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The impact of Social Virtual Presence Agents and Content-Based Product Recommendation System on On-Line Customer Purchase Intention.

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Master in, *Management of Services and Technology*

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Acknowldgements

The development of this dissertation is the result of several months of work and a sense of motivation and passion, towards the theme and technology importance perception in today's society. The new COVID-19 was a big obstacle and made the first planned research to be restructured into an on-line based experiment. Nevertheless, such project only was possible thanks to different people from different background, to whom I would like to express my gratitude.

First, to my father, mother and brother that provide unconditional support in all project stages and thought me the importance of responsibility and appreciation.

Secondly, to both my supervisors, for their guidance and valuable inputs. To professor João Guerreiro, who challenged me and was always available to support and help in any occasion. To professor Rita Jerónimo, who provided extreme respected experience on the different matters and made the all dissertation project path more smoothly.

Thirdly, a special thanks to Sofia Frade from LAPSO Iscte, who before the COVID-19 hit, shared her knowledge, experience and made my presence possible in several relevant workshops and seminars.

Furthermore, Pedro Romano, to contribute with his knowledge on web development and taking all my doubts regarding the platform coding.

Finally, a big thank to my girlfriend and to the 673 people who took the time to participate in the questionnaire and made this research possible.

I could never say enough to express my gratitude to all of you.

Resumo

Com o aparecimento do mercado on-line, as empresas que quiseram manter uma relação de qualidade com os seus clientes, tiveram de investir no desenvolvimento de uma experiência de utilizador de qualidade e manter um olhar atento na inovação. A falta de estudos relativos à antropomorfização em *chatbots* virtuais e as possibilidades, ainda por descobrir, do sistema de recomendação de produtos à medida de cada utilizador, trouxeram o autor ao tema deste estudo. O seu objetivo é investigar os efeitos de dois tipos de presença social em *chatbots*: uma presença virtual computada versus uma presença virtual humana; e como o sistema de recomendação de produtos à medida de cada utilizador influencia a intenção de compra dos consumidores nas lojas on-line. Para tal, foi desenvolvida uma plataforma on-line, recriando uma possível interação em loja virtual. Os dados foram tratados utilizando o modelo PLS-SEM. Os resultados indicam que a presença social virtual feita por um agente humano melhora substancialmente o estímulo intelectual feito pela marca e os seus benefícios hedónicos, quando comparado com um agente virtual computado. Tal resultado pode ser explicado pelo facto dos participantes que interagiram com um agente computado sentirem um maior valor de *creepiness*. Considerando que a utilização do sistema de recomendação de produtos tem forte impacto na intenção de comprar do consumidor, este estudo mostra-se relevante ao salientar a importância da presença social nas lojas on-line, especialmente quando o agente é humano.

Keywords: Inteligência Artificial; Presença Social Virtual; Compras On-line; Sistemas de Recomendação; Marketing Relacional; Intenção de Compra.

JEL Classification: (M31) Marketing; (L81) Retail and Wholesale Trade, E-Commerce

Abstract

The appearance of the digital market came as turning point factor, obligating companies to maintain the relationship with consumers by improving and keeping a high technological innovativeness on-line overall experience. The lack of studies on antropomorphization of virtual voice assistances chatbot and the possibilities, yet to be found, on customized product recommendation system variation integration, brought the author to this study. The aim of this research is to investigate the effects of using two different chatbot social virtual presences interactions: with a fully pre-recorded computed personification agent versus with a pre-recorded human social virtual agent; and also understand how having a customized content-based product recommendation system can influence the consumers purchase intention at on-line shopping framework. An on-line platform was developed, recreating a possible virtual store interaction, and the core data was treated using a PLS-SEM model. The results indicate that Human Social Virtual Presence Agent, while assisting the shoppers, have a larger model positive effect on Intellectual stimulus and Hedonic Benefits than a computed personification Agent. This might be explained by the fact that computed imagery and sound Agent was perceived with some amount of emotional creepiness by the participants. Also, recommendation system presence is impacting customers purchase intention on a positive way when compared with not using recommendation system. Thus, this study shows how relevant social interactions are for the customers, especially when done by a human, and how recommendation system has an impact on customers purchase intention.

Keywords: Artificial Intelligence, Social Virtual Presence, On-line Shopping, Recommendation system, Relationship Marketing, Purchase Intention.

JEL Classification: (M31) Marketing; (L81) Retail and Wholesale Trade, E-Commerce

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List of Abbreviations

AI	Artificial Intelligence
BE	Brand Experience
SVP	Social Virtual Presence
VA	Voice Assistant
S	Sensory
A	Affective
B	Behavioural
I	Intellectual
Pl	Pleasure
Ar	Arousal
Att	Attention
HB	Hedonic Benefit
SB	Symbolic Benefit
UB	Utilitarian Benefit
RQ	Relation Quality
PI	Purchase Intention
CR	Composite Reliability
HTMT	Heterotrait-Monotrait
AVE	Average Variance Extract
VIF	Variance Inflation Factor
AA	Attachment-Aversion
RS	Recommendation System

1.   Introduction

During the different Ages, the survival of companies and how they can attract and retain customer attention depends on how easy they can adapt to innovation (Gilbert, 2003). The Technological Age brought several concerns and a need of fast adaptation by the different identities, demanding a supply chain improvement and reworking, from product production to customer brand perception (Weber & Schütte, 2019). While developing a Technological innovativeness timeline, Artificial Intelligence takes an important role by being the biggest innovativeness source for the twenty-one century (Bughin et al., 2017). In 2016 this digital wave took up to 39 B$ investment with around 77% coming from tech giants (Bughin et al., 2017). It has countless application on different sectors such as Automotive, Financial Services, Travel and Tourism, Education, Health Care, Media/Entertainment, Retail and much more (Bughin et al., 2017; Jarek & Mazurek, 2019). Weber & Schütte (2019) claim that top retailers use Artificial Intelligence mainly for prediction purpose (80% of the retailers) while keeping aside problems such as rankings, clustering, recommendations and classification. According with Berger (2016) the market to robots designed for retailing will increase from $19 billion in 2015 to $52 billion in 2025. This growing prediction of the market rely on the applications and potential of the technology. Is a technology that provide a more financial and social insurance over the ability to detect errors and provide facts and figures (Davenport et al., 2019; Weber & Schütte, 2019).

Retail sector is especially taking attention to chatbot integration with Artificial Intelligence technology (Burgoon et al., 2000; Shankar, 2018). Chatbot is defined by Oxford English Dictionary as a computer software developed to stimulate conversation with human users, usually through the internet. Such presence allowed the reinforcement and reshaping of the sector providing the ability for all intervenient to benefit on collecting and managing user's data, achieve higher degree of user experience and service delivery quality, and improve the relationship with customers (Shankar, 2018). As chatbots are integrated, other technologies came to enrich the on-line shopping experience and fill a necessary gap of information overload, such as the recommendation system (Kim & Johnson, 2016; Pazzani & Billsus, 2007). These systems provide a more user-friendly experience on search and can guide on-line customers' expectations according with information given or collected (Han & Karypis, 2005).

The COVID-19 pandemic period made consumers think on more existential questions and rethink their interactions and experiences, making business consider new engagement approaches that show more of their humanistic side and integrate human characteristics (Anthropomorphization), for example through chatbots technology (Karpen & Conduit, 2020). Existing literature extensively study the importance of Anthropomorphic characteristic presence on retail (Chérif & Lemoine, 2019). Despite those studies, little research is known on the representation of those characteristic on a voice assistance agent and the impact that voice and imagery personification can have in a human/computer environment (Chérif & Lemoine, 2019). Such personality association integrated with facial expression and visual imagery are important on motivating social interaction and improve interpersonal relations in an on-line context (Bartneck, 2001). The idea of having a virtual assistance orally dialoguing with customers might help to overcome impersonal expressions that is known on commercial websites (Holzwarth et al., 2006). This personal touch and personification of a computer and the presence of Artificial Intelligence with sound and visual expression might unleash a positive outcome on brand trust and influence the decision making path (Bartneck, 2001; Chérif & Lemoine, 2019). The same happens with recommendation systems, where the literature is abundant regarding the assessment of specifically collaborative filtering approach, which uses data from similar users to predict possible recommendation queries to the user (Han & Karypis, 2005; Walek & Spackova, 2018). This system is the most used and studied since it provides a fast and almost undetectable way of collecting and delivering information (Shih & Liu, 2008). Despite of a well-done job on collaborative-filtering studies, another technique used for recommendation systems is content-based filtering, which lacks research about the impact of user customization by content-based filtering recommendation system and their decision making while shopping on-line, using an intelligent agent that treats data from users feedback (Pazzani & Billsus, 2007; Walek & Spackova, 2018). In this perspective, this study proposes to investigate the effect of the chatbot personification and customized content-based recommendation system on on-line shopping customer decision making.

The aim of this research is to examine the effects on how consumers react and act when interacting with social chatbot presence while shopping on-line, and how Customized Content-Based Recommendation Systems can improve a positive final decision making of buying a product. With this study we intend to enrich chatbot and customized content-based recommend system literature within marketing context. More specifically, the experiment will analyse consumers responses to a certain on-line based brand experience stimulus and their level of

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relation quality and purchase intention. Although the social presence and recommendation systems fields have already been studied in a context of human/computer interaction, where they could significantly impact how consumers shop (Holzwarth et al., 2006), the topic needs to be addressed and consent a space for possible future researches.

Through this study, the author proposes to test the influence of two types of chatbots virtual assistant (VA) personifications on an on-line shopping environment and the impacts on customers purchase intention. Two types of social virtual presence agents are used: a pre-recorded Artificial Intelligence agent chatbot with a fictitious avatar imagery and voice assistance and a pre-recorded human-like agent from an actual human. In this same research, the author also tests if the presence of a user customization content-based recommendation system has any relevant positive or negative impact on customers purchase intention.

The current dissertation has as main objectives the study of humanization and computed anthropomorphic characteristics on voice assistance role, as a social virtual presence, and to understand the impact, on customers purchase intention, of implementing a Customized Content-Based Recommendation Systems at on-line shopping platform. This can be done with the study of cognitive and emotional responses and benefits on consumers interactions and lastly explore their purchase intention reaction.

The present dissertation is structured in 8 main chapters. Chapter 1 presents the research background and the study's main objectives; Chapter 2 disclose how relationship marketing and chatbots are relevant and how they evolve, explain the Social Presence and Recommendation system role; Chapter 3 includes the Stimulus-Organism-Response model framework introduction, concepts definitions and hypotheses formulation; Chapter 4 presents the methodology and the on-line based experiment conducted; Chapter 5 includes statistical analyses, results and conclusions; Finally, Chapters 6, 7 and 8 provide a discussion, managerial implications and future research suggestions.

2.   Literature Review

Having information about the customer needs, motivations, attitude and actions is, nowadays, the way for companies to keep competitive over a so complex system in capturing customer attention. Companies goals are not just persuading people to buy their products sporadically, but to create an experience in each decision making moment, being a consumer-oriented organization (Hunt & Hunt, 2016; Mihart, 2012). Providing to the customers satisfaction before, during and after consumption, trying to influence each part of the sale pipeline and provide retention solutions (Mihart, 2012; Padma et al., 2016).

2.1. Relationship Marketing in Digital Era

Relations matter when keeping a direct contact with mind and emotions of consumers. Such a strong "weapon" has been studied for years to understand how people relate to each other and how to build a strong and healthy, either personal or enterprise, connection (Ling & Yen, 2001; Schaie et al., 2004). For enterprises having the ability to keep a retain customer policy is mandatory to have a financial and time investment in emerging a relation and maintain it. The retention of consumers over a brand is built over a strong connection between intervenient. For example, having one hundred new customers and lose twenty existing customers is better than having one hundred and thirty new customer and lose sixty existing customers (Sheth & Atul Parvatiyar, 2002).

From this idea, the Relationship Marketing concept was created. By definition, the Relationship Marketing is considered the identification and establishment, maintenance and enhancement and, in some specific cases, the end of relationships with customers and other stakeholders in order to meet all parties objectives (Gronroos, 1994). Later, in 2002, the same term appears with a different definition, as being only the attraction, maintenance and in multi-service organizations to enhance customer relationships, claiming the necessity of Relationship Marketing for firm to provide good service (Sheth & Atul Parvatiyar, 2002). Creating such a relation in business, is important since its emergence. Several authors studied it flow and triggers, claiming that this kind of emergence of a relation is divided into 4 stages: Awareness, Initiation, Interaction and Trust, only then relations are born (Koivisto & Karjaluoto, 2018; Mandják et al., 2015).

In the late 70s, researchers started to actively address Relationship Marketing and tried to understand how marketing could develop relations between buyers and sellers, and it impact on consumer retention (Möller & Halinen, 2000). Was noticeable, particularly from Services researchers, that the overall experience and customer satisfaction are directly connected with the outcome from the intervenient interaction, this could be from marketing communication, brand imagery or service delivery technology (Möller & Halinen, 2000). Also, the investment done in relations builds customer brand loyalty, favourably affecting the attitudes towards a brand that ends with the repetition behaviour habit of buying a brand product (Keller, 1972). Brand loyalty is strictly connected with brand engagement and likelihood to buy a product, both concepts appear every time side by side, persuading the way customer decide.

As the studies keep appearing, in the mid-80s, companies started to focus on retrieving consumers data and apply an information technology approach on marketing fields, trying to influence the cognitive rational process of decision with offline relations, based on face-to-face encounters, verbal interactions or written contacts (Möller & Halinen, 2000; Steinhoff et al., 2019a; Thunholm, 2004). Allowing several advantages such as marketing costs reduction; business scale up; new customers attraction and communication between consumers. Such benefits happen mainly because of more action time and answer to competitive threats (Aaker, 1996). During this period, Fournier (1998), verified that brands started to be addressed like humans and can translate feelings and thoughts as a person would, taking a crucial role on relationship connection investigation. Such concept appears as anthropomorphization of the brand.

In late 90s and all twenty-one century until today, Relationship Marketing needed an energised change regarding the appearance of on-line relations, which by definitions is the relation with internet technology mediation in a human/technology environment (Steinhoff et al., 2019a). Until here people were used to have only offline relations, and now are continuously being exposed to hybrid relations, which englobe both, on-line and offline relations (Steinhoff et al., 2019a). The address of on-line relations was important with the regular use of on-line retailers that, for Kacen et al. (2013), is the selling of goods and services throughout internet, extranet, electronic data interchange network, electronic mail, or other on-line systems. This brought some advantages when comparing with brick-and-mortar retailers such as timesaving, enhance product search, eliminate the need of store travelling or convenience (Kacen et al., 2013; Szymanski & Hise, 2000), paying all this benefits mainly with the intangibility of products

when searching and the increase of delivery time (Szymanski & Hise, 2000). The new century was a turning point, where location-based marketing, social media interactions and e-commerce communications were more frequent (Steinhoff et al., 2019a). Such innovations allowed an extreme active contact with customers and provided more in deep tools to influence customers decision. This decision are characterized for being explained, interpretable and comes from sense-making of everyone (Shrestha et al., 2019). Also, the human capacity does not allow to evaluate a large set of alternatives, decide with accuracy and speed at the same time, being a fragility harnessed by firms (Shrestha et al., 2019). This high technological integration started to impact the capacity of decision by the customers with subliminal level messages, either in language or through visual techniques (Danciu, 2014). At the time, this newly studied concept, question the capacity of free choice when deciding and it presence is not a defined and specific, making the justice and regulations difficult to judge the influencer intention (Danciu, 2014).

As the technology evolve and the urge of service automation appears, since 2010, Artificial Intelligence and Augmented Reality took a crucial role on firm's relation maintenance by dehumanizing the frontline services, with virtual assistants, chatbots, social virtual agents and augmented reality applications (Steinhoff et al., 2019a). The combination of human and digital technology lead to a new concept of dividualisation (Cluley & Brown, 2015). It is predicted that customers will manage 85% of their relationships with firms without any human interaction (Steinhoff et al., 2019b). This electronic ramification business brought e-loyalty concept (Rafiq et al., 2013). The main importance of this concept relies in brand mentioning (Ferrao & Alturas, 2018). Such customers, that are engaged, according to Brodie et al. (2013) might increase, among other things, their loyalty and satisfaction to the brand. Also, social contact, increasing payment security, overall consumer experience and 24/7 service availability are some of the aspects that motivate the consumer decision and can massively increase connection strength and satisfaction of the consumer, and were some of the areas affected by this decade technological revolution (Katawetawaraks & Wang, 2011).

In this same decade, Park et al. (2013) introduces the Attachment-Aversion (AA) model, approaching relations between consumers and brand on a comprehensive level (Schmitt, 2013). The research includes some of the antromorphization ideas and allow the model to create conditions for the co-existence of cognitive and emotional dimensions, using several psychological dimensions within marketing context (Fournier, 1998; Schmitt, 2013). This connection starts with brand experience stimulation as marketing determinants and the 3E's

addressing the psychological model, building different outcomes for both fields with the objective of a successful customer-brand relation (Schmitt, 2013). As for an extension of the basic AA model, (Schmitt, 2013), uses sensory, affective, behavioural, intellectual and relational experiences as Brand Experience stimulus on Marketing related determinants. As Brand Experience, automation and AI were carefully accessed and studied, companies started to integrate several high-end technological tools to assist shoppers and increase their service quality (Schmitt, 2013; Steinhoff et al., 2019b). One of this tools was chatbots, that registered an exponential growth when integrating it with AI and machine learning technology (Steinhoff et al., 2019b).

2.2. Chatbots and Smart Devices

Chatbot essential principle is to interact with human users and be capable to understand and actively keep a conversational flow level and reply properly (Don et al., 1992; Peters, 2018). Ultimately, the objective is to allow an imperceptible environment of anthropomorphism integration (Don et al., 1992).

Such technology appeared for the first time in 1966 on ELIZA project, providing psychiatric inputs and a well design illusion of real chatting (Peters, 2018). ELIZA could do simple conversational tasks through texts from a computer-based software (Don et al., 1992). This project allowed the initial process of chatbot innovations. Since the implementation of ELIZA, several conversational bots technologies were developed and only in 2001 a huge breakthrough appears, created by ActiveBuddy, Inc. (Peters, 2018), where chatbots were connected to a knowledge data base, providing real time information to the users, such as, weather forecasts or news access. This innovation created a new environment and more accessible way to use chatbots (Peters, 2018).

As companies found the possibilities and benefits of including a chatbot on their services, several companies, in 2010, introduced the virtual assistants. The technology provided the connection between chatbots and Artificial Intelligence agents, that could deliver real time information on different levels. The concept of Artificial Intelligence is by definition the show of human intelligence by machines (Wang & Siau, 2017); is a computer system that can understand the environment, learn and think, and react according to the surroundings and objectives (PwC Belgium & Gondola Group, 2017). The integration of both technologies allows an exponential growth on chatbot usage. Voice Assistances started to came up from different high tech companies, including Google Assistant from Google, Cortana by Microsoft

or Siri by Apple, all of which provide a new form of completing tasks, searching for information, purchasing products or interacting with people and firms, just by dialoguing with a virtual assistant (Mclean & Osei-frimpong, 2019). This unique technology was an innovation since it allows a certain degree of conversational level through dialog. Virtual assistants (VAs) are always listening the surroundings, but only stay active and ready for interaction after hearing the "wake-word" (Mclean & Osei-frimpong, 2019). When hearing the word, the device can start an interaction. McCue (2018) claims that 27% of the global on-line population is using voice search by individual electronics device or cell phones and tablets. The VAs also allows a certain degree of customization with several possible configurations in terms of voice and language (within several boundaries) and be pre-programmed to interact in a certain way according with what the user says and desires.

This technology combination hugely affected the customer decision path, providing 24/7 availability, several recommendations according with the user, efficient solutions for lower level questions, or even an higher degree of anthropomorphism (Davenport et al., 2019; Grewal et al., 2018; Mortimer & Milford, 2018; Weber & Schütte, 2019). Companies started to integrate chatbots on their interactions with clients, through customer assistants and on-line stores facilitators (Davenport et al., 2019). The scaling up brought its limitations and increased concerns from many authors, believing that this new technology might create a revolution and replace jobs in sales and marketing professionals either at on-line or traditional retail stores.

The presence of a more friendly interface that increase relational experience, pleasure, flow and increase the customer trust feeling at on-line stores (Burgoon et al., 2000; Chérif & Lemoine, 2019) feelings were positively affected as the anthropomorphic characteristics increased (Burgoon et al., 2000), contributing to Burgoon et al. (2000)'s recommendation that VAs should englobe specific human characteristics such as voice, gestures and facial expressions. Such improvements on digital world can be seen as extensions of humans capacity (Belk, 2013). Belk (2013), on is updated concept of self-extension, verified that avatars can be an identity anchor and strongly affect the off-line behaviour and sense of self, explaining the powerfulness of this tool and allowing an increasingly perception of memories, facts and feelings when interacting with them. On the other hand, several researches point out that numerous VAs were lacking autonomy and did not meet the customers' expectations, therefore were not satisfactory for the user (Mimoun et al., 2012). Thus, humanistic and anthropomorphic integration allow certain

important degree of social presence into on-line environment (Belk, 2013; Chérif & Lemoine, 2019; Karpen & Conduit, 2020).

2.3.Social Presence (Physical vs. Virtual)

A core element for both, on-line and brick-and-mortar retailers differences, is the social presence, being an influencer regarding competition from both channels and can put traditional retail, for this element, in a upper hand (Chang & Zhang, 2017). Brick-and-mortar retailers success relies, in part, on the social presence of human sales agents, expecting that customers feel more comfortable by making an investment on relational level (Chang & Zhang, 2017; Rafiq et al., 2013). During the twenty-one century, several e-commerce businesses started to use VA on their websites in order to integrate a social presence for guiding purposes, allowing customers to have computed social interaction even on-line with a personification presence (Holzwarth et al., 2006). For Musalem et al. (2020), Human Resources or/and Information Technology presences are the factors that dictate the a high quality customer service delivery.

Social presence can be defined as a key dimension from presence perception, providing a group feeling (Biocca et al., 2003) and, in a digital environment, it can take the form of avatars, humans' presence through video, or even voice assistance. Moon et al. (2013) suggested that the lack of social experience with peers or salesperson might be the reason why consumers prefer brick-and-mortar shopping to on-line shopping. Additionally, a salesperson interaction or a social presence (which can be enhanced by anthropomorphic agents) during the sale pipeline can enhance pleasure, satisfaction and purchase intention while shopping and motivate consumers to maintain a relationship with the brand (Chérif & Lemoine, 2019; Holzwarth et al., 2006; Mohr & Bitner, 1995). Also, the same positive effect was seen on e-commerce websites that used voice pre-recorded sound as social presences, declaring that human voices have bigger impact than synthetic voices, but both have a positive effect both on trust and social perception (Chérif & Lemoine, 2019). The same is seen while shopping on-line with the presence of an avatar or voice, that can lead to higher satisfaction with the seller and an increase on purchase intention (Holzwarth et al., 2006). Such use of avatars with human like imagery and social virtual presence can enhance the realism of social interaction on-line, providing a higher level of brand experience at on-line stores (Rohm & Swaminathan, 2004). Also, a higher feeling of social presence and realism in a virtual experience for the consumer positively influences the shopping decisions (Hyun & O'Keefe, 2012).

2.4. User Customization System on Content-based Filtering

The exponential growth of data available on-line, users necessarily need a way to facilitate data search moment (Rafailidis & Manolopoulos, 2018). From this, recommendation systems took a vital role on facilitating decision-making processes and allow a more friendly interface with the different on-line sites (Rafailidis & Manolopoulos, 2018). Recommendation systems are intelligent agents that assist the information seeking moment with recommendation according with interest and preferences of the individuals (Rafailidis & Manolopoulos, 2018). The characteristic of this systems were perfectly adapted to e-commerce stores, where they could recommend products that better fits users and, ultimately increase their satisfaction (Pazzani & Billsus, 2007; Rafailidis & Manolopoulos, 2018). Such technology was previously being used, but on a more sporadically level, for example, on video clubs, where people would buy a movie and the vendor, having access to previous bought products, could recommend the sequel (Pazzani & Billsus, 2007).

Such smart product suggestion can be seen as an extension and an upgraded version of recommendation system, which is, by definition, a method of collecting information about the user and actively suggesting products that go according to the user data (A. Lee & Chau, 2011). Product suggestion can take the form of several techniques, including collaborative filtering, where the past purchase opinion of other similar users affect the product recommendation; content-based filtering, where the recommendation is based on profile user preference and description items from past personal user information; and hybrid recommendation system (Shih & Liu, 2008). As content-based filtering, the system can retrieve users' preferences and the history user's interaction (Pazzani & Billsus, 2007). This retrieval can occur as a user customization system or through rule-based recommendation system (Pazzani & Billsus, 2007).

User customization system on content-based filtering allows the user to actively create a construction of his/her own profile and interests (Pazzani & Billsus, 2007). The system provide an interface, usually with checkboxes or though small-text insertion and, when entered the information, the system will simple connect to a predefined database, matching the recommendation with the user input preferences (Pazzani & Billsus, 2007). This user customization allow them to actively choose their real time needs making the all recommendation product system more pertinent, but also more time consuming (Pazzani & Billsus, 2007; Rafailidis & Manolopoulos, 2018). This system provided a powerful overcome of information overload and a higher degree of customer personalization and customization (Hiralall, 2011). It might benefit all intervenient, increasing turnovers and decreasing seeking information time (Hiralall, 2011).

3.   Theoretical background and Hypotheses Formulation
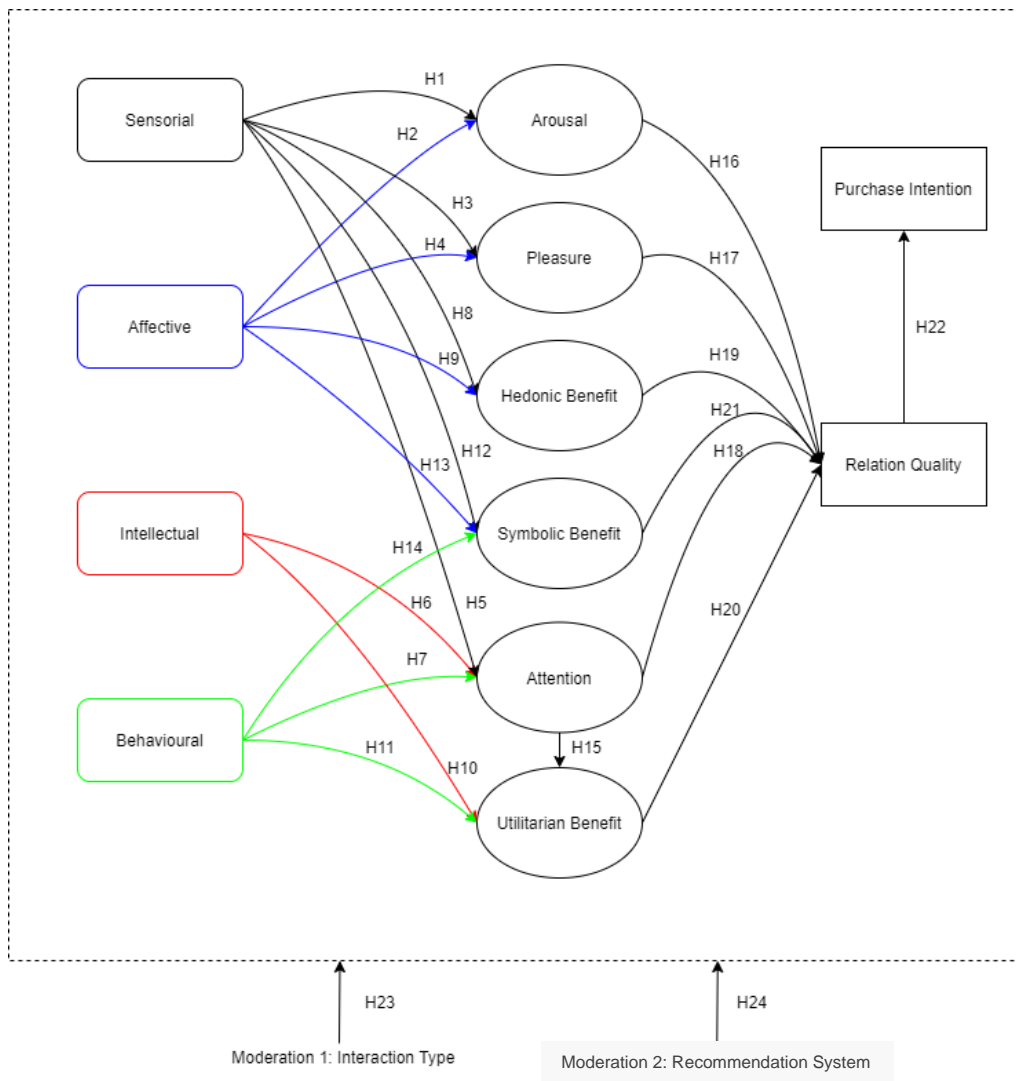
Figure 3-1 - Hypothesis formulation model framework

Recommendation systems and social virtual presence implementation, within on-line shopping environment, are all part of increasing customer on-line experience and relation objective. Such stimulus can appear as an improvement of customers brand experience, and influence either psychological and marketing fields, being translated into an outcome (Schmitt, 2013). In order to better frame the conceptual hypotheses in study, a model framework is used.

3.1. Theoretical Framework

The main theoretical framework used in this thesis is the Stimulus-Organism-Response (S-O-R) theory by Mehrabian & Russell (1974). Such theory represents a connection between reaction and action along organismic component (Buxbaum, 2016) during shopping environment. The Framework is usually used in different application regarding retail, impulse

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to buy, virtual environment and consumer behaviour (Changa et al., 2011; Eroglu et al., 2003; Gatautis et al., 2016). The S-O-R model was firstly used as a retail stores theoretical tool test object by Donovan & Rossiter (1982) that claim that all emotional states can be represented by combining 3 dimensions: Arousal and pleasure, and in some extend Dominance. Later the framework was used on on-line retailing atmosphere (Peng & Kim, 2014) with different applications levels: (1) Eroglu, Machleit, & Davis (2001) while studying the relationship between environmental cues and shopping outcomes; (2) McKinney (2004) while studying consumers' internal motivations for internet shopping and it impact on shopping satisfaction (3) Wang et.al (2010) while studying the relation between web aesthetics and on-line shoppers satisfaction; (4) Wang, Minor, & Wei (2011) while studying on-line aesthetic stimuli and consumers emotional and cognitive responses; or (5) Schmitt (2013), while studying brand experience stimulus and relationship marketing relation. Therefore, validating the model usage during this specific thesis analysis. The following chapter goes along with S-O-R components and formulate the purposed hypotheses.

3.2. Stimulus: Brand Experience

Consumers are constantly experiencing several stimulations through the different brand exposure or physical product attributes, from brand identity, packaging and communication to the environment itself (Brakus et al., 2009). This ongoing exposure has a crucial relevance on the long-term relation with the brand trust, providing a deeper impact on memory and trust brand perception (Ha & Perks, 2005). When showing intention of purchasing, customers not only select the product on the basis of it functional benefit, but also take into account if the product provide an experience aspect (Williams et al., 2013). The specific case of retail experience relies on the encouragement of customers to interact with selling actors (ex. Website features) and on stimulating the customer to connect with the product (such as overcome intangibility and learn how to use it) and developing an emotional connection with the brand (Jones et al., 2013). Brand Experience can be defined as the consumer awareness of their experience with the brand (Ding & Tseng, 2015), and this can be considered when the consumer is within a process of information search, decision making and/or product usage (Ha & Perks, 2005). The power of such experience with a brand can provide a bulk impact beyond product features and benefits, creating an unforgettable and deeper meaning with the brand (Ha & Perks, 2005).

For Brakus et al (2009), Brand Experience (BE) is both a pre and an in-consumption experience conceptualized as four main dimensions: (1) *Sensorial* – sensory concept dimension is critical for brand exposure and customer relation, being a way for the brand to entertain their customers (Sensory Marketing), providing a full-packed brand integration experience with all five sensory activation, emerging a holistic customer experience (Diţoiu & Căruntu, 2014); (2) *Affective* – try to reach customer feeling and emotions with the goal of creating a subconscious positive mood link with the main brand (B. H. Schmitt, 1999); (3) *Intellectual* – accentuates the major importance of convergent and divergent thoughts connection between customers and the mains brand (Williams et al., 2013) and (4) *Behavioural* – customer behaviour is mainly connected with cultural background but also with physical experiences and their lifestyle provided by brand interactions (Williams et al., 2013). All four dimensions not only have the role to stimulate customers' sensations but also to generate different responses on human natural thinking process and emotional path. Also, Zehir et al. (2011), verified in their study that BE created a trust based relation between the brand and customer, positively affecting customer satisfaction. Each one of this dimensions provide determinants on marketing fields to improve Attachment–Aversion (AA) model relationship, that covers approach and avoidance relations that customers have with brands (Schmitt, 2013).

Regarding on-line brand experience, it congregates both cognitive and emotional states, and can also have a focus on the hedonic aspects of BE (Brown et al., 2007; Morgan-Thomas & Veloutsou, 2013). The on-line BE can be enhanced with the use of social presence as an assistant throughout the sales pipeline. Ha & Perks (2005) highlight the importance of website navigation and the relevance on a positive experience. The on-line environment it is a powerful tool to build a strong corporate brand since it relies on several touchpoints with customers (search, evaluation, purchase and consumption) (Brakus et al., 2009; Khan et al., 2016). In the present research a social virtual presence is used to enhance the brand experience during product search interaction at on-line shopping environment.

3.3.   *Organism: Emotional Response, Cognitive Response and Benefits*

Schmitt (2013) research has several components that can help to understand the model outcomes, which englobe, the 3E's psychological determinants, AA relation and all Motivational Strengths. For the purpose of this thesis is important to accentuate the difference between Emotional and Cognitive Response from different stimulus. Emotions can be defined as small time spaces with numerous subsystems that are coordinated to an event considered

relevant to an individual (Coppin & Sander, 2016). The Emotional response, as previous stated at the beginning of chapter, has three possible categorizations: Arousal, Pleasure and Dominance (PAD). *Arousal* is a measurement of consumers excitement, activation and stimulation and many times it comes up together with stress (King et al., 1983). For Baddeley (1972), stress effect is a consequence from arousal changes but this change provides an increasing level of arousal, leading to a more focus for the individual up to a maximum point, when crossed performance start to be poorer and poorer. If Arousal is within the boundaries of increasing performance and used safely, it can lead to an open intention of buying, since it provides less nervousness and apprehensions to the customer (Hameed et al., 2018). *Pleasure* is correlated with what customer receives based on the fun and playfulness of the experience (consumer happiness or satisfaction with the information or interaction), and can facilitate the completeness of product-acquisition tasks and positively affect utilitarian value (Babin et al., 1994). Both Sensorial and Affective dimensions from BE are bond with consumers emotions response and the usage of five senses, mood and sentiments (Ding & Tseng, 2015; Jones et al., 2013). Also, Arousal, Pleasure and Dominance were previous seen on a chatbot environment, to study the pleasantness of a conversation and the mental stimulation and excitement when interacting with the technology (Zarouali et al., 2018). Brand experience effect on emotional commitment was previous studied on different product categories, including high-end technological products, providing a pertinent conclusion on the effect of such response into long-term relationship experience (Khan & Rahman, 2017). Customers responses can be highly influenced using high-technological attributes such as Performance, Appearance and Communication, with special attention to visual appeal and innovativeness (S. Lee et al., 2011), being suitable to predict an association between virtual social presence usage at on-line environment and emotional responses:

H1: The level of Sensory stimuli positively influences the emotional response of Arousal.

H2: The level of Affective stimuli positively influences the emotional response of Arousal.

H3: The level of Sensory stimuli positively influences the emotional response of Pleasure.

H4: The level of Affective stimuli positively influences the emotional response of Pleasure.

Cognitive responses can be defined as the way customers actively process limited data, including conscious and unconscious processes (Weerd, 2006). In this thesis, cognitive responses are seen as how information meets the consumer through social virtual presence.

Attention can be defined as goal-directed behaviour in the middle of different distractions and to perform tasks need a cognitive function (Awh et al., 2000; Silverstein et al., 1998). Attention has an important role over the cognitive response and can come up in different forms such as sustained, selective, divided and alternating attention (Weerd, 2006). Sustained attention is the ability to keep focus over time, and so have an important role on capturing information on on-line based tasks (McAvinue et al., 2012). Attention enter as a game changer, facilitating the product search only to relevant stimulus, providing a higher degree of choosing important information and being influenced by customers background behaviour or their ongoing thinking process (Guerreiro et al., 2015; Morgan-Thomas & Veloutsou, 2013; Weerd, 2006). The Sensorial dimension from BE has an important role; namely, the five senses have an important role in generating attention and maintaining it overtime (Sahu & Adhikari, 2018). Also, both Intellectual and Behavioural dimensions from BE are bond with cognitive process from a thinking perspective and are appealing to physical experience and lifestyle stimulation (Jones et al., 2013). Such behavioural dimension provides an efficiently estimation over the Attention-related states of the users (Asteriadis & Tzouveli, 2009). The same happens with intellectual dimension, where thought connections between intervenient are extremely affected by the efficiency of the initial attention grabber (Asteriadis & Tzouveli, 2009; Li et al., 2011). This cognitive process ability predictors, such as Intellectual dimension, can be positively influenced by companies that use chatbot technology as a part of their service experience, showing that how consumers think about chatbots interaction can influence the effectiveness of the technology (Zarouali et al., 2018).

H5: The level of Sensory stimuli positively influences the cognitive response of Attention.

H6: The level of Intellectual stimuli positively influences the cognitive response of Attention.

H7: The level of Behavioural stimuli positively influences the cognitive response of Attention.

Consumer benefits can be in several dimensions: Hedonic, Utilitarian, Symbolic, Social Presence and Social Attraction (Mclean & Osei-frimpong, 2019). Delivering high quality benefits to consumers contributes positively to brand loyalty in retail market (E. S. T. Wang, 2017). For the purpose of this research is used Hedonic, Utilitarian and Symbolic benefits. Throughout the chapter it will be presented the The *Hedonic benefit* relies on the affective and emotional connection with the stimulus using different senses analysis (Rese et al., 2020). Hedonic Benefits has also been crucial on technology utilization, being associated with the emotional experience, such as enjoyment and pleasure, associated with the interaction or the

usage of new technology and being a retention factor for future usage (Schuitema et al., 2013). For Wu et al. (2010), consumers interact for hedonistic purposes with technology. *Utilitarian Benefits* offer the possibility of being an useful and pertinent way to complete tasks (such as searching for information on-line) (Mclean & Osei-frimpong, 2019). Such benefit can easily be a source of purchase motivation and physical experiences since it provides ways of convenience, variety seeking, reasonable price rate, and more; increasing the product utility perception with the appearance of intellectual stimulus (Sarkar, 2011). For (Maclnnis & Jaworski, 1989), as the consumer attention increases more ability to process information is assigned to interpret the overall experience and how utilitarian benefits are embraced. *Symbolic Benefits* relay on individuals being rewarded with a favourable social impact and status identity creation (Goodin, 1977). It is believed that can also be related to "sense of self or social identity" as a result from the usage of a new technology (Schuitema et al., 2013). This technology can have the power to enhance such social status (Mclean & Osei-frimpong, 2019) and show the importance of emotional states stimulus on the customer perception of the symbolic benefit in store environment (Marinao-Artigas et al., 2019). The different chatbots benefits were already been studied, revelling an intensification of the utilitarian benefits in detriment of either hedonic or symbolic purposes in this technology (Rese et al., 2020). Customers intensively prefer to use chatbots as a productivity tool and enhance their thinking and affective stimulus (Rese et al., 2020). But, according to Liao et al. (2016), this only happens when chatbots are interacting with a low-social profile. When chatbots are interacting as a high-social agent, people tent to see the system as a humanization and increase their symbolic and hedonic benefit, opening their sensory and affective data retrievers (Chaves & Gerosa, 2019; Liao et al., 2016).Thus:

H8: The level of Sensory stimuli positively influences Hedonic Benefits.

H9: The level of Affective stimuli positively influences Hedonic Benefits.

H10: The level of Intellectual stimuli positively influences Utilitarian Benefits.

H11: The level of Behavioural stimuli positively influences Utilitarian Benefits.

H12: The level of Sensory stimuli positively influences Symbolic Benefits.

H13: The level of Affective stimuli positively influences Symbolic Benefits.

H14: The level of Behavioural stimuli positively influences Symbolic Benefits.

H15: The level of Attention response positively influences Utilitarian Benefits.

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3.4.Response: Relation Quality and Purchase Intention

The challenge to predict customer buying behaviour context, the literature came up with the Perceived Relation Quality concept. In many studies, the connection between Relation quality and Purchase Intention has been explored. It is a chain of concepts that largely influence each other (Geuens, 2010). The responses on S-O-R can be compared to the outcomes from B. Schmitt (2013) model, that can either come from psychological factor or marketing factor, and impact the final objective. Perceived Relation Quality consists on commitment, trust and satisfaction that, together, lead to a repetition habit of buying intentions and lastly to a loyal behaviour factor and profit for the brand (Morgan, 2015; Pritchard et al., 2015; Reinartz & Kumar, 2000; Zeithaml & Berry, 1996). This customer satisfaction should be kept at a continuous basis, as it is a crucial response for a well succeed prediction of customer's buying intention and positively influences the willingness to buy (Homburg et al., 2005). Overall, the important assumption is that the higher the Relation Quality, the higher is the buying intentions (Mittal et al., 1999; Zeithaml & Berry, 1996). Monroe (n.d.) verify that participants' affective responses positively impact the quality product judgement. Russell & Pratt (1980) claim that functional quality is not the only parameter that participant evaluates, but also the emotional induced quality. Such impact of pleasure on Perceived quality, and Arousal on Satisfaction, need to be carefully accessed, since this is only verified on Retail industry and, not in sectors such as health care or PC home-banking (C. L. Wang, 2016). In addition, both affective and cognitive responses influence subjective evaluation of product quality (Monroe, 1998). Some findings suggest that the presence of a virtual brand and a perceived level of information quality can affect consumer intention on purchasing a brand (Kim & Johnson, 2016). Others refer the importance of the relation between utilitarian, symbolic and hedonic benefits at perception of product quality and purchase intention since products perception go well beyond utilitarian benefits (Kyguoliene et al., 2017; E. S. T. Wang, 2017). For O'Brien (2010), on his study in 802 on-line shoppers, the results demonstrate that both, hedonic and utilitarian shopping values, are the a quality of user experience variables in the on-line environment such as e-commerce websites interactions. The role of trust as a relation quality at e-commerce is a core piece, coming from reputation values and can easily enhance perceived usefulness and benefits (Dachyar & Banjarnahor, 2017). Thus, we propose the following hypotheses:

H16: The level of Arousal positively influences Relation Quality.

H17: The level of Pleasure positively influences Relation Quality.

H18: The level of Attention positively influences Relation Quality.

H19: The level of Hedonic Benefit positively influences Relation Quality.

H20: The level of Utilitarian Benefit positively influences Relation Quality.

H21: The level of Symbolic Benefit positively influences Relation Quality.

H22: The level of Relation Quality Response positively influences Purchase Intention.

3.5.Moderators: Interaction Type and Recommendation System

As seen at the conceptual framework at the beginning of the chapter, the study refers to two possible intervenient that can influence the consumers reaction and final purchase decision: the type of interaction and the presence of Customized recommendation system.

Firstly, Interactions agents and interactions moments at retail environment are crucial for the perception of quality service delivery. Brick-and-mortar retailers success when compared to on-line shopping retail relies on the use of social presence, providing a more comfortable way of relation (Chang & Zhang, 2017; Rafiq et al., 2013). The same applies to the use of AI as a sales agent, that can be a win-win situation since they can provide both an innovative brand perception and a customized customer service (Kacen et al., 2013). Also, on-line retail channel gains a lot with the use of such selling assistants, driving customers attention and supporting them throughout the sales pipeline, creating a similar felling when shopping at Brick-and-mortar retailers (Moon et al., 2013). Consumers feel more connected with human-like robots and create a personification for them, as seen in the previous chapter (De Gauquier et al., 2018). Both interactions types are a suitable way of asking and delivering information on on-line environment. So, it is assumed that the type of interaction from the social virtual presence, either with Artificial Intelligence or a Human Resource, can have a moderating effect on the way BE is deliver and its responses. Thus, we propose the following hypothesis:

H23: Stronger effects occur in the results of the above hypotheses (H1 ~