chapter presents this dissertation's main Conclusions and implications, in which the limitations of the present dissertation are discussed, followed by the presentation of several recommendations for future research on the topic

Chapter 1- Literature Review

1.1. The exploration of Intelligent Systems in e-commerce

A new digital transformation, led by AI, is currently taking place in our society, imposing both challenges and opportunities. Understanding in which way AI can help businesses increase their performance, by enabling a more customer-oriented approach, is a managerial issue of great relevance. Hence, the present chapter will seek to compare and discuss different theories in the field of AI and e-commerce.

1.1.1. The conceptualization of Artificial Intelligence

Artificial Intelligence aims to create autonomous machines capable of producing intelligent behaviour (Teixeira, 2019). Recent developments in this field have enabled the creation of intelligent systems that use language, form abstractions, and solve complex problems (McCarthy et al., 2006).

The technical landscape of AI has changed substantially since 1950, when Alan Turing firstly posed the question of whether machines could think. It was later in 1956, at Dartmouth College, during a conference led by John McCarthy, that the term 'Artificial Intelligence' would be first coined.

At the time, this research field focused on debating the usage of machines to simulate human intelligence (Lee et al., 2019; Song et al., 2019). The original idea was based on the premise that if we were to describe every aspect of learning or any other feature of intelligence, then a machine could be produced to simulate it (McCarthy et al., 2006).

Following this assumption, during the early stages of AI development, scientists focused on studying the human cognitive function, particularly on actions related to learning and problem solving, with the ultimate goal of creating computer systems that were able to perform intelligent tasks in ways similar to the human process (Lee et al., 2019). A more recent view claims that AI represents the development of intelligent systems that use data, analysis, and observations to perform certain tasks in an autonomous manner (Antonescu, 2018).

It thus becomes relevant to consider that AI developments, which have led to numerous applications in a broad range of domains, also resulted in increasing difficulties when attempting to generate a universally accepted definition of AI (Bughin et al., 2017). Russell et al. (1995) claim that, throughout history, the study and definition of AI have followed two different approaches. On one hand, AI research has focused on humans, whereas others are centred on rationality. On the other hand, some definitions focus on AI being concerned with the process of thought and reasoning, whereas others address AI as a behaviour.

Hence, four distinct lines of reasoning can be applied to define AI: (1) Systems that think like humans: In which AI refers to "the automation of activities that we associate with human thinking,

activities such as decision-making, problem solving, learning ..." (Bellman, 1978); (2) Systems that act like humans: in which AI refers to "the art of creating machines that perform functions that require intelligence when performed by people" (Kurzweil, 1990), (3) Systems that think rationally: in which AI refers to "the study of the computations that make it possible to perceive, reason, and act" (Winston, 1992); (4) Systems that act rationally: in which AI refers to "the branch of computer science that is concerned with the automation of intelligent behaviour" (Luger & Stubblefield, 1993).

A common link between the different perspectives and spheres of AI is that its research is both centred on comprehending and building intelligent entities (Russell et al., 1995). On this view, AI research and development often occur through the focus on understanding intelligence and how this concept can vary among humans and machines. Paschen et al. (2019) define intelligence within the human context as "a person's ability to learn, deal with new situations, to understand and handle abstract concepts, and use knowledge to manipulate one's environment". On the other hand, within the field of AI, intelligence can be conceptualized as the ability to process and transform data into information, using this knowledge towards goal-directed behaviour (Paschen et al., 2019).

Following this perspective, nowadays, AI is often defined as an overarching category, which has resulted in the application of several technologies. In this sense, Song et al. (2019) define AI as a technological science that develops theoretical methods, technologies, and applications to simulate and extend human Intelligence. Likewise, Kolbjørnsrud et al. (2016) define AI as a combination of technologies that can sense, comprehend, act, and learn.

Ultimately, this recent conceptualization of AI encompasses a more general view, in which tasks are performed due to advancements in dominant technologies, which enable intelligent systems to perceive the environment, analyse and understand the information collected, make informed decisions, and learn from experience (Kolbjørnsrud et al., 2016). For the purpose of this dissertation, technologies related to Machine Learning (ML), Deep Learning (DL), Natural Language Processing (NLP), and Computer Vision (CV) will be considered, although it is relevant to note that other technologies are being explored throughout the distinct domains of AI adoption.

ML represents the most predominant technology, as it has led to large developments in the field of AI. Nowadays, intelligent systems that offer AI capabilities often rely on machine learning mechanisms (Janiesch et al., 2021). In particular, increased advancements in this field have been mainly led by developments of programming frameworks, data availability, and broad access to necessary computing power (Bryjolfsson & McAfee, 2014). Considered as a subset of AI, ML is based on algorithms that enable computer systems to autonomously learn from data and adapt their models in order to draw conclusions or direct a course of action, without being instructed to do so (Bughin et al., 2017). In other words, this technology enables an intelligent system to establish links between

individual pieces of data, thus resulting in the ability to make predictions and form generalisations (Jarek & Mazurek, 2019).

Under the field of ML, researchers rely on particular sophisticated techniques, as Neural Networks, in order to make predictions. Essentially, these represent a set of algorithms that assist both the prediction and categorization of data. Neural Networks are characterized by multiple layers able to learn information in parallel. A neural network is also made up of inter-connected nodes that communicate the information to each other (Pupillo, 2019). Overall, this technique encompasses the interconnection of thousands of millions of simple transformations into a statistical machine able to learn sophisticated relationships between inputs and outputs (OECD Publishing, 2019).

DL represents a subset of ML. This field is characterized by particularly large neural networks which are composed of hierarchical layers that increase the complexity of the relationship between input and output (OECD Publishing, 2019). As so, Deep learning makes it possible to decode and provide the result for a new piece of information, in real-time, as it relies upon complex algorithms able to engage in nonlinear reasoning, allowing to analyse a wide range of variables at once.

The application of ML and DL encompasses both NLP and CV, thus enabling intelligent systems to process, analyse and understand text, speech, and imagery (Janiesch et al., 2021). Particularly, NLP algorithms enable machines to learn and identify patterns of words common to the human language, which support the provision of personalized solutions as well as tailored interactions with customers within a virtual shopping context (Pupillo, 2019). NLP can also improve the quality of online search, creating a more accurate match between the customer's expectations and the information generated (OECD Publishing, 2019). On the other hand, image recognition becomes crucial to develop online services. As so, CV represents a field of AI that enables machines to process and analyse images and videos, through DL algorithms. This technology allows machines to identify objects and react to what they visualize (Luce, 2018; Pupillo, 2019).

Ultimately, Dwivedi et al. (2021) argue that AI offers transformative potential for growth and automation within industrial, intellectual, and social applications. Even though AI is not a recent field, it is argued that its breakthrough is only happening now. Among the factors that have enabled these advances is the availability of large and diverse data sets, the improved algorithms able to find patterns in large amounts of data, in addition to the increased Research & Development funding and new levels of mathematical computing power (Bughin et al., 2017).

AI's capabilities have continued to expand, so have its applications. For instance, machines powered by AI can recognize complex patterns, synthesize information, and draw conclusions (Bughin et al., 2017). In addition, AI's applications encompass a variety of fields including healthcare, finance, manufacturing, education, marketing, among others (Dwivedi et al., 2021). According to Bughin et al. (2017), business applications of AI follow two different areas, which is ultimately the case of the

different AI tools present in e-commerce. Overall, the authors argue that some key areas of AI development are related to processing information from the external world- through computer vision and language (including natural language processing, text analytics, speech recognition, and semantics technology); whereas others focus on learning from information, as machine learning.

1.1.2. The impact of Intelligent Systems in the context of online shopping

AI is increasingly transforming the way businesses interact with their customers (McLean & Osei-Frimpong, 2019), which have led to the creation of new opportunities for businesses, as it is the case of e-commerce, whose market is growing exponentially over the past few years (Donici & Diacon, 2011). Despite the fact that e-commerce is not an emerging concept, its dynamics have recently been evolving, particularly due to developments in the field of AI. It is argued that one of the main advantages of an AI-enabled e-commerce platform relies on the fact that its application can positively impact the customer experience when shopping online (Hoyer et al., 2020; Pupillo, 2019).

Notably, the use of Intelligent Systems as Chatbots, Recommendation Agents, and VTOs on the business to customer (B2C) activities in e-commerce, is allowing firms to process, act and learn upon information, optimizing operational efficiency, improving service quality, and exploring new ways to meet customer demands and enhance the customer interaction with the brand (Song et al., 2019).

Generally, AI technologies enable companies to increase their knowledge about customer preferences and patterns of shopping, which can ultimately lead to improvements in the customer journey (Ameen et al., 2021). As a result, the use of intelligent systems has led firms to increase the value delivered to the customer, as well as to provide greater personalization, thus increasing their competitiveness (Bleier et al., 2019).

However, to understand the impact of intelligent systems in e-commerce, it is first important to analyse the context of online shopping. E-commerce generally entails business transactions that occur online. Some of its advantages rely upon the fact that it allows firms to increase their revenue growth by improving their customer base as well as to expand their communications and engagement with customers (D Tran, 2020). For the purpose of this dissertation, only Business to Consumer (B2C) will be considered.

In addition, it is important to understand that the context of online shopping nowadays pertains to both advantages and disadvantages. In one hand, online channels offer 24/7 availability and superior convenience, allowing customers to shop from anywhere in the world, also benefiting from a wider variety of products and services available, along with improved access to relevant information. Moreover, shopping online allows customers to compare options and reduce costs. On the other hand, there are still some perceived barriers customers face when shopping online, namely

the lack of social contact and assistance as well as the inability to try the product when purchasing online (Katawetawaraks & Wang, 2011).

Overall, AI promises to leverage the experience of online shopping to one similar to shopping in stores. As a result, among the most widespread applications of AI are the domain of customer services, offering the ability to develop personalization as well as enhancing customer experience online (Campbell et al., 2020; Pupillo, 2019). Thus, it is claimed that AI enables firms to strategically improve the customer journey along different distribution and communication channels, adding information, and stimulating the interaction between consumers and companies (Matarazzo et al., 2021).

Ultimately technologies as Chatbots, Recommendation Agents, and VTOs enable the delivery of a tailored customer service in mass. These intelligent systems encompass several AI technologies discussed in the previous chapter, including ML, NLP, and CV, which can ultimately improve the customer experience, whilst breaking some of the perceived barriers of online shopping (Fu et al., 2020; Hoyer et al., 2020; Jarek & Mazurek, 2019). Firstly, NLP allows to carry out conversations between machines and human beings, through virtual assistants as Chatbots. In addition, ML is used to perform predictive analysis, which results in the ability to forecast future consumer behaviour and demand, as well as to generate product recommendations. Finally, CV and Augmented Reality can be applied to technologies as VTO Systems, ultimately breaking the barriers between physical and online shopping.

Chatbots represent interactive virtual agents that respond to natural language inputs, thus enabling the provision of real-time response to customer queries, through text, image, and voice commands (Song et al., 2019). This technology facilitates the interaction between humans and machines, being available 24/7, providing services in fields related to sales (41%), support (37%), and marketing (17%) (Ashfaq et al., 2020). This interaction can be either initiated by the machine, giving information and advice, or by the customer that seeks a response to individual questions (van Dolen et al., 2007).

Recommendation Agents consist of Machine Learning and Deep Learning algorithms that analyse past customer behaviour and activity in order to predict and suggest products that are likely to attract customers' attention. Ultimately this is becoming a business tool empowering firms to identify the right target for their products and to deliver a personalized experience to their customers (Song et al., 2019)

In recent years, Computer Vision technologies in e-commerce are presented in VTOs, which provides a 3D virtual experience that helps costumers evaluating items online (Merle et al., 2012). According to Fiore et al. (2005), VTOs enable the creation and manipulation of product images to simulate, or surpass, the actual experience with a product or environment, by exploring computer

vision and augmented reality. As so, VTOs consist of a system through which the customer can try-on a product or service using a device equipped with a camera (Kwiecień, 2019)

1.2. Understanding the Online Shopping Behaviour of Customers

Recent digital developments have impacted the way users search for products and brands, evaluate alternatives, make choices, and consume (Hoyer et al., 2020; Libai et al., 2020). As e-commerce becomes a strategic channel for many firms, it is important to understand how will the customer experience be affected within the online context, and what can the influence of the customer behaviour have on its adoption.

In regard to consumer behaviour, recent research argues that, so as in the offline context, consumers are also increasingly seeking experiential value in e-commerce. In fact, whereas early consumers were mainly searching for utilitarian benefits when shopping online- such as convenience, price, and availability- compelling with such attributes is no longer sufficient to drive purchases. Recent research highlights that consumers are increasingly seeking hedonic benefits from e-commerce, allowing consumers to immerse themselves in exciting experiential contexts (Bilgihan et al., 2014; Kumar & Gabriel, 2020; Micu et al., 2019). Hence, Bilgihan et al. (2014) argue that, in order to create emotional engagement with shoppers, brands must focus on developing interaction, engagement, and emotional hooks in the experience they provide, through a pleasant online environment.

Moreover, Dandörfer (2019) argues that there are two types of e-commerce users, namely, goal-directed and experiential users. The first ones identify with a more utilitarian view as these customers usually plan their online purchases, which are followed by a directed search and goal-directed choice. On the other hand, experiential users are thought to be quite impulsive with their purchasing decisions. The navigation process is perceived in an affectionate way by this type of customer, as the shopping behaviour is often followed by hedonistic values, such as pleasure and fun (Dandörfer, 2019).

On this view, Bilgihan et al. (2014) have utilized the flow theory to study the consumer's online experience. Csikszentmihalyi (1990) defines flow as the state in which people are so intensely involved in an activity that nothing else seems to matter. Citing the author "the experience itself is so enjoyable that people will do it at great cost, for the sheer sake of doing it" (Micu et al., 2019). Based on this theory, Bilgihan et al. (2014) claim that hedonic features, including virtual interactivity, media richness, and appealing website designs, are an important drivers to create a flow experience in e-commerce.

Other studies focus on the Technology Acceptance Model (TAM) to understand the online behaviour of the customer. The theory, firstly proposed by Davis (1989), is based on the premise that customers' acceptance and adoption of information systems is dependent on two main variables, namely, the perceived ease of use and perceived usefulness. As so, if customers perceive that a certain

technology adds value and is easy to use, then it is likely to be accepted and adopted among the population (Dandörfer, 2019; Ma & Liu, 2005).

Following the TAM theory, Ashfaq et al. (2020) have analysed the consumer acceptance towards Chatbots, concluding that consumers perceive that Chatbots provide an enhanced customer experience, increasing both information quality and service quality. In addition, both perceived usefulness and perceived ease of use revealed to be strong enablers towards the intention to carry on using this tool.

On the other hand, Armentano et al. (2015) studied the user behaviour in regard to Recommendation Agents. The findings suggest that the perceived usefulness of this tool plays a crucial role in its adoption. On this view, additional research points that users perceive that this technology is able to improve the quality of searching for and selecting products. This technology has also become useful in reducing the information overload consumers face, as well as the complexity of online searches, thus being likely to be adopted among consumers (Bo & Benbasat, 2007).

In regard to customer behaviour related to VTOs, research indicated that VTOs have a positive influence on shopping enjoyment, perceived ease of use, perceived usefulness, as well as hedonic and utilitarian value (Fiore et al., 2005). Kim & Forsythe (2008) research revealed that the users' attitudes towards VTOs are directly influenced by consumers' perceptions of VTO as a useful tool, that also drives entertainment value. In addition, Zhang et al. (2019) concluded that perceived privacy risk does not influence customers' intention to use the VTO tool.

1.2.1 Conceptualizing Online Customer Experience

Following the theories presented arguing that AI leads to a more enhanced customer experience when shopping online, this subchapter seeks to understand the concept of customer experience and its spheres.

Gentile et al. (2007) argue that the customer experience originates from a set of interactions between a customer and a product, a company, or part of its organization, which provoke a reaction. In addition, it is argued that the customer experience has a holistic nature, involving the customers' cognitive, social, affective, and physical response to all interactions with a firm or brand (Homburg et al., 2017; Verhoef et al., 2009).

Another view presented defines customer experience as the internal and subjective responses customers encounter through any sort of direct or indirect contact with a firm (Meyer & Schwager, 2007). According to the authors, direct contact is often initiated by the customer, occurring in the course of purchase, use, and service. On the other hand, indirect contact involves spontaneous and unplanned encounters with a company's products, services or brand are through word-of-mouth recommendations, advertising, and media coverage.

As so, the above definitions identify customer experience as an internal psychological state, which can be both multidimensional and individual to each customer (Gentile et al., 2007; Rose et al., 2011). In recent years, the focus on creating a compelling customer experience has significantly increased, mainly due to the fact that nowadays customers interact with a brand through myriad touchpoints and media, resulting in more complex customer journeys (Lemon & Verhoef, 2016)

Therefore, the customer experience is regarded as an important area for research that is not only related with utilitarian consumption patterns but also with hedonic value (Bilgihan et al., 2016; Lusch & Vargo, 2006). In fact, whereas traditional research regards the consumer as a rational problem-solver who makes rational purchasing decisions; recent research claims on the importance of the emotional value perceived by customers in order to drive a positive customer experience (Gentile et al., 2007).

In addition, previous studies indicate that developing an attractive customer experience results in increased satisfaction, purchase intention, trust, loyalty, and retention of the customer (Kumar & Gabriel, 2020; Micu et al., 2019), whilst also promoting the creation of an emotional tie between customer and brand (Gentile et al., 2007).

1.2.2 The dimensions of the online customer experience

The recent technological improvements have enabled customers to increase their interaction with the e-commerce platforms, being more involved in their own value creation process (Vakulenko et al., 2018). Similarly, as customers increasingly seek more value from these platforms and have higher expectations within the online environment, information technology is also enabling firms to improve

their ability to create a more compelling online experience (Bilgihan et al., 2016; Vakulenko et al., 2018).

As an evolving concept, Bleier et al. (2019) define the Online Customer Experience (OCE) as the subjective and multidimensional psychological response to a product's presentation online. On this view, Dandörfer (2019) claims that the OCE can be characterized through the interaction of the user with sensory stimuli such as visual imagery, audio, video, and text-based information (Dandörfer, 2019).

Since the online assessment of the product doesn't allow the customer to use physical stimuli, research has found that verbal and visual inputs play an important role in the customer experience in the online context (Bleier et al., 2019). Subsequently, this has led to earlier researchers arguing that OCE should be treated as simply compromising a cognitive dimension (Novak et al., 2000), as opposed to the conceptualization of the offline customer experience, which compromises multiple dimensions. Nonetheless, recent research conceptualizes OCE as consisting of several dimensions that encompass the informativeness (cognitive dimension), entertainment (affective dimension), social presence (social dimension), and sensory appeal (sensorial dimension) provided along the customer journey, which will ultimately influence purchases (Bleier et al., 2019; Matarazzo et al., 2021).

According to Bleier et al. (2019), *informativeness*, refers to the extent to which a website provides consumers with resourceful and helpful information (Lim & Ting, 2012), in order to assist the consumer with its purchase decision, which often involves thinking, conscious mental processing and problem solving (Gentile et al., 2007). Hence, the cognitive dimension captures the functional aspect and value of the experience to the customer (Verhoef et al., 2019), and is generally seen as an impersonal, objective, and outcome-oriented action (Schlosser et al., 2006).

Secondly, *entertainment* refers to the immediate pleasure customers take from the experience, regardless of its ability to facilitate a specific shopping task (Babin et al., 1994). This conjecture is based on the idea that the online interaction between a customer and a product can evoke an emotional response that is enjoyed for its own sake, without regard for the function enabled (Bleier et al., 2019), thus implying that e-commerce can lead to a pleasurable and fun experience, improving customers' interaction with the brand. Furthermore, Gentile et al. (2007) argue for the importance of creating an emotional experience in order to create an affective relationship with the brand. Following this view, Hsieh et al. (2014) highlight the importance of building entertainment value through the online platform, since it can prompt visitors' arousal to the web platform, as well as reduce cart abandonment in online stores.

Thirdly, the *social* dimension refers to the feeling of warmth, personal connection, and sociality that a web page imparts (Bleier et al., 2019; Gefen & Straub, 2003). Research indicates that it is important to provide a sense of social presence in the e-commerce platform, in order to match the

benefits of an offline experience (Bleier et al., 2019; Wang et al., 2007). Furthermore, it is argued that this dimension provides the customer with a feeling of closeness regarding the product, ultimately driving their purchase intention and loyalty.

In addition, Doorn et al. (2017) argue that, due to technological developments, customers will be able to engage on a social level with the various technologies. The authors introduced the concept of Automation Social Presence (ASP), which represents the extent through which technology (for example, Chatbots) makes customers feel as if they are interacting with another social entity.

On the other hand, Dandörfer et al. (2020) describe the social-cultural experience pertains to the feeling of connection to a product. It occurs when the customer is able to relate to it by sensing a social connection. As so, Dandörfer et al. (2020) draw a link between this dimension and behavioural models such as the TAM. Hence, the author argues that the social dimension can be impacted by the perceived usefulness and perceived ease of use, as well as the empathy, assurance, and reliability provided during the experience.

Although the pre-conceived limitations of the online environment, sensations can be evoked through imagery, for instance using pictures or videos (Elder et al., 2017). Previous research argues that the *sensorial* appeal can influence customer's perception of the product performance and affect purchase intention (Bleier et al., 2019; Schlosser et al., 2006; Weathers et al., 2007). The sensorial dimension refers to the way the e-commerce platform stimulates the customers' senses (Bleier et al., 2019). These include aspects such as sight, hearing, touch, taste, and smell, as well as the aesthetical pleasure, excitement, satisfaction, and sense of beauty (Gentile et al., 2007). In an online context, this refers to the representational richness of a mediated environment (Bleier et al., 2019; Steuer, 1992). Therefore, Dandörfer (2019) claims the sensorial experience in the online context refers to the structure of the platform, as well as the perceived quality and usefulness of the content provided.

Furthermore, Bleier et al. (2019) argue that ordering an item online has its own nuances related to characteristics of the products and brands, which either exacerbate or alleviate the inherent uncertainty that comes with online shopping. This uncertainty is often related to the trustworthiness of the seller as well as the need for direct physical experience to evaluate the product. As a result, each dimension of the OCE may have a different effect on purchases.

It is also argued that AI tools can enhance the OCE (Dandörfer, 2019; Hoyer et al., 2020; Matarazzo et al., 2021). Even though little research has been taken in this field, Dandörfer (2019) has studied the impact of Chatbots on the four dimensions of the customer experience, concluding that all these were enhanced. In terms of the cognitive dimension, the author argued that Chatbots can increase the state of "flow", as it helps customers navigate on the platform and find the information needed more quickly. Regarding the affective dimension, Chatbots can increase customer engagement to the different stimuli received online and the entertainment value provided. The author also argued

that Chatbots provide a sense of social presence, increasing comfort. Finally, Chatbots can create a more visually appealing platform, resulting in an enhanced sensorial experience and increasing the perceived value of the e-commerce platform.

Overall, research indicates that shopping experiences enabled by interactive technologies result in stronger purchase intentions when compared to conventional (passive) product presentations in the online context (Kim & Forsythe, 2008).

1.2.3 The impact of AI on the Online Experience and Purchase Intention of Customers

Since emerging technologies are creating new value to customers and shaping their experience, it is important to acknowledge how can B2C brands deliver added value to customers, by considering in what manner are intelligent systems influencing buyers (Hoyer et al., 2020; Matarazzo et al., 2021).

Moreover, recent studies have focused on understanding the impact of new technologies on the customer journey entailing pre-purchase, purchase and post-purchase stages, where the customers interact with the firm through various touchpoints (Hoyer et al., 2020; Schrottenboer, 2019). Furthermore, it is important to consider how the consumer-brand interaction will be reshaped, as new touchpoints emerge due to the development of digital platforms (Lemon & Verhoef, 2016).

In the *pre-acquisition stage*, firms can identify, interact and engage with current and potential customers that notice and consider purchasing, by actively evaluating the brand (Matarazzo et al., 2021). Hence, it is argued that in a pre-transaction phase, Chatbots provide customers with real-time support to their queries, being able to direct the user to relevant information. Thus, research highlights that Chatbots deliver greater convenience, by facilitating access to information (Hoyer et al., 2020). In addition, it is believed that this tool increases the perception of employee presence and the feeling of being served at the right moment (Broeck et al., 2019).

During this stage, Recommendation Systems simplify the process of evaluating alternatives, by providing customized sets of choices, based on the customer's needs and its past behaviour online (Hoyer et al., 2020; Schrottenboer, 2019). Based on these perceived benefits, Luce (2018) claims that Recommendation Agents can increase the possibility of conversion. Furthermore, during the pre-transaction stage, VTOs can break the barriers between physical and online shopping, by providing customers with the capacity of visualizing and evaluate the product in 3D (Hwangbo et al., 2020; Merle et al., 2012), ultimately addressing the suit, fit and match dilemma.

As stated by Matarazzo et al. (2021), at this stage, the cognitive and affective dimensions of the customer experience should be predominant, as users benefit from both greater access to information, for instance through Chatbots and Recommendation agents, but also through the increased interaction of the customer with the platform as well as the greater entertainment value delivered through these AI tools.

In the *transaction* and *post-transaction* stages, firms should aim at developing long-term relationships with customers, by creating highly positive emotions (Matarazzo et al., 2021). Ultimately AI can increase satisfaction at the purchasing process, since Chatbots are able to check supply availability, process orders, and assist on problems related to payment (Hoyer et al., 2020). On the other hand, VTOs allow consumers to improve product evaluation, boost their curiosity, and create a more joyous and fun experience when testing new products (Beck & Cri , 2018). Hence, it is argued that VTO can play a crucial role in customers' decision-making (Merle et al., 2012; Zhang et al., 2019), particularly reducing uncertainty and increasing satisfaction (Hoyer et al., 2020).

In addition, this technology offers both reliability- by providing customers with an accurate representation of the product; and convenience- by allowing the customer to try the product at a time that is most suitable, anywhere in the globe (Kim & Forsythe, 2008), which ultimately makes customer more assured about completing their purchase (Zhang et al., 2019). During the transaction stage, this tool can also facilitate and even automate payment by enabling face recognition (Pupillo, 2019).

Additionally, it is believed that Recommendation Agents play a critical role in increasing the OCE, as these tools facilitate access to information and the feeling of engagement during online shopping (Roudposhti et al., 2018). Particularly, Schafer et al. (2001) argue that Recommendation Agents drive sales growth in three manners. Firstly, these tools increase the likelihood that a customer visiting a website will actually convert into a buyer, as customers are more likely to perceive more value from the recommendations suggested to them. Secondly, these systems provide a tool to increase cross-selling by suggesting additional products to purchase. At last, it improves loyalty, as buyers will return to the sites providing the best recommendations, ultimately enhancing the firm's ability to retain customers.

On a *post-purchase* stage, Chatbots help customers by answering questions regarding the purchased goods, offering advice for optimal use. These virtual agents are also able to deal with returns and complaints, being also capable of directing the client to service staff (Luce, 2018; Song et al., 2019). Simultaneously, Recommendation Agents can increase engagement with the brand by suggesting additional products the customer may like, driving further purchases and loyalty towards the brand (Hoyer et al., 2020; Matarazzo et al., 2021; Schrotenboer, 2019).

As argued by Matarazzo et al. (2021), during the purchase stage of the customer journey, the affective dimension of the customer experience is highly relevant, as positive emotions drive satisfaction, retention, and customer commitment. At the post-purchase stage, those positive feelings can encourage brand advocacy and engagement, hence the social dimension must be prevalent, in order to enhance satisfaction. Ultimately, the adoption of these AI systems can facilitate the engagement of the customer with the brand, thus enhancing these dimensions (Schrotenboer, 2019; Hoyer et al., 2020).

Furthermore, Schrotenboer (2019) argues that the use of intelligent systems in e-commerce represents sources for value creation through two main perspectives: convenience and relevance. On one hand, Chatbots represent a tool to enhance customer engagement, by increasing interaction and personalization, thus creating value through offering a more convenient experience (Luce, 2018). Furthermore, Chatbots represent an optimal solution due to their accessibility, low cost, and ease of use for the end consumer. It can potentially replace customer services and reduce labour costs at the same time as creating a more unified system for customer response and improve service quality (Przegalinska et al., 2019), whilst also reducing uncertainty during the purchase decision (Hoyer et al., 2020).

On the other hand, Recommendation Systems provide the ability of personalisation, ultimately delivering relevant suggestions and simplifying the decision process, ultimately creating value through relevance (Schrotenboer, 2019). Furthermore, Schafer et al. (2001) suggest that Recommendation Systems represent a path towards achieving mass customization, as the system itself provides a customizable service, able to deliver products that match customer preferences, thus increasing sales (Luce, 2018; Song et al., 2019).

Lastly, VTOs can decrease the gap between the online and offline shopping experience, offering both convenience and entertainment value (Merle et al., 2012). As so, it is believed that VTOs play a role in influencing customers' purchase intention (Zhang et al., 2019), as well as driving sales growth (Hwangbo et al., 2020). Zang et al. (2019) also argue that this visualization technology reduces product risk and enhances the entertainment value of the online user, thus increasing the interactivity and engagement of the customer with the e-commerce platform.

In addition, recent research in the field indicates that the use of AI tools to respond to customer expectations leads to an increased perceived quality of the service provided to the customers, which in turn leads to a stronger customer-brand relationship (Nguyen et al., 2021). On this view, it is argued that the interaction with AI can ultimately shape the service quality provided (Przegalinska et al., 2019) This promise of an enhanced customer service is sustained by increased satisfaction, improved relationships, and personalized support. To conclude, significant technological shifts in e-commerce are aimed at influencing customer behaviour toward certain products and brands.

Chapter 2 – Theoretical Approach

Following the Literature Review carried out in Chapter 2 of this dissertation, distinct points of view and theories were contrasted, in both theoretical and practical terms. As a result, a set of research questions emerged, which will be leading the following discussion.

To begin, the previous chapter unveiled several opportunities that AI can lead to. These technologies are increasingly facilitating interactions, transforming businesses and industries, and leading to the creation of new products and services. Arguably, a new reality is emerging, in which several companies are already investing in its opportunities. Particularly, one can argue that e-commerce marks the evolution of technology in the business context, having become a predominant channel for the transaction of goods and services. Under this context, one of the perceived benefits of AI, which has driven the main focus of this dissertation, is related to its possibilities of increasing the value created to the customer in a digital context and ultimately break the barriers between traditional and online shopping by offering an enhanced customer experience (Song et al., 2019).

Nonetheless, as an emerging subject, previous empirical research is somehow limited regarding this field. As presented in the previous chapter, Dandörfer (2019) evaluated the influence of Chatbots on the OCE, concluding that each dimension (informativeness, entertainment, social and sensorial) was positively affected, ultimately allowing firms to provide a more enhanced customer service. In addition, Hoyer et al. (2020), Song et al., (2019), and Schrottenboer (2019) proposed frameworks to assess the use of Chatbots, Recommendation Agents, and VTOs focusing on its impact on the customer journey. However, research so far was mainly based on case studies and previous literature, hence a need to collect empirical data that confirms these theoretical constructs was perceived by the authors of this paper.

Previous studies also indicate that the experience of the customer when shopping online has a direct effect on its purchase intention (Jaiswal & Singh, 2020; Maitlo et al., 2017; Peña-García et al., 2020). Additionally, companies are increasingly aware of the importance of investing in technology to increase sales, improve the quality of the customer experience and reduce the cost of customer support (Kohler et al., 2011), which confirms the managerial importance of the present investigation.

On this note, Jaiswal & Singh (2020) found four predominant determinants of buying decision of the customer, namely the perceived price competitiveness, customization, customer service and post-purchase experience. In addition, previous research in this field revealed that the availability of information and product details were a major determinant of the consumer decision to purchase (Bauboniene & Guleviciute, 2015).

Ultimately, it becomes relevant to assess whether AI can leverage on the determinants mentioned by Jaiswal & Singh (2020). Previous studies indicate that intelligent systems can increase the level of personalisation and customer service during both transaction, and post-transaction stage,

increasing access to the information available as well as offering increased convenience (Bilgihan et al., 2016; Schrottenboer, 2019; Hoyer et al., 2020). Nonetheless, with AI developing at a fast pace, the need for more updated empirical evidence in this field is highly perceived among researchers, thus leading to the formulation of the first research question:

(Q1) In what manner can the interaction with AI lead to a more enhanced shopping experience and drive the purchase behaviour of customers?

On the other hand, despite the perceived benefits of AI presented throughout this paper, the adoption of intelligent systems in e-commerce is still in early stages, being primarily explored by large multinational players and digital firms that take advantage of key technology enablers, as Chatbots, Recommendation Agents, and VTOs, to improve the customer experience and increase the competitiveness of their e-commerce platforms.

Through interviewing several Italian-made SMEs competing in the digital environment, Matarazzo et al. (2021) found that the digitization of these firms became crucial for their competitiveness. In particular, the interviewed firms highlighted the advantages of focusing on understanding customers' needs and developing the company's brand image, through e-commerce. This study emphasizes that, as our society becomes increasingly shaped by AI and digital platforms, the inability to seek these opportunities can compromise the competitiveness of many firms.

This discrepancy between the level of adoption among larger multinational players and local brands has driven the focus of this dissertation. In one hand, this paper will seek to understand the impact of artificial intelligence as a means of delivering an enhanced customer experience, by analysing the customer perception regarding these tools, through the formulation of the first research question. On the other hand, this dissertation will focus on understanding what is the corporate perspective regarding the use of AI as a way to improve the online customer experience.

With the numbers pointing towards a low adoption of e-commerce, and consequently of AI, amongst Portuguese Brands, it is expected that local firms are not strategically benefiting from the digital transformation, losing value to their large multinational competitors (PHC Software, 2020). On a more positive note, research indicates that the current pandemic has contributed to an exponential acceleration of e-commerce adoption, particularly among SMEs (OECD, 2019), which proves the fact that the time is right to gain a greater understanding of the perception of Portuguese firms regarding the impact of Artificial Intelligence in creating value to the customer. Thus, the following research question emerged:

(Q2) What is the current level of AI adoption in Portugal? Are Portuguese Brands willing to adopt AI tools in e-commerce in order to improve the customer experience?

Table 2.1. Relation between Research Objective, Research Question, Data Analysis Technique and Literature Review

Research Objective	Research Question	Data analysis technique	Literature Review
To assess the perceived value of Chatbots, Recommendation Agents, and VTOs by users of online shopping platforms	In what manner can the interaction with AI lead to a more enhanced shopping experience and drive the purchase behaviour of customers?	PLS-SEM - Analysis of the Strength and Significance of Paths (betas)	(Dandörfer, 2019; Hoyer et al., 2020; Jarek & Mazurek, 2019; Schrotenboer, 2019; Song et al., 2019; Zhang et al., 2019)
To understand the current perception of local brands regarding the impact of AI in enhancing the shopping experience of customers.	What is the current level of AI adoption in Portugal? Are Portuguese Brands willing to adopt AI tools in e-commerce in order to improve the customer experience?	Analysis of Descriptive Statistics	(Aarstad & Saidl, 2019; Matarazzo et al., 2021; PHC Software, 2020)

Chapter 3 - Methodology

In this chapter, the methodology used to answer the research questions defined in the previous chapter will be presented and analysed. The research approach is defined together with the data collection methods employed. To finish, a comprehensive explanation of the data analysis method employed in the present paper is provided.

3.1. Research Approach and Design

Research methodology is a discipline derived from logic, focused on the study of the scientific method (Tarski, 1977). As so, one can argue that the scientific method represents a set of systematic, critical, and empirical practices regarded by the scientific community as a valid approach for the study and confirmation of a given theory or problem (Sampieri, 2014). These practices represent a source of knowledge, thus complying with the investigation process, by analysing and questioning the surrounding reality (Vilelas, 2020).

Provdanov & Freitas (2013) claim the scientific method defines the line of reasoning adopted in the research process. The authors state that there are several approaches providing the logical base for scientific research, in particular the use of the inductive and the deductive approach. It is argued that these methods clarify the logical procedures that should be followed in the process of scientific investigation of facts regarding nature and society, which enable the researcher to decide upon the scope of the given investigation and the rules employed to explain presented facts, as well as to decide upon the validity of the presented generalizations.

In one hand, the deductive approach enables the researcher to predict particular conclusions from the analysis of previously established theories, principles, and events. On the contrary, the inductive method is responsible for generalisations, as induction refers to a mental process by which, starting from particular data, yet sufficiently verified, a general or universal truth is inferred (Marconi & Lakatos, 2003). Therefore, the purpose of inductive arguments is to lead to conclusions whose content is much broader than the one from the premises on which they are based (Provdanov & Freitas, 2013).

Thus, the inductive approach has proven to be the most suitable method for the present study, which will be applied to test the hypothesis presented in the previous chapter. In addition, the conceptual framework was established following pre-existing theories in the field of customer experience and the application of AI in e-commerce, yet the aim of this investigation is to lead to conclusions that have not yet been explored.

Nonetheless, the Literature Review undertaken in the second chapter of this dissertation, although presenting important theories under this area, also revealed a lack of empirical evidence. Taking into consideration the recent nature of the research topics, a need to study, in greater depth,

the impact of VTOS, Chatbots, and Recommendation Agents on the OCE as well as its' contribution towards the purchase intention of consumers, was perceived.

Hence, it is important to consider that this investigation employs an exploratory approach, aiming not only to confirm the previous research theories but also to provide additional empirical information regarding this topic. In addition, according to Singh (2007), an exploratory study is most common under initial investigations, in areas of recent interest, allowing the researcher to attain a more comprehensive view on the studied issue and to develop new insights, thus being the most suitable approach for the present study.

3.2. Data Collection Method

The scientific research requires the usage of data in order to reach meaningful conclusions from theoretically based propositions, ultimately allowing researchers to make inferences about the wider population, from a sample of individuals (Kelley et al., 2003), which is the ultimate goal of this paper. Following this view, Williams (2007) proposes three possible approaches to collect data, namely the qualitative, quantitative, and combined approaches.

The quantitative method is a systematic process of collecting observable and quantifiable data, that is based on the observation of objective facts, events, and phenomena. Its purpose is to contribute to the development and validation of knowledge, offering the possibility to generalise results, predict trends and establish a potential relation between variables. On the other hand, qualitative research focuses more on describing and interpreting a situation, rather than assessing or evaluating whether there is a relationship between variables (Fortin, 1999). Thus, considering this dissertation focuses on an emerging topic, a quantitative approach was adopted, since it is the most suited method to draw conclusions on potential synergies.

Particularly, it is claimed that online questionnaires enable the collection of large amounts of data, under a short period of time (Falk & Miller, 1992), as it is designed to include several questions that allow the apprehension of answers in a standardized manner. The authors also claim this to be the most appropriate method when the unit of analysis of the study is people. Online questionnaires are also the most widely used method within the managerial field, as it allows for cost reduction, facilitates the comparison of results, and decreases errors related to the analysis of the content (Vilelas, 2020).

On that account, primary data was collected and analysed by the means of two separate research surveys. The target population for the first study, pertaining to the first research question, were Portuguese consumers. On the opposite, the target population of the second study was focused on Portuguese brands that operate with e-commerce, in B2C retail services, addressing the second research question presented in the previous Chapter.

Moreover, the investigation was conducted as a cross-sectional study, due to the fact that the time frame required for conducting a longitudinal study was not achievable. Hence, instead of investigating the phenomenon over a period of time, a cross-sectional study was employed, allowing the researchers to take enabling to take a snapshot of the situation experienced at a particular moment in time (Saunders et al., 2009). Nonetheless, this was in line with this dissertation's goal of depicting how the application of AI in the field of online shopping is currently perceived by customers and firms in Portugal.

Both questionnaires were built and answered through the Google Forms platform. Since this study concerns the impact of AI-enabled tools on the online shopping experience of consumers, conducting an online survey was also seen as a strategic choice, ultimately enabling to target respondents that are accustomed to online platforms and familiar with the presented concepts.

Finally, the present methodology considered the ethical standards intrinsic to any scientific research. In particular, prior to the online questionnaire, participants were informed in regard to the anonymity and confidentiality, as well as the objective and scope of the survey.

In sum, this research was divided into four phases, namely: 1) the bibliographical research and treatment of information; 2) the conversion of the theoretical construct to the field of observation, to obtain the best possible confidence in the results; 3) fieldwork and information gathering and 4) the quantitative analysis of data received from questionnaires, with the aim of originating new conceptual theoretical approaches based on empirical data.

3.3. The influence of AI in enhancing the shopping experience and increasing the purchase intention of customers

3.3.1 Research Model

To answer the first research question- *To what extent does the interaction with AI experience increase the purchase intention of customers?* - a statistical analysis was conducted using the Structural Equation Modelling (SEM). SEM originates from the work of Wright (1918), an American geneticist who used an approach based on path analysis in which structural coefficients were estimated based on the correlation of observable variables. In parallel, Spearman (1904, 1927), would also be associated with the beginning of this methodology by building the first factor analysis model. Since then, applications of SEM have increased considerably (Tarka, 2017).

According to the author, one of the main goals of any research taken in the field of social and behavioural sciences (particularly in the context of recognizing concepts and events) is to be able to justify and predict the specific behaviour of an individual, group of people or organization, in a valid manner (Tarka, 2017). Hence, by recognising a series of conditions by which the individual, society, or organisations exist, researchers are able, within certain limits, to identify particular trends of

development and describe the details concerning their existential sphere. However, since the aim of social sciences is not only to conduct an elementary statistical description and recognise individual factors and behaviours, but also to determine the cause-effect links between variables and the complexity of social reality, investigations ultimately require sophisticated methods and techniques of statistical data analysis, such the SEM model (Tarka, 2018).

This refers to a set of equations in which parameters are determined based on statistical observation. Particularly, structural equations refer to equations that use analytical parameters of observable or latent variables (Jöreskog & Sörbom, 1998). According to Tarka (2018), the SEM model allows researchers to answer a set of interrelated questions in a single, systematic, and comprehensive analysis, by simultaneously modelling the relationships among multiple independent and dependent theoretical constructs (Anderson & Gerbing, 1988). Ultimately, this differs from initial statistical models, such as the Linear Regression model or ANOVA, that are only able to analyse one layer of the linkages between dependent and independent variables.

Given that the evaluation of a model using factor analysis alone does not establish causality relationships, and that path analysis (despite establishing causality) does not measure the error of observable variables, SEM presents itself as a tool of excellence in measuring the total effect, direct and indirect, of the explanatory variable on the dependent one (Haque et al., 2019).

That being said, there are two main reasons for the frequent use of this methodology. Firstly, the SEM model is able to provide researchers with a comprehensive approach to quantifying and testing theories. The second reason is related to the fact that structural equation models explicitly consider measurement error, which is ubiquitous in most situations (Raykov & Marcoulides, 2000).

Thus, the measurement of latent constructs is performed indirectly, through a set of observable variables, and via the observation of causal effects in the SEM between the respective latent variables (Tarka, 2018). Anderson & Gerbing (1988) propose a two-stage approach: the first stage must test the credibility, factor loading, and quality of fit for each scale in the study; the second stage, the structural model stage, must focus on the relationship between constructs, describing the details of each in the model.

As so, the SEM model was used to test the conceptual framework, through the Partial Least Squares Technique, which consists of a variance-based structural equation modelling technique. In particular, the SmartPLS software was used for this purpose (J. F. Hair et al., 2017; Henseler et al., 2015). The analysis and interpretation of the results followed a two-step approach. Firstly, the reliability and validity of the measurement model were assessed, followed by the structural model.

To answer the previously stated Research Questions, a conceptual model was created to test the customer perception regarding the impact of intelligent systems in the customer experience as well as its possible influence on their purchase behaviour:

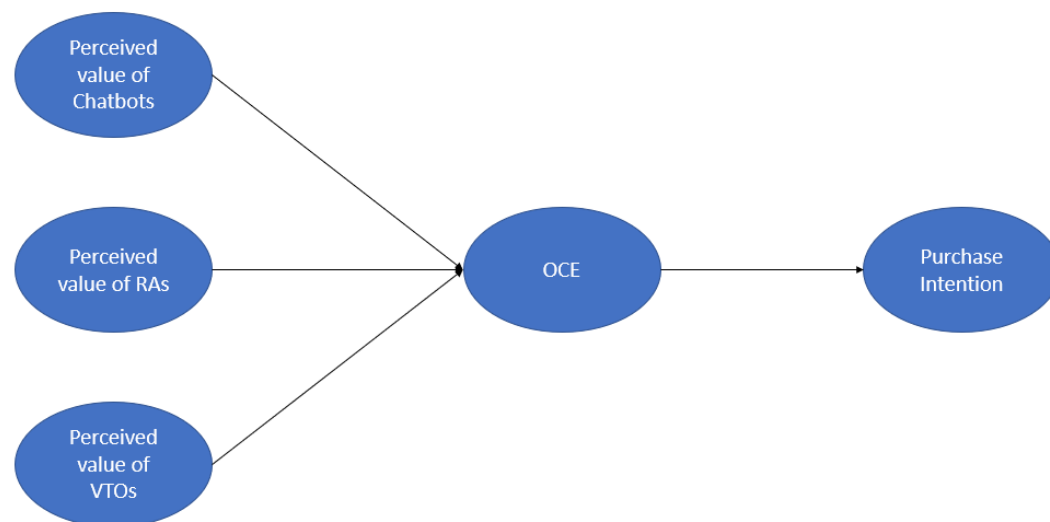


Figure 3.1- Research Model

Following the above research model, a series of hypothesis were formulated to assess the impact of AI on increasing the online shopping experience and thus influencing the purchase intention of customers.

Table 3.1. Relation between hypotheses and Literature Review.

Hypotheses	Literature Review
H1a: Chatbots have a positive impact on the online customer experience.	(Dandörfer, 2019; Fu et al., 2020; Hoyer et al., 2020; Przegalinska et al., 2019; Song et al., 2019)
H1b: Recommendation Agents have a positive impact on the online customer experience.	(Hoyer et al., 2020; Luce, 2018; Roudposhti et al., 2018; Schafer et al., 2001; Song et al., 2019)
H1c: VTO systems have a positive impact on the online customer experience.	(Beck & Crié, 2018; Hoyer et al., 2020; Kim & Forsythe, 2008; Merle et al., 2012; Song et al., 2019; Zhang et al., 2019)
H2: The AI-enabled customer experience has a positive influence on the purchase intention of customers	(Schrotenboer, 2019; Meyer & Schwager, 2007; Roudposhti et al., 2017; Schafer et al., 2001; Broeck et al., 2019)
H3a: The use of chatbots mediates the effect between consumer experience and its purchase intention	(Van den Broeck et al., 2019; Yen & Chiang, 2020)

H3b: <i>The use of Recommendation systems mediates the effect between consumer experience and purchase intention</i>	(Roudposhti et al., 2018; Broeck et al., 2019)
H3c: <i>The use of VTOs mediates the effect between consumer experience and purchase intention</i>	(Merle et al., 2012; Zhang et al., 2019)

3.3.2 Survey Content

The target population of the present methodology was Portuguese consumers. For the purpose of data collection, an online questionnaire was developed based on the Literature Review. Before its publication, the survey was reviewed using a two-step split approach. Firstly, the validation by expert advisors allowed to assess the content validity of the scales. Secondly, a pre-test was conducted, allowing a convenience sample to validate the wording and design of the survey. The questionnaire was shared among social networks as LinkedIn, WhatsApp and Facebook, as well as via email, between the 3rd of March and the 3rd of May of the current year. In total, 270 valid responses were collected for this study between the respective period.

In an attempt to characterise the sample with greater detail, the questionnaire began by enquiring the participants with questions regarding sociodemographic data (Provdanov & Freitas, 2013). The survey was then divided into three parts, one per each AI-enabled tool being studied, namely, Chatbots, Recommendation Agents, and VTOs.

Additionally, taking into consideration that the present study takes on an exploratory approach, a small explanation of each tool was given at the beginning of each part of the survey, as a means to ensure all participants were able to provide their opinion regarding the perceived impact each tool could have on their online shopping experience. In this description, both a definition as well as an example of an application during a shopping task and an image were provided, ultimately aiming to facilitate the responses.

Moreover, it is also important to emphasize, that the present study did not aim to assess the consumer's previous experience with Chatbots, Recommendation Agents, or VTO systems. Instead, the goal was to instigate upon the consumers' perception regarding the impact each tool may have on their experience as a consumer, by using the OCE construct to evaluate the costumers' perceptions upon the four different dimensions previously presented.

Finally, this investigation complied with ethical guidelines for conducting scientific-related research, with all participants being informed of their voluntary and anonymous participation prior to the completion of the survey.

3.3.3 Sample Characterization

Once defined a target population, in this case, Portuguese consumers, it was necessary to select a sample compromising some members of this population (Vaus, 2002). Given time and resource constraints, a non-probabilistic sample was applied.

In regard to demographic characteristics, the sample is mainly representative of the female gender, accounting for 68,7% of the total respondents, the remainder 31,3% were male.

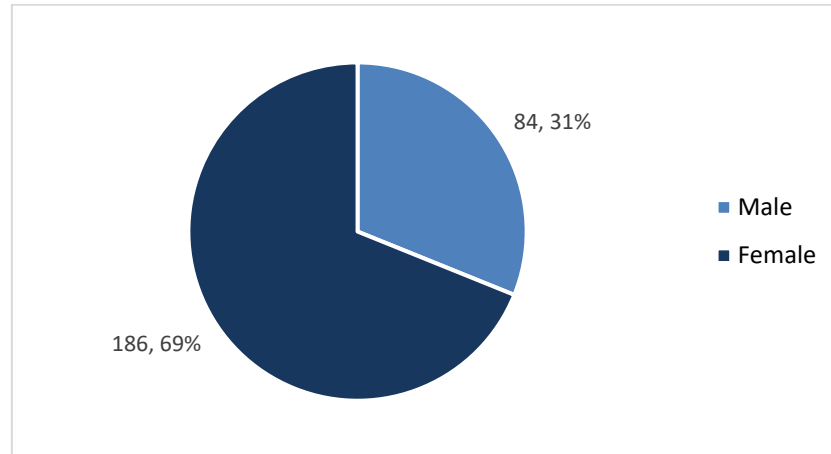


Figure 3.1. Distribution of respondents by gender

In addition, regarding the age group of respondents, one can claim that the present study was able to reach all generations. The most representative age group was between 18 and 25 years old, which accounted for 56,7% of the total. The age group between 26 and 35, represented 10,8%. Participants between ages 36 and 50, encompassed the second most represented group (17,9%). Finally, the age category above 50 years old accounted for 14,2% of respondents. The following chart summarizes the age characterization of the respondents to the online survey:

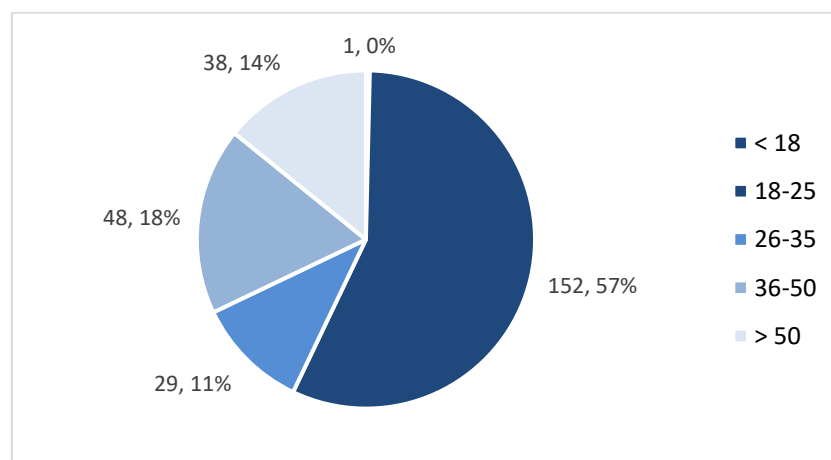


Figure 3.2. Distribution of respondents by age

Following the previous demographic questions, participants were enquired about their current consumption habits in e-commerce. In this respect, all participants in the study had already used e-

commerce. The study also unveiled, by assessing the different regularity to which participants use e-commerce, that shopping online is still not the preferred shopping method to the majority of participants (Figure 3.3).

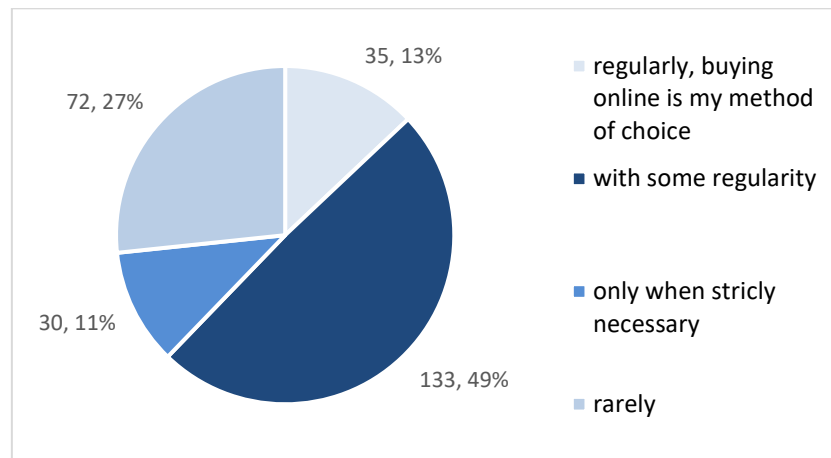


Figure 3.3. Frequency of customers interaction with e-commerce

In addition, since the present study aims to understand the perceived value of AI in the view of Portuguese consumers, respondents were asked about their previous contact with this technology. In this sense, it was possible to confirm that participants are already interacting with Chatbots, Recommendation Agents, and VTOs technologies during their online purchasing activities. Recommendation agents were the tool to which most respondents (83%) had already interacted with. In regard to chatbots, over 45% of respondents had already had contact with this tool. On the other hand, only 16% of respondents had already interacted with VTOs.

Finally, it is important to consider that a non-probabilistic sample is not representative of the population, occurring when participation is voluntary, or the elements of the sample are chosen as a matter of convenience. In this particular case, as previously mentioned a convenience sample was used, for reasons concerned to the ease of access to obtain responses (Sampieri, 2014), meaning that the sample is made of participants that were directly asked to answer a set of questions and decided to cooperate.

Therefore, the results of this research must be interpreted with caution, as the sample was collected for convenience. As so, this sampling is not representative of the population in question, which results in the inability to use the present questionnaire in order to generalise upon the population, ultimately conferring a limitation to the present study.

Nonetheless, the main objective of the study was still achieved, which was to assess whether the different dimensions of the customer experience could be fulfilled through the usage of AI tools. As so, despite the inability to generalise results, the outcomes of the questionnaire ultimately contribute to the empirical research under this field, as it allowed to assess the perception of

Portuguese consumers regarding the impact of AI-enabled tools when shopping online as well as to measure the impact of the different dimensions of the customer experience.

3.4. Assessing the current level of AI adoption by Portuguese brands and its perception towards AI improving OCE

3.4.1 Research Model

The last research question - *What is the current level of AI adoption in Portugal? Are Portuguese Brands willing to adopt AI tools in e-commerce in order to improve the customer experience?* - was answered through techniques of descriptive statistics, using a set of practices and rules to summarise the information collected from the questionnaire, including tables and charts derived from percentages, means, modes, and counts (Vilelas, 2020).

Considering the following research question, the target population of the study was Portuguese firms operating with e-commerce in B2C retail areas, for which an online questionnaire was made available via a link. Hence, a survey was designed, consisting of closed questions, tested to be more understandable for respondents and unambiguous, whilst allowing for a higher degree of directness (Carmo, H. & Ferreira, 2008). Initial questions aimed at characterising the sample, by analysing the size of the firm and its field of activity. The following part of the questionnaire sought to understand the firm's perception regarding the impact of each AI tool on the online experience of the customer. An additional part of the study was designed to assessing potential barriers Portuguese brands may find to the adoption of Chatbots, Recommendation Agents, and VTOs. The final part aimed at addressing the willingness of the respondents in adopting these tools as a means of improving the customer experience.

The main goal of the questionnaire targeting Portuguese brands was to understand their perception regarding the potential impact of AI-enabled tools to drive the experience of the consumer when purchasing online. As so, it is relevant to reinforce that the target of this study focused on brands that already operate with e-commerce. Throughout the study, it was also possible to gain insights upon which tools are firms already interacting with, and which are they willing to adopt.

To address this target, previous research was conducted using search engines and social media, in order to reach out to Portuguese brands of various sizes and fields within the B2C online retail sector. Firms that operated with a dedicated e-commerce platform were directly contacted, either via e-mail or Instagram, in order to participate in the survey. During both the contact via email and the survey, all firms were informed regarding the anonymity of the present study.

Regarding the type of responses to the questionnaire, mainly sociodemographic questions or other intuitive questions whose nature required the consumer to choose between several options, were answered using a multiple-choice system. Besides, the majority of questions sought to evaluate

experiences, opinions, and attitudes towards a specific phenomenon. For this purpose, a seven-point Likert scale was applied, where Level 1 indicated “strongly disagree” and 7, “strongly agree”. Ultimately, this method enabled to gather more complex and subjective information, whilst facilitating the coding and analysis of the responses, as well as eliminating potential biases (Cohen et al., 2007; Sampieri, 2014).

3.4.2 Sample Characterisation

Data was collected between the 5th of May and 1st of July of the present year; however, a low response rate was experienced. In total, 48 responses were received and considered valid for the present investigation. The low sample can be explained due to difficulty in contacting the person in charge at the company to complete a survey that requires a multidisciplinary view over the strategic position of the brand. Considering that a large majority of local brands in Portugal represent micro and small enterprises, with a small number of workers performing multiple tasks, one reason that may explain the low response rate may be explained due to intense workload. In addition, the low levels of e-commerce adoption may have translated in difficulties in finding brands that match the target population of this survey. Yet, the sample collected managed to provide a comprehensive overview of the corporate context, as multiple retail sectors and company sizes were represented.

From the 48 responses to the questionnaire, several retail areas focused on B2C operations were identified. Among the most predominant sectors of activity present in the study, were the fashion industry, together with the commercialization of sustainable products. Other represented retail activities included wine, beauty products, home design. and optics. It is also important to note that a vast number of respondents did not specify its activity (Fig 3.4).

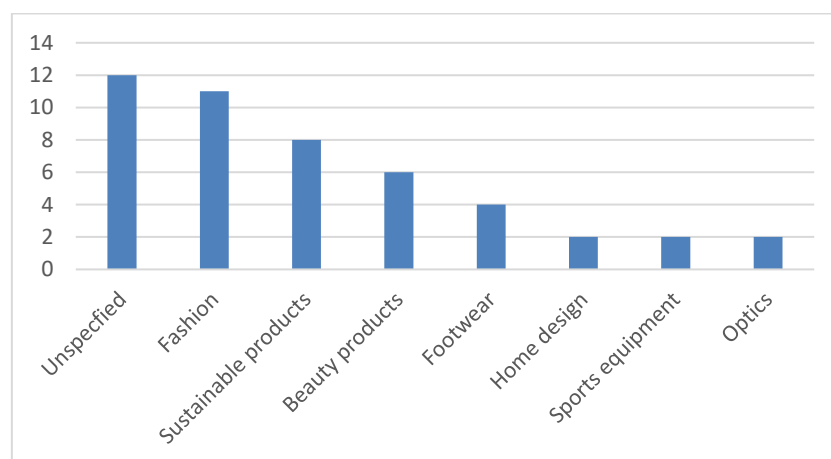


Figure 3.4. Distribution of respondents by activity sector

The sample collected was also representative of companies of different sizes, thus allowing to take into consideration different realities (Fig. 3.5). This becomes relevant in an emerging field, as

different contexts may represent a determining factor in the willingness to adopt transformative technologies like AI. Companies were asked to provide information regarding their size, being grouped into categories, taking into consideration the number of employees and the annual turnover registered, thus following the guidelines presented by the European Commission (2015).

The sample of the present study was most representative of micro-enterprises, accounting for over 44% of participants (n=21), followed by companies holding less than 50 employees and a turnover inferior to €10 million (n=17). Figure 3.5 summarizes the sizes of the companies that have completed the survey:

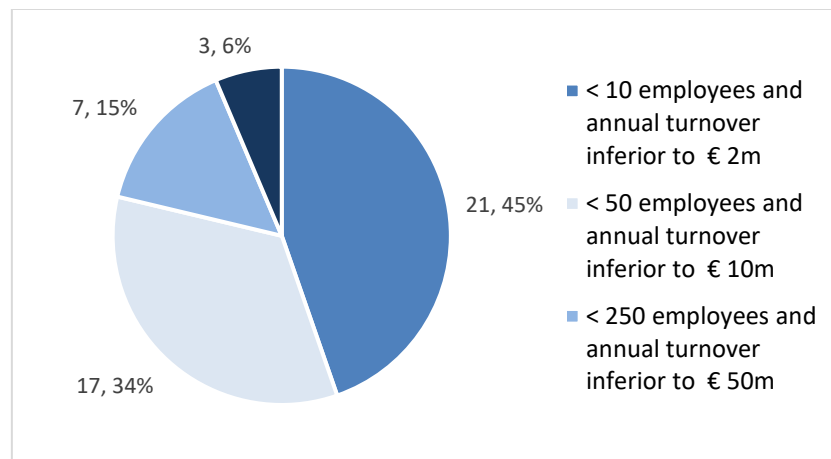


Figure 3.5. Distribution of respondents by company size

In sum, it is relevant to consider that the low sample obtained may represent a limitation for the current study, which can undermine the reliability of results, as data collected is subject to higher variability, increasing biases. Nonetheless, due to the low variability of results, the main objective of this research was still achieved, allowing to gain insight upon the current vision of Portuguese brands regarding the impact of AI tools on the experience of the customer when shopping online.

Chapter 4 – Results

4.1. The influence of AI in enhancing the shopping experience and increasing the purchase intention of customers

The results obtained in this section of the paper sought to answer the research question- *To what extent does the interaction with AI experience increase the purchase intention of customers?*- using the SEM technique. The analysis and interpretation of the results followed a two-step approach. Firstly, the reliability and validity of the measurement model were assessed. In the second part, the structural model was measured.

To begin, the quality of the measurement model was verified, in which the individual indicators of reliability, convergent validity, internal consistency reliability and discriminant validity were assessed (Hair et al., 2017).

The results revealed that all items' standardized factor loadings were above 0.6. In addition, all items were significant with $p < 0.001$, which evidenced the reliability of the individual indicator (Hair et al., 2017). The reliability of the internal consistency of the Conceptual Model was confirmed as all the values of Cronbach's Alpha (CA) and Composite Reliability (CR) of the constructs exceeded the minimum value of 0.7 (Hair et al., 2017).

Table 4.1. Cronbach Alpha, Composite Reliability, Average Variance, Correlations and Discriminant Validity.

	CA	CR	AVE	CH	RA	VTO	OCE	PI
CH	0.908	0.926	0.610	0.781	0.514	0.540	0.881	0.883
RA	0.876	0.910	0.670	0.462	0.819	0.557	0.796	0.827
VTO	0.907	0.929	0.688	0.493	0.488	0.830	0.845	0.911
OCE	0.870	0.896	0.492	0.785	0.684	0.771	0.701	1.072
PI	0.789	0.850	0.489	0.739	0.666	0.807	0.897	0.699

Note: CA – Cronbach Alpha, CR – Composite Reliability, AVE – Average Variance. Bold numbers in diagonal represent the square roots of AVE. Below the diagonal elements are the correlations between the constructs. Above the diagonal elements are the Heterotrait-Monotrait ratios.

According to Table 4.1, convergent validity was also confirmed due to three main reasons. Firstly, all individual items appeared positively and significantly on each respective construct. Secondly, all construct's CR values were above 0.7. Lastly, the Average Variance Extracted (AVE) surpassed the limit value of 0.5 (Bagozzi & Yi, 1988). In regard to two variables, AVE did not reach the threshold of 0.5. Nevertheless, according to Fornell & Larcker (1981) in the case of AVE being less than 0.5, if composite reliability is higher than 0.6 the convergent validity of the construct is still adequate, which is ultimately applicable in this case.

Additionally, Discriminant Validity was assessed using two approaches. Primarily, the Fornell & Larcker (1981) criterion was applied, which in turn requires the square root of the AVE of each

construct to be greater than the highest correlation involving the constructs (Fornell & Larcker, 1981), as seen by the values presented diagonally in bold in Table 4.1. Secondly, the Heterotrait-Monotrait ratio (HTMT) criterion was examined to provide additional evidence of discriminant validity. In this criteria, a threshold value of 0.9 is recommended, however research indicates that an exact threshold level of the HTMT is debatable (Henseler et al., 2015). The results presented are fairly under these guidelines, thus supporting the validity of the conceptual model.

Before assessing the structural model, collinearity was verified. It was concluded that all items of the structural model did not present collinearity among each other since the values of VIF ranged between 1.399 and 4.556, which is below the indicative critical value of 5 proposed by Hair et al. (2017).

To assess the structural model three main points were considered. Firstly, the sign, magnitude, and significance of the structural path coefficients were analysed. Secondly, to evaluate the predictive accuracy of the model, the magnitude of the R^2 value for each endogenous variable was measured. Lastly, to measure the predictive relevance of the structural model, the Stone-Geisser Q^2 values were examined (Hair et al., 2017).

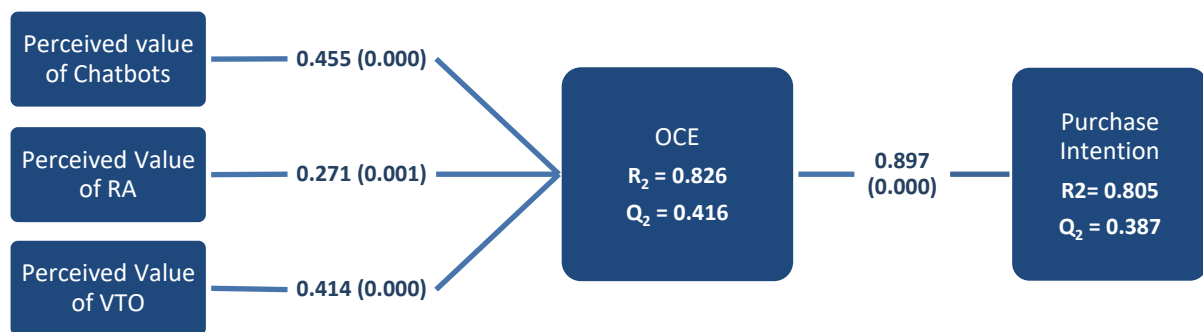


Figure 4.1. Research Model with PLS algorithm and bootstrapping results

As presented in Table 4.2, the coefficient of the determination R^2 for the two endogenous variables of OCE and PI was 82.6% and 80.5%, respectively, which surpassed the limit value of 10% (Falk & Miller, 1992). The Q^2 values for the endogenous variables of 0.416 and 0.387 were both above zero, which ultimately confirms the predictive relevance of the model (Hair et al., 2017).

The results in Table 4.2 highlight that the use of Chatbots has a positive effect on the OCE ($\beta = 0.455$, $p < 0.000$). Likewise, the usage of Recommendation Agents (RA) also has a positive effect on the

OCE ($\beta = 0.271$, $p < 0.000$) as well as the usage of VTOs ($\beta = 0.414$, $p < 0.000$), ultimately supporting the hypothesis H1a, H1b and H1c, respectively. Moreover, the results highlight that OCE has a positive effect on PI ($\beta = 0.897$, $p < 0.000$), sustaining hypothesis H2.

Table 4.2. Structural model assessment.

	Path Coefficient	Standard Deviation	T Statistics	P Values
CH -> OCE	0.455	0.031	14.482	0.000
RA-> OCE	0.271	0.033	8.103	0.000
VTOs -> OCE	0.414	0.033	12.557	0.000
OCE-> PI	0.897	0.014	64.148	0.000

To test the mediation hypotheses (H3a-H3c), the recommendations of Hair et al. (2017) were followed. Thus, a bootstrapping procedure was applied to test the significance of indirect effects through the mediator. Table 41 presents the results of the mediation effects.

Table 4.3. Bootstrap results for indirect effects.

	Estimate	Standard Deviation	T Statistics	P Values
CH -> OCE -> PI	0.409	0.029	14.219	0.000
RS -> OCE -> PI	0.243	0.030	8.204	0.000
VTO -> OCE -> PI	0.372	0.031	12.143	0.000

The indirect effect of Chatbots on the Purchase Intention of the customer via the mediator of OCE was significant ($\beta = 0.409$, $p < 0.000$), thus verifying the mediation hypothesis H3a. Similarly, the indirect effect of Recommendation Systems on the Purchase Intention of the customer via the mediator of OCE was also significant ($\beta = 0.243$, $p < 0.000$), supporting H3b. At last, the indirect effect of VTOs on the Purchase Intention of the customer via the mediator of OCE was significant ($\beta = 0.372$, $p < 0.000$), validating H3c.

Following the results from the analysis, it is possible to verify which of the hypothesis from the research model were accepted. Table 4.4 presents the hypotheses of the study, in addition to the value of β and its statistical significance, that will support the decision of rejecting or accepting the hypotheses presented.

Table 4.4. Hypotheses testing

Hypotheses	β	P value	Accepted/ Rejected
H1a: The interaction with Chatbots has a positive impact on the online shopping experience of customers.	0.455	0.000	Accepted
H1b: The interaction with Recommendation Agents has a positive impact on the online shopping experience of customers.	0.271	0.000	Accepted

H1c: The interaction with VTO systems has a positive impact on the online shopping experience of customers.	0.414	0.000	Accepted
H2: The shopping experience of customers has a positive influence on their purchase intention of customers	0.897	0.000	Accepted
H3a: The use of chatbots mediates the effect between consumer experience and its purchase intention	0.409	0.000	Accepted
H3b: The use of Recommendation Agents mediates the effect between consumer experience and purchase intention	0.243	0.000	Accepted
H3c: The use of VTOs mediates the effect between consumer experience and purchase intention	0.372	0.000	Accepted

Additionally, it was possible to confirm the presence of linear relationships between the different items of the model. Particularly, in a hierarchical linear regression, one or more independent variables are connected by causal relationships. In this study, two hierarchical linear regressions were conducted. The first model consists of the factors CH, RA and VTO regarding OCE. The second model examines the influence of OCE on PI.

From the analysis of hierarchical regressions, all hypotheses were accepted. Hence it is possible to infer that the interaction with Chatbots, Recommendation Agents, and VTOs influences the purchase intention of the customers. In addition, the OCE variable influences customers' PI.

4.2. Assessing the current awareness of AI by Portuguese brands

The results obtained in this section of the paper sought to answer the research question- *What is the current level of AI adoption in Portugal? Are Portuguese Brands willing to adopt AI tools in e-commerce in order to improve the customer experience?*- using the Descriptive Statistics methodology.

The first step applied with regard to the quantitative analysis was to assess the current level of adoption of Chatbots, Recommendation Agents, and VTOs among retail brands in Portugal. In regard to the current adoption of Chatbots, only 31% of the brands enquired using this tool (n= 33). The tool most adopted so far by respondents was Recommendation Agents, with 56% (n=27). On the opposite, none of the respondents already use VTO systems. After this initial assessment, table 4.5 was created to allow for a better assessment of the adoption of AI tools, in accordance with the different company sizes present in the study:

Table 4.5. Count of Adoption of AI tools per company size

Company size	Head count	Not using	%	Using	%	Intention to use	%
Chatbots							
Micro enterprise	21	14	67%	7	33%	6	43%
Small enterprise	17	10	58%	7	41%	7	70%
Medium enterprise	7	7	100%	0	-	6	86%
Large enterprise	3	2	67%	1	33%	1	50%
Total	48	33	69%	15	31%	20	60%
Recommendation Agents							
Micro enterprise	21	12	57%	9	43%	7	58%
Small enterprise	17	6	35%	11	65%	4	67%
Medium enterprise	7	2	29%	5	71%	1	50%
Large enterprise	3	1	33%	2	67%	1	100%
Total	48	21	44%	27	56%	13	61%
Virtual Try On							
Micro enterprise	21	21	100%	0	-	12	57%
Small enterprise	17	17	100%	0	-	14	82%
Medium enterprise	7	7	100%	0	-	3	43%
Large enterprise	3	3	100%	0	-	2	100%
Total	48	48	100%	0	-	31	65%

Note: % Intention to use was calculated based on the number of respondents that do not already utilize AI

Following the analysis of Table 4.5, it is possible to confirm that, despite the low levels of adoption, the respondents were able to perceive value from the technologies presented in the survey, since for the brands not using a certain AI-tool, the majority reported an intention to begin using it.

In the next part of the survey, participants were asked about their perception regarding the impact of Chatbots, Recommendation Systems and VTOs on the experience of the customer. The data was analysed by drawing a descriptive statistics table which included the minimum, maximum, mean, median, mode, and standard deviation values for each of the questions studied in regard to Chatbots, as shown in Table 4.6. The test was performed with the Descriptive Statistics tool from Excel.

Table 4. 6. Descriptive Statistics of Brands' perceived value from Chatbots

	Facilitate the process of shopping online	Facilitates the process of establishing an opinion about the product	Creates a more interactive experience	Creates a more personalized experience	Provides a more enhanced customer service	Facilitates the communication of issues	Facilitates access to relevant product information	Increased feeling of human contact during shopping	Enhances the perception regarding the quality of the service
Mean	4.88	4.67	5.52	4.73	4.65	5.65	5.50	3.75	4.73
Median	5.00	5.00	6.00	5.00	5.00	6.00	5.50	4.00	5.00
Mode	5.00	5.00	5.00	5.00	5.00	6.00	5.00	5.00	5.00
Standard Deviation	1.20	1.40	1.11	1.44	1.58	1.21	1.09	1.83	1.33
Minimum	1.00	2.00	3.00	1.00	1.00	2.00	2.00	1.00	2.00
Maximum	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00

Following the analysis of table 4.6, it is possible to confirm that brands perceive several benefits from the utilization of chatbots, in particular, the ability to access relevant information and to communicate issues more easily, when assessing the results from both median and mode. In regard to the perception of brands about the impact of chatbots in increasing the feeling of human contact during the shopping experience of customers, not only the lowest mean was achieved but also the highest standard deviation was scored, confirming that reluctance was found among Portuguese brands concerning the possibility of Chatbots augmenting the feeling of human contact.

In addition, the same exercise was conducted for the results from the perception of brands regarding the perceived value of Recommendation Agents, as presented in table 4.7:

Table 4.7. Descriptive Statistics of Brands' perceived value from Recommendation Agents

	<i>Facilitates the process of purchasing online</i>	<i>Facilitates product search</i>	<i>Facilitates the process of establishing an opinion about the product</i>	<i>Creates a more interactive experience</i>	<i>Creates a more personalized experience</i>	<i>Provides a more enhanced customer service</i>	<i>Facilitates access to relevant product information</i>	<i>Enhances the perception regarding the quality of the service</i>	<i>Allows the customer to feel safe regarding its privacy and data protection</i>
Mean	4.83	5.40	4.54	5.31	5.54	4.94	4.88	4.92	4.02
Median	5.00	5.00	4.00	5.00	6.00	5.00	5.00	5.00	4.00
Mode	5.00	5.00	4.00	6.00	5.00	5.00	4.00	6.00	5.00
Standard Deviation	0.20	0.19	0.18	0.16	0.17	0.18	0.20	0.22	0.25
Minimum	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Maximum	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00

The above results highlight that brands have a positive perception regarding the value Recommendation Agents can provide to customers, showing an overall unified opinion with a low overall Standard Deviation. This can be possibly explained by the fact that several brands already interact with Recommendation Agents, hence having a more established opinion. Particularly, brands perceive that RA facilitate the processes of shopping online and searching for products. Nonetheless a lower median and mode was found on the questions regarding the impact of RA in helping the customer establishing an opinion about the product and accessing relevant information.

Subsequently, the same analysis was applied for the perceived value of VTOs, as present in Table 4.8. Hence, it was possible to confirm that brands believe this tool facilitates the shopping task, by analysing both median and mode values. Strong agreement was also found on the fact that brands perceive VTOs are able to provide a more interactive experience with the customer (sd= 0.84), also allowing for greater levels of personalization. Additionally, a high minimum value and high mode were found among the questions regarding the impact of VTOs in facilitating the evaluation of the product as well as allowing the customer to establishing an opinion about the product more easily, which

confirms the strong perceived value of brands regarding this tool. Concerns were found among the perception of brands in regard to the safety and privacy of customers when using VTOs, in which a low mean (= 3.79) was obtained, despite the high standard deviation, emphasizing the division of opinions.

Table 4. 8. Descriptive Statistics of Brands' perceived value from VTOs

	<i>Facilitates the process of shopping online</i>	<i>Facilitates the process of establishing an opinion about the product</i>	<i>allows the customer to imagine the product and evaluate it</i>	<i>Creates a more interactive experience</i>	<i>Creates a more personalized experience</i>	<i>Provides a more enhanced customer service</i>	<i>Are an easy and intuitive tool to use</i>	<i>Facilitate the evaluation of a product within the online context</i>	<i>Enhances the perception regarding the quality of the service</i>	<i>Allows the customer to feel save regarding its privacy and data protection</i>
Mean	5.56	5.94	5.29	6.13	6.13	5.73	4.54	5.81	5.79	3.79
Median	6.00	6.00	5.00	6.00	6.00	6.00	4.50	6.00	6.00	4.00
Mode	6.00	6.00	6.00	7.00	6.00	6.00	5.00	6.00	6.00	4.00
Standard Deviation	1.18	0.78	1.13	0.84	0.84	1.22	1.34	0.84	1.15	1.70
Minimum	1.00	4.00	2.00	4.00	4.00	2.00	2.00	4.00	2.00	1.00
Maximum	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00

Following an analysis of brands' perceived value of AI tools, their perception regarding the impact of Chatbots, Recommendation Agents, and VTOs on the purchase intention of customers was assessed. The results from table 4.9 demonstrate that brands perceive VTOs as the most impactful tool towards influencing the purchase behaviour of customers, which can be confirmed by analysing the higher minimum values obtained in this category when compared to others.

Table 4.9. Descriptive Statistics regarding perceived influence of AI on the Purchase Intention

	<i>AI influences the purchase behaviour of the customer</i>			<i>AI allows the customer to feel more confident about their purchase decision</i>		
	CH	RA	VTO	CH	RA	VTO
Mean	4.94	5.42	5.83	4.83	4.85	5.88
Median	5.00	6.00	6.00	5.00	5.00	6.00
Mode	5.00	6.00	6.00	4.00	6.00	6.00
Standard Deviation	1.26	1.41	1.02	1.24	1.58	0.91
Minimum	1.00	1.00	3.00	2.00	1.00	4.00
Maximum	7.00	7.00	7.00	7.00	7.00	7.00

To complement the results previously presented, the next step of this statistical analysis was to conduct a correlation analysis. In regard to Chatbots, correlations ranged between 0.16 and 0.82. Correlations among questions related to the perceived value of Recommendation Agents ranged

between (-0.03 e 0.75). Concerning VTO, there was a range of correlations between -0.23 and 0.82. The strongest correlation was found between the fact that AI-enabled tools enhance the perception of the customer regarding the quality of the website and brand, with the fact that AI enables customers to feel more confident regarding their purchase decision. The same correlation was retrieved concerning Chatbots (0.82), Recommendation Agents (0.75) and VTOs (0.55) which allows to confirm that brands believe that customers' purchase intention can increase as their perception regarding the quality of the service (brand and platform) increases through the presence of AI.

Before assessing brands' perceived value in adopting AI as a means of enhancing the customer experience, respondents were first asked to evaluate some of the perceived barriers that could prevent them from adoption. According to the literature, these barriers include 1) high implementation costs, 2) insufficient return on investment, 3) resistance to change from the part of employees fearing to be replaced, 4) business being based on a traditional model, 5) clients not willing to use AI, 6) concerns related to security and data privacy issues, 7) lack of competence to implement AI (Aarstad & Saidl, 2019; MacGregor & Kartiwi, 2010).

Table 4.10. Descriptive Statistics of perceived barriers to the implementation of AI

	High implementation costs perceived	Insufficient Return on investment	Fear of being replaced	Business based on a traditional model	Clients are not ready or looking to use these tools	Fears related to security and data concerns	Lack of IT competence to implement AI
Mean	5.17	3.96	2.77	2.06	2.71	4.19	3.00
Median	5.50	4.00	2.00	1.00	2.00	4.00	3.00
Mode	6.00	5.00	2.00	1.00	1.00	5.00	1.00
Standard Deviation	1.69	1.68	1.60	1.55	1.70	1.61	1.92
Minimum	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Maximum	7.00	7.00	7.00	7.00	7.00	7.00	7.00

As seen in Table 4.10, by analysing the overall standard deviation, it becomes crucial to understand that the overall opinion and perceived barriers tend to vary between companies. From an analysis of the mode and median of responses, it is possible to confirm that the participants have identified concerns in regard to the security and data privacy of AI tools. (mode=5; median=4). Another major barrier identified was the high implementation costs associated with the implementation of AI tools (6 and 5.50 respectively). In contrast to previous studies (Aarstad & Saidl, 2019; MacGregor & Kartiwi, 2010), the lack of internal knowledge to implement AI tools scored both a low mode and median. Nonetheless, when accessing the high standard deviation and the wide range between minimum and maximum values obtained, it is possible to see that this was not widely accepted.

Participants were also asked whether they were willing to implement AI as a means of improving the experience of their customers when shopping online, using a 7-point Likert scale. The results in Table 4.11, show that a vast majority of the brands enquired are keen on using AI to drive the experience of the customer. When enquired regarding their urgency in adopting the tool, most confirmed they believe these tools to be critical to adopt in a medium to long term frame.

Table 4.11. Comparison of willingness to adopt AI

	N	%
1- Strongly Disagree	-	
2- Disagree	-	
3- Somewhat disagree	-	
4- Undecided	4	8%
5- Somewhat Agree	18	38%
6- Agree	11	23%
7- Strongly Agree	15	31%
Total	48	100%

Moreover, brands were asked which tool they believed could have a more significant impact towards improving the experience of customers when shopping online. The results highlight that a greater preference was given to VTOs (40%), followed by Recommendation Agentss (31%) and Chatbots (29%).

To finalize, it is relevant to mention that ANOVA tests were conducted to assess whether possible differences amongst results in relation to the company's size could be found, nonetheless, no significance was confirmed.

Chapter 5 - Discussion

In this chapter, the results of the empirical data are critically compared with the findings explored throughout the Literature Review Chapter. The main purpose of this study was to understand the impact intelligent systems can have on building an improved customer experience when shopping online and to assess whether this relationship could increase the purchase intention of the customer. As so, both consumers and brands have been enquired, ultimately aiming to understand their perception regarding the impact of three main tools: Chatbots, Recommendation Agents, and VTOs.

5.1 In what manner can the interaction with AI lead to a more enhanced shopping experience and drive the purchase behaviour of customers?

The present investigation reveals that customers perceive Chatbots, Recommendation Agents, and VTO systems as highly valuable tools under the context of online shopping, allowing to improve both access to information, entertainment, and engagement during online shopping, leading to increased personalization and satisfaction. As so, the results from the current research highlight that not only the customer experience is enhanced through the usage of Chatbots, Recommendation Agents, and VTOs, but it also influences the purchase intention of customers. These findings go in line with previous studies in this field (Schrotenboer, 2019; Hoyer et al., 2020; Matarazzo et al., 2021; Song et al., 2019; Zhang et al., 2019). In addition, it was also found that the OCE plays a mediating effect between the perceived value of AI tools and the purchase intention of customers.

Firstly, the interaction with Chatbots provides customers with increased access to relevant information regarding the product or service to be purchased, ultimately enhancing the informativeness of customers. Likewise, respondents vastly agreed upon the importance of this tool in order to deliver a more personalized service under a digital environment.

Particularly, the respondents from the study perceived Chatbots as a useful tool that facilitates the interaction between the user and the shopping platform, providing both entertainment and personalization. As so, the study revealed that one of the main reasons that influence customers to interact with Chatbots is that it improves the customer service provided in an online context, facilitating the communication of issues, allowing customers to receive support to their queries and to easily access relevant information regarding the product. As a result, customers feel more assured regarding their purchase decision, which can ultimately influence their buying behaviour.

These findings are ultimately supported by Przegalinska et al. (2019) whose research focused on the importance of chatbots as an enabler of service quality. In addition, Hoyer et al. (2020) claimed that this tool can reduce uncertainty, which is ultimately evidenced in the empirical findings of this paper.

On the other hand, Schafer et al. (2001) claim that Recommendation Agents enable a more customized service, addressing customers' needs. (Roudposhti et al. (2018) argue that this technology facilitates the access to information and feeling of engagement during the shopping experience. These findings are in line with the results obtained from the present study which highlight that consumers believe that Recommendation Agents facilitate the process of shopping online, by simplifying the search of products, allowing users to quickly grasp items that match their needs. In addition, respondents highlight that Recommendation Agents allow the user to establish an opinion regarding the product more easily.

So as with Chatbots, respondents believe that Recommendation Agents deliver a more personalized service, allowing the customer to easily access relevant information whilst also being provided with a more enhanced customer service. In addition, respondents consider this tool can improve the experience when shopping online, by increasing their engagement, whilst facilitating the shopping task.

In regard to the impact of VTOs in creating a more compelling customer experience, this intelligent system, despite being the least adopted, is viewed as a very promising tool by the respondents. Particularly, customers believe that this tool enables them to establish an opinion regarding the product more easily, ultimately facilitating the process of online shopping. The respondents believe this tool can increase the accessibility of shopping online, as it allows customers to try the product from the comfort of their homes and at a time that is more convenient to them, thus eliminating one of the biggest perceived challenges when shopping online, the inability to try and visualize the product, helping customers feel more assured regarding their purchase decision.

Despite potential scepticisms concerning the actual value of this tool, respondents believe that the use of VTOs provides an accurate representation of the product, allowing the user to assess its quality and fitting. In addition, customers believe this tool increases the level of personalization received during online shopping also providing enhanced entertainment value. These findings ultimately go in line with previous research presented in the second chapter of this dissertation. In particular, it is argued that VTOs boost the creativity of customers, enabling them to experience fun and joy (Beck & Cri , 2018), offering greater reliability and convenience (Kim & Forsythe, 2008).

Thus, it was also possible to conclude that customers perceive AI tools, whether Chatbots, Recommendation Agents or VTOs to provide relevant and adequate information, increasing the level of personalization and allowing the customer to facilitate the evaluation of the product. Ultimately, these findings provide empirical evidence for the previous theoretical constructs presented in the Literature Review, confirming that consumers recognize several benefits to interacting with intelligent systems, which ultimately lead towards a more enhanced experience when shopping online (Hoyer et al., 2020; Merle et al., 2012; Schrotenboer, 2019; Zhang et al., 2019).

Nevertheless, the results revealed that customers perceive these tools as complementary to each other. Whereas Chatbots allow access to greater customer service and technical information, Recommendation Agents are perceived to facilitate the process of searching for products, however not enabling the provision of greater information. Following this view, VTOs facilitate the virtual assessment of the product, but do not assist communication with the brand. In all, the customer experience is enhanced as this tool provides access to a more facilitated service, promoting interaction between the customer and the brand, and increasing the level of personalization and support received, thus resulting in an increased perceived quality of the service provided.

On the other hand, despite the fact that these tools have not been widely used or employed under e-commerce platforms, the present investigation reveals the customer perceived trust regarding Chatbots, Recommendation Agents, and VTOs is high, as respondents consider their data and privacy to be protected. As so, bounded with the high levels of perceived usefulness of these systems, this finding suggests that, as these tools become more adopted, customers will seek to interact with them.

This study also highlights that customers' perception regarding the quality of the service provided by platforms employing Chatbots, Recommendation Agents, or VTOs is superior when compared with shopping platforms that do not provide these tools, which is ultimately supported by the research of Nguyen et al. (2021). Hence, the present results led to the conclusion that one of the main perceived advantages of AI is that it relies upon its ability to provide an improved service during online shopping.

In sum, customers from the study believe that the usage of intelligent systems as Chatbots, Recommendation Agents, and VTOs when shopping apparel online can lead towards a more enhanced customer experience. The customer interaction with the brand is facilitated as well as the access to relevant information and increased personalization, which can ultimately affect the client's purchase intention. In particular, through this investigation, the authors were able to conclude that the main impact of AI under the context of online shopping is that it makes it easier to shop online, removing some of the perceived barriers found in the Literature Review as the inability to experiment the product or to receive the necessary assistance when shopping online (Katawetawaraks & Wang, 2011).

5.2 What is the current level of AI adoption in Portugal? Are Portuguese Brands willing to adopt AI tools in order to improve the customer experience in e-commerce?

The present study unveiled that both consumers and brands foresee several benefits of using AI-enabled tools in e-commerce. Despite the fact that AI adoption is still at an early stage among Portuguese brands, consumers are already interacting with AI during their shopping experiences. As so, the majority of brands interviewed are willing to adopt tools such as Chatbots, VTOs, and

Recommendation Agents to enhance the consumer experience in an online context, considering it a competitive need in the long term.

Portuguese brands also perceived that AI tools provide several benefits to consumers shopping online, namely the increased access to information, improved customer service delivered, as well as the greater personalization and interaction that customers can access through AI. Ultimately, when comparing these findings with the ones from the first methodology, the perception of Portuguese brands is in line with the value perceived by consumers regarding the impact of AI in shopping online. The interviewed brands also believe that the usage of Chatbots, Recommendation Agents, and VTOs can influence the purchase intention of consumers, by overall improving their experience through an increased engagement of the customer and greater information availability.

On the other hand, neither customers nor brands perceived the use of AI tools enabled an enhanced feeling of social contact during the shopping experience. This goes against the findings of Dandörfer (2019) which confirmed that the impact of chatbots enhanced the feeling of social presence in e-commerce. One explanation for this may be that, in the case of the customers interviewed, shopping online is not the method of choice for purchasing goods. As so, Portuguese customers may still be more directed towards hedonic values of e-commerce, which in turn, make customers prefer the physical contact of a human assistant.

Even though AI tools will still be able to provide them with the value customers are seeking, for instance, through facilitating the shopping process, allowing for convenience and greater access to information, this may not replace some of the attributes felt during an in-store purchase experience. As a result, this will not only affect the way customers perceive social value through AI, but also influence the perception of brands which are likely to perceive that their customers may not feel that AI tools are able to replace human contact. As a result, brands did not perceive as a barrier to the adoption of AI, the fear of their being replaced by a technology, which differs from previous studies in this field (Aarstad & Saidl, 2019; MacGregor & Kartiwi, 2010).

Nonetheless, it was possible to confirm that brands experience several concerns in regard to the security and privacy of their customers when using AI tools, which ultimately complements the current literature available in this matter. These same concerns were not perceived by the participants interviewed in the first methodology presented in this dissertation, which suggests that customers are willing to use these tools despite potential privacy concerns. Hence, this shouldn't be seen as a barrier by firms seeking to adopt AI.

Other barriers were perceived during this study, as the high implementation costs could somehow jeopardize their ability to adopt AI. These findings go in line with previous research in this area (Aarstad & Saidl, 2019; MacGregor & Kartiwi, 2010). On a more positive note, despite these

perceived barriers to the adoption of AI, the majority of respondents still felt willing to implement AI tools in their e-commerce platforms, as a way to enhance the online customer experience.

In sum, the brands enquired in this study perceived several advantages to the adoption of AI which can ultimately surpass potential barriers and lead to its adoption. Particularly, the majority of brands have expressed an interest in adopting AI tools to enhance the experience provided to their customers. A strong perception regarding the impact of these tools in enhancing the customer experience was also found.

As far as the authors are concerned, no similar study has been taken with retail Portuguese brands regarding their awareness of AI. As it is widely argued that adopting AI will soon become a need for companies to remain competitive, the present investigation has not only allowed to address a research gap, but also opened the way for further investigation in this issue.

Conclusion

The aim of this investigation was to explore the impact of AI technology on the customer shopping experience and how this could contribute to an increased purchase intention. To analyse the problem statement, two cross-sectional quantitative online surveys were conducted to gain insights regarding both corporate and customer perspectives of the perceived value of AI. This chapter aims at presenting and discussing the main findings of the study, drawing upon final conclusions.

In order to understand the potential role of AI in the field of online shopping, three AI technologies were selected considering the scientific findings highlighted in the bibliographic review of the present dissertation (Hoyer et al., 2020; Song et al., 2019): Chatbots (using NLP), Recommendation Agents (using ML) and Virtual Try-On Systems (using CV). Following a two-step approach, analysing both the current interaction of Portuguese consumers and brands with these systems as well as the perceived value of the impact of using tools when shopping online; this investigation was able to develop a more profound understanding of the topics related to the influence of AI on the online experience, ultimately contributing with empirical evidence to this field. Hence, it becomes relevant to analyse and compare the results from different targets, as both can ultimately influence the future adoption of AI.

Overall, the current research was able to evidence that, even though the current usage and application of AI tools are still at an early stage, both customers and brands perceive value from these technologies in four overall factors that increase the online experience of the customer: AI interaction results in increased entertainment value for the customer, whilst delivering greater levels of personalization, increasing the access to information and providing an online customer service with enhanced quality. These findings are ultimately in line with previous research (Schrotenboer, 2019; Hoyer et al., 2020; Przegalinska et al., 2019; Zhang et al., 2019).

Within the three technologies selected for this study, customers have already interacted the most with Recommendation Agents. Likewise, this was also the most employed technology by Portuguese brands operating with e-commerce. Some of the perceived advantages of Recommendation Agents in which both brands' and consumers' expectations were aligned, included the fact that both targets consider this tool to be efficient in facilitating product search, ultimately supporting previous findings (Roudposhti et al., 2018).

However, whereas the majority of Portuguese Firms that responded to the survey indicated that they believe Recommendation Agents allowed customers to form an opinion regarding the product more easily; the majority of customers did not perceive this tool as facilitating upon this matter. According to customers' view, Chatbots proved to be more efficient in helping them establish an opinion regarding the product, since they allow to quickly access relevant information regarding its characteristics, whereas Recommendation Agents enabled customers to quickly grasp products that

match their preferences. Nevertheless, both customers and brands believe the use of Recommendation Agents can augment the purchase intention of the customer, making them feel more assured and confident regarding their purchase decision.

Chatbots were the second most used and employed tool by Portuguese consumers and brands, respectively. Despite not having the same popularity as Recommendation Agents, they are considered useful by both subjects in the study. Particularly, both customers and brands believe that chatbots can facilitate the communication of problems within the online shopping context, enabling a more personalized and enhanced customer service as well as increasing the interactivity during the purchase experience, which goes in line with previous research taken on this field (Dandörfer, 2019; Hoyer et al., 2020; Song et al., 2019). In addition, the findings suggest that chatbots are perceived to be most useful during pre- and post-transaction stages of the customer journey, particularly enabling greater access to information as well as greater customer support. In comparison, Recommendation Agents are more present during the shopping process, when the customer is suggested other products to buy after he has already selected some others.

From the three technologies being studied, VTO systems are the least used by consumers. In addition, none of the brands that participated in the survey currently employ this tool. This may be explained by the fact that VTOs are currently at the early stages of adoption, ultimately being deployed by large firms, often multinationals, particularly in fields related to fashion (Luce, 2018). Nonetheless, the perceived value of this technology was indisputable. Both customers and brands believe this tool can ultimately surpass some of the uncertainty experienced during online shopping, facilitating the imagination of consumers as well as the experimentation of the product before purchasing (Hoyer et al., 2020). In addition, respondents believed that through VTOS, customers can feel more confident regarding their purchase decision, which can ultimately influence their intention to complete the purchase. This tool can also enhance the experience of the customer by providing increased entertainment value and interactivity, ultimately increasing the hedonic value experienced during shopping, which in turn can lead to customers repeating the shopping task in the future.

Moreover, it was also possible to conclude that both consumers and brands perceive that shopping platforms providing customers with these three technologies provide a superior quality and customer service when compared to those platforms that do not employ these tools, which ultimately contributes to the findings of Nguyen et al., (2021), which claim that AI improves service quality. As a result, the intention to adopt these systems among Portuguese firms was very high, with local brands believing this to be a strategic decision that allows to increase the experience and service provided. Additionally, firms believe these tools will become a competitive need in medium to long term.

However, considering that Portuguese customers are already interacting and perceiving increased value from using AI, it could be argued that, despite the fact that local brands perceive these

tools will become important in a medium to long term scenario, perhaps a more urgent approach should be considered, to secure they remain competitive.

In sum, this research allowed to determine that the industry of online retail can benefit from the development of AI systems in order to improve the customer experience. In turn, these technologies will increase customer interaction with the brand and satisfaction during the customer journey, ultimately influencing the intention to purchase. Being an emerging field, it is expectable that the impact of these technologies will increase in the next few years.

Nevertheless, despite the fact that this dissertation has clearly outlined a relationship between AI, OCE and Purchase Intention, contributing with empirical evidence to this field, it is also relevant to analyse both limitations and implications of the present study. In regard to limitations, it is important to note that a cross-sectional study was applied. Considering the field of AI is in constant development, this approach can ultimately limit the ability to form causal links between variables. In addition, this research focused on a particular context, Portugal, which also limits the possibilities of generalising perception for a wider population.

Moreover, despite the high number of responses ($n=270$) in the first survey, a limitation to the study is inherent to the fact that a convenience sample was used which constraints the ability to generalize results, since the sample is not representative of a population neither randomly obtained (Sampieri, 2014). In regard to the second questionnaire, a limited sample was obtained which ultimately compromise the ability to make significant statistical inferences.

As so, concerning external validity, it is not possible to generalize results since these are not representative of a wider population. Although this study managed to reinforce some of the existing theories concerning the impact of AI on the OCE and Purchase Intention, the present dissertation should be seen as an exploratory study which cannot be generalized or representative.

Finally, it is important to consider that AI is a technology still in current development. In the next few years, not only is this technology expected to improve but also to become more used, which will ultimately impact the perception of customers and its possibilities. Hence, the field of OCE will still be greatly impacted by AI, which will surely give rise to new studies and possibilities. As so, interesting to compare the findings of future studies with this current one, allowing to assess how the difference in time frames and adoption levels have impacted the perception of customers regarding AI. Moreover, the authors believe it would be interesting to extend this study to other countries where it would be possible to analyse the difference in mentality and consumer behaviour between different cultures. Furthermore, a corporate study could be developed, for instance, taking into consideration firms operating in different industries.

To conclude, the impact of AI on the customer experience offers opportunities for further empirical research. In light of the significant increase in AI-embedded technologies, it is hoped that

this present research can encourage further managerial studies in this field, in a field that is likely to become increasingly important.

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Appendixes

Appendix A – Survey

O Impacto de Sistemas Inteligentes na Experiência do Consumidor em E-Commerce

O presente questionário integra o projeto de investigação final no âmbito do mestrado em Gestão de Empresas realizado na ISCTE Business School. O mesmo tem como objetivo avaliar a perceção do consumidor, quanto ao impacto da utilização de sistemas inteligentes para a melhoria da sua experiência em e-commerce (comércio online).

Ao longo do questionário são apresentadas definições que o poderão ajudar a compreender melhor a função de cada sistema inteligente. Mesmo que não tenha ainda utilizado algumas destas ferramentas, peço que responda às questões colocadas de acordo com a sua perceção quanto ao impacto que as mesmas poderão ter na sua experiência como consumidor.

Agradeço desde já toda a disponibilidade e reforço ainda que todas as questões serão tratadas anonimamente. Em caso de dúvida, peço que entre em contacto comigo através do email ibfpc@iscte-iul.pt.

I- Informação sobre o inquirido e hábitos de consumo online

1. Por favor, indique a sua idade.

- ☐ 18 – 25
- ☐ 26 – 35
- ☐ 36 – 50
- ☐ > 50

2. Por favor, indique o seu género.

- ☐ Masculino
- ☐ Feminino

3. Já fez compras online?

- ☐ Sim
- ☐ Não

4. Se sim, com que regularidade faz compras online?

- ☐ Regularmente, comprar online é o meu método de eleição
- ☐ Com alguma regularidade
- ☐ Raramente
- ☐ Apenas quando estritamente necessário

II- Interação com Chatbots

Agente virtual, também conhecido como Chatbot, é um software de conversação que permite ao consumidor interagir com um agente virtual em tempo real, obtendo respostas às suas questões de forma rápida e assertiva. Por exemplo: nas plataformas de e-commerce que utilizam Chatbots, é costume aparecer uma janela a perguntar ao consumidor se necessita de ajuda. O consumidor poderá

então iniciar uma conversa com um agente virtual, em que pode colocar questões, expor problemas, etc.

1. Já Utilizou Chatbots nas suas compras em e-commerce?

- ☐ Sim
☐ Não

2. Por favor, selecione a resposta que mais se adequa à sua percepção desta tecnologia, considerando 1 como "Não concordo" e 7 como "Concordo plenamente".

	1 (Discordo plenamente))	2	3	4	5	6	7 (Concordo plenamente)
A utilização de Chatbots facilita a pesquisa de produtos na plataforma, reduzindo as dificuldades de comprar online							
A utilização de Chatbots torna a minha experiência a comprar online mais interativa							
Interagir e receber suporte de Chatbots influencia a minha decisão de compra							
Através da interação com Chatbots, tenho acesso a uma experiência mais personalizada							
Ao interagir com Chatbots, tenho acesso a um serviço online de apoio ao cliente de maior qualidade, em relação a outras plataformas que não utilizem as mesmas							
A utilização de Chatbots torna a comunicação de problemas mais fácil							
A utilização de Chatbots ajuda-me a estabelecer uma opinião acerca do produto mais facilmente							
A utilização de Chatbots permite-me aceder a informação relevante acerca do produto (como detalhes do produto, métodos de pagamento, política de devolução, métodos de envio, etc.)							

Ao interagir com Chatbots, sinto-me mais confiante acerca da minha decisão de compra:							
Considero que existe uma sensação de contacto humano na interação com Chatbots:							
Considero que os Chatbots são fáceis e intuitivos de utilizar:							
A presença de Chatbots em e-commerce pressupõe uma qualidade superior da plataforma, em comparação com outras plataformas que não utilizem esta ferramenta							
Sinto que posso confiar em Chatbots, uma vez que os meus dados e privacidade estão protegidos:							
Considero que a utilização de Chatbots pode melhorar a minha experiência a comprar online							

III- Interação com Agentes de Recomendação

Sistemas de Recomendação representa uma tecnologia de Machine Learning que permite à plataforma de e-commerce recomendar outros produtos que o consumidor poderá gostar, com base na sua informação e historial de compras, permitindo ao consumidor encontrar produtos que estejam à procura de forma fácil.

Por exemplo: nas plataformas de e-commerce que utilizam Sistemas de Recomendação, é frequente encontrar sugestões de outros produtos que o consumidor possa gostar, com base naquele que acabou de visualizar ou com base nas escolhas de outros consumidores que também visualizaram o mesmo produto. Em alguns casos, o próprio sistema inteligente envia e-mails aos subscritores a sugerir a compra de determinado produto, com base nas recentes aquisições do consumidor.

1. Já utilizou sistemas de recomendação?

- ☐ Sim
☐ Não

2. Por favor, selecione a resposta que mais se adequa à sua perceção desta tecnologia, considerando 1 como "Não concordo" e 7 como "Concordo plenamente".

1 (Discordo plenamente))	2	3	4	5	6	7 (Concordo plenamente)
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A utilização de Sistemas de Recomendação facilita a pesquisa de produtos na plataforma, reduzindo as dificuldades de comprar online:						
A utilização de Sistemas de Recomendação torna a minha experiência a comprar online mais interativa:						
Os Sistemas de Recomendação influenciam a minha decisão de compra, uma vez que me permitem descobrir novos produtos						
A utilização de Sistemas de Recomendação permitem-me ter uma experiência mais personalizada:						
Ao interagir com Sistemas de Recomendação, tenho acesso a um serviço online de apoio ao cliente de maior qualidade, em relação a outras plataformas que não utilizem as mesmas						
A utilização de Agentes de Recomendação permite-me estabelecer uma opinião acerca do produto mais rapidamente						
Considero que as sugestões de produto providenciadas por Sistemas de Recomendação são relevantes e adequadas						
Ao comprar produtos sugeridos pelos Sistemas de Recomendação, sinto-me mais confiante relativamente à minha decisão de compra						
A presença de Sistemas de Recomendação em e-commerce pressupõe uma qualidade superior da plataforma, em comparação com outras plataformas que não utilizem esta ferramenta:						

Sinto que posso confiar em Sistemas de Recomendação, uma vez que os meus dados e privacidade estão protegidos:							
Considero que a utilização de Agentes de Recomendação pode melhorar a minha experiência a comprar online							

IV- Interação com VTOs

A sigla inglesa de Virtual Try-On (VTO), consiste numa ferramenta de Inteligência Artificial que utiliza visão a 3D de modo a permitir que o consumidor possa experimentar o produto que deseja comprar na plataforma online. Apesar desta ser uma tecnologia ainda pouco adotada no comércio online, crê-se que o seu crescimento e popularidade virá a aumentar. Por exemplo, esta tecnologia permite ao consumidor experimentar produtos como roupa, óculos, maquilhagem, através de uma câmara.

1. Já utilizou VTOs

- ☐ Sim
- ☐ Não

2. Por favor, selecione a resposta que mais se adequa à sua perceção desta tecnologia, considerando 1 como "Não concordo" e 7 como "Concordo plenamente".

	1 (Discordo plenamente))	2	3	4	5	6	7 (Concordo plenamente)
A utilização de VTOs diminui os entraves de fazer compras online, ao me permitir experimentar o produto virtualmente, antes de realizar a compra							
A utilização de VTOs torna a minha experiência a comprar online mais interativa:							
Ao testar o produto através de um sistema VTO, sinto-me mais confiante relativamente à minha decisão de compra							
Ao utilizar um sistema VTO, sinto que estou a receber um serviço personalizado							
Ao interagir com VTOs, tenho acesso a um serviço online de							

apoio ao cliente de maior qualidade, em relação a outras plataformas que não utilizem as mesmas:							
Os sistemas de VTO aumentam a conveniência de comprar online ao me permitirem experimentar o produto no meu próprio tempo e espaço							
Ao utilizar VTOs consigo estabelecer uma opinião acerca do produto mais rapidamente							
A utilização de Sistemas VTO permite-me avaliar a qualidade do produto e se me fica bem							
A utilização VTOs influencia minha decisão de compra							
A utilização de VTOs faz com que seja mais fácil avaliar o produto							
Os sistemas VTO são fáceis e intuitivos de utilizar:							
A presença de VTOs em e-commerce pressupõe uma qualidade superior da plataforma, em comparação com outras que não utilizem esta ferramenta:							
Sinto que posso confiar em VTOs, uma vez que os meus dados e privacidade estão protegidos:							
Considero que a utilização de VTOs pode melhorar a minha experiência a comprar online							

Appendix B – Survey 2

A Perceção das Empresas Portuguesas quanto ao Impacto de Sistemas Inteligentes na Experiência do Consumidor em E-Commerce

O presente questionário, integra o projeto de investigação final no âmbito do mestrado em Gestão de Empresas realizado na ISCTE Business School.

O mesmo tem como objetivo avaliar a perceção das Empresas Portuguesas quanto ao impacto da utilização de sistemas inteligentes para a melhoria da experiência do consumidor em e-commerce (comércio online). Este questionário procura ainda aferir a intenção das Empresas Portuguesas quanto à implementação e utilização destes sistemas, bem como determinar possíveis barreiras à adoção das mesmas.

Ao longo do questionário são apresentadas definições dos diferentes sistemas inteligentes abordados. O questionário tem como objetivo aferir a perceção das Empresas portuguesas com base no conhecimento e perceção que têm acerca destas ferramentas. Deste modo, mesmo que não tenha ainda sido utilizado algumas destas ferramentas na sua empresa, peço que responda às questões colocadas de acordo com a sua perceção quanto ao impacto que as mesmas poderão ter na sua experiência do consumidor na sua plataforma de e-commerce.

Agradeço desde já toda a disponibilidade e reforço ainda que todas as questões serão tratadas anonimamente. Em caso de dúvida, peço que entre em contacto comigo através do email ibfpc@iscte-iul.pt.

I- Informações acerca da Empresa

1. Por favor a área de atividade da sua empresa
2. Quais as características da sua empresa?
 - ☐ A minha empresa emprega menos de 10 pessoas, e tem um volume de negócios anual ou balanço total anual inferior a 2 milhões de euros.^{36 – 50}
 - ☐ > minha empresa emprega menos de 50 pessoas e tem um volume de negócios anual ou balanço total anual inferior a 10 milhões de euros.
 - ☐ A minha empresa emprega menos de 250 pessoas e tem um volume de negócios anual ou balanço total anual inferior a 43 milhões de euros
 - ☐ A minha empresa emprega mais de 250 pessoas e tem um volume de negócios anual ou balanço total anual superior a 43 milhões de euros
3. Utiliza o e-commerce como canal de vendas da sua empresa?
 - ☐ Sim

☐ Não

II- Chatbots: percepção da Empresa quanto ao impacto desta ferramenta na experiência do consumidor em e-commerce

Agente virtual, também conhecido como Chatbot, é um software de conversação que permite ao consumidor interagir com um agente virtual em tempo real, obtendo respostas às suas questões de forma rápida e assertiva. Por exemplo: nas plataformas de e-commerce que utilizam Chatbots, é costume aparecer uma janela a perguntar ao consumidor se necessita de ajuda. O consumidor poderá então iniciar uma conversa com um agente virtual, em que pode colocar questões, expor problemas, etc.

1. Por favor, selecione a resposta que mais se adequa à sua percepção desta tecnologia, considerando 1 como "Não concordo" e 7 como "Concordo plenamente".

	1 (Discordo plenamente))	2	3	4	5	6	7 (Concordo plenamente)
Chatbots eliminam as barreiras de comprar online, ao permitir ao consumidor interagir com a loja e obter suporte							
A utilização de Chatbots permite ao consumidor estabelecer uma opinião à cerca do produto mais facilmente							
A utilização de Chatbots torna a experiência do consumidor a comprar online mais interativa							
A utilização de Chatbots permite ao consumidor ter uma experiência mais personalizada							
Ao interagir com Chatbots, o consumidor tem acesso a um serviço online de qualidade superior, em relação a outras							

plataformas que não utilizem a mesma ferramenta							
A utilização de Chatbots permite ao consumidor comunicar problemas mais facilmente							
A interação e suporte recebidos pelos Chatbots influenciam a decisão de compra do consumidor							
A utilização de Chatbots permite ao consumidor ter acesso a informação relevante acerca do produto, como detalhes, políticas de devolução, informação à cerca do envio, métodos de pagamento, etc.							
A utilização de Chatbots permite ao consumidor sentir-se mais confiante relativamente à sua decisão de compra							
Ao interagir com Chatbots, o consumidor tem uma maior sensação de contato humano na plataforma de e-commerce							
A presença de Chatbots faz com que a percepção do consumidor relativamente à qualidade da plataforma, e subsequentemente à qualidade da marca, seja superior							

2. Utiliza atualmente Chatbots na sua plataforma de e-commerce?

- ☐ Sim
- ☐ Não

3. Estaria interessado em adotar esta ferramenta?

- ☐ Sim

☐ Não

III- Agentes de Recomendação: percepção da Empresa quanto ao impacto desta ferramenta na experiência do consumidor em e-commerce

Sistemas de Recomendação representa uma tecnologia de Machine Learning que permite à plataforma de e-commerce recomendar outros produtos que o consumidor poderá gostar, com base na sua informação e historial de compras, permitindo ao consumidor encontrar produtos que estejam à procura de forma fácil.

Por exemplo: nas plataformas de e-commerce que utilizam Sistemas de Recomendação, é frequente encontrar sugestões de outros produtos que o consumidor possa gostar, com base naquele que acabou de visualizar ou com base nas escolhas de outros consumidores que também visualizaram o mesmo produto. Em alguns casos, o próprio sistema inteligente envia e-mails aos subscritores a sugerir a compra de determinado produto, com base nas recentes aquisições do consumidor.

1. Por favor, selecione a resposta que mais se adequa à sua percepção desta tecnologia, considerando 1 como "Não concordo" e 7 como "Concordo plenamente".

	1 (Discordo plenamente))	2	3	4	5	6	7 (Concordo plenamente)
Os Agentes de Recomendação eliminam as barreiras de fazer compras online ao permitir ao consumidor ter acesso a recomendações de produtos relevantes e adequadas							
A utilização de Agentes de Recomendação permite ao consumidor estabelecer uma opinião à cerca do produto mais facilmente							
A utilização de Agentes de Recomendação facilita a pesquisa de produtos por parte do consumidor							
A interação com Agentes de Recomendação torna a							

experiência do consumidor a comprar online mais interativa							
A utilização de Agentes de Recomendação permite ao consumidor ter uma experiência mais personalizada							
Ao interagir com Agentes de Recomendação, o consumidor tem acesso a um serviço online de qualidade superior, em relação a outras plataformas que não utilizem as mesmas							
A interação com Agentes de Recomendação influencia a decisão de compra do consumidor:							
A interação com Agentes de Recomendação permite ao consumidor aceder a dados relevantes acerca dos produtos							
A utilização de Agentes de Recomendação permite ao consumidor sentir-se mais confiante com a sua decisão de compra							
A presença de Agentes de Recomendação faz com que a percepção do consumidor relativamente à qualidade da plataforma, e subsequentemente à qualidade marca, seja superior							
Esta ferramenta permite ao consumidor sentir-se seguro quanto à proteção dos seus dados e privacidade							

2. Utiliza atualmente Agentes de Recomendação na sua plataforma de e-commerce?

☐ Sim

☐ Não

3. Estaria interessado em adotar esta ferramenta?

☐ Sim

☐ Não

IV- Virtual Try On's: percepção da Empresa quanto ao impacto desta ferramenta na experiência do consumidor em e-commerce

A sigla inglesa de Virtual Try-On (VTO), consiste numa ferramenta de Inteligência Artificial que utiliza visão a 3D de modo a permitir que o consumidor possa experimentar o produto que deseja comprar na plataforma online. Apesar desta ser uma tecnologia ainda pouco adotada no comércio online, crê-se que o seu crescimento e popularidade virá a aumentar. Por exemplo, esta tecnologia permite ao consumidor experimentar produtos como roupa, óculos, maquilhagem, através de uma câmara.

1. Por favor, selecione a resposta que mais se adequa à sua percepção desta tecnologia, considerando 1 como "Não concordo" e 7 como "Concordo plenamente".

	1 (Discordo plenamente))	2	3	4	5	6	7 (Concordo plenamente)
VTOs eliminam as barreiras de fazer compras online, ao permitir ao consumidor experimentar o produto online							
A utilização de VTOs permite ao consumidor estabelecer uma opinião à cerca do produto mais facilmente							
Ao utilizar VTOs, o consumidor consegue avaliar se o produto corresponde ao que procura, e se lhe fica bem							

A utilização de VTOs tornam a experiência do consumidor a comprar online mais interativa							
A utilização de VTOs permite ao consumidor ter uma experiência mais personalizada							
Ao interagir com VTOs, o consumidor tem acesso a um serviço online de qualidade superior, em relação a outras plataformas que não utilizem as mesmas							
A interação com VTOs influencia a decisão de compra do consumidor:							
A utilização de VTOS permite ao consumidor sentir-se mais confiante relativamente à sua decisão de compra							
VTOs são ferramentas fáceis e intuitivas de utilizar							
VTOs tornam a avaliação do produto num contexto online mais fácil para o consumidor:							
A presença de VTOs faz com que a perceção do consumidor relativamente à qualidade da plataforma de e-commerce, e subsequentemente à qualidade marca, seja superior.							
Esta ferramenta permite ao consumidor sentir-se seguro quanto à proteção dos seus dados e privacidade							

2. Utiliza atualmente VTOs na sua plataforma de e-commerce?

- ☐ Sim
- ☐ Não

3. Estaria interessado em adotar esta ferramenta?

- ☐ Sim
- ☐ Não

V- Barreiras à implementação de Sistemas Inteligentes?

Nesta parte do estudo, gostaríamos de aferir que tipo de barreiras a sua empresa antevê, ou experienciou, à implementação deste tipo de ferramentas

Por favor, selecione a resposta que mais se adequa à sua percepção desta tecnologia, considerando 1 como "Não concordo" e 7 como "Concordo plenamente".

	1 (Discordo plenamente))	2	3	4	5	6	7 (Concordo plenamente)
Elevados custos de implementação							
ROI insuficiente							
Existe receio por parte dos meus colaboradores à adoção deste tipo de ferramentas							
A estratégia da minha empresa foca-se num modelo de negócio tradicional							
Considero que os meus clientes não estão prontos/ interessados em utilizar estas tecnologias							
Considero que possam existir lacunas relacionadas com a							

segurança e restrições legais deste tipo de ferramentas							
Considero que a minha empresa tem falta de conhecimento de IT para adquirir estas ferramentas							

VI- Conclusões Finais

1. Considero que ferramentas como Chatbots, Agentes de Recomendações e VTOs potenciam a experiência do consumidor ao comprar online:
 - 1- Discordo Plenamente
 - 2- Concordo Plenamente
2. Considero a adoção destas ferramentas como uma necessidade competitiva a curto prazo:
 1. Discordo Plenamente
 2. Concordo Plenamente
3. Considero a adoção destas ferramentas como uma necessidade competitiva a médio-longo prazo
 1. Discordo Plenamente
 2. Concordo Plenamente
4. Estou disponível para adotar ferramentas como Chatbots, VTOs e Agentes de Recomendação, com o intuito de aumentar a experiência do consumidor num contexto online
 1. Discordo Plenamente
 2. Concordo Plenamente
5. Por favor, indique qual a ferramenta que teria maior interesse em adotar:
 - ☐ Chatbots
 - ☐ Agentes de Recomendação
 - ☐ VTOs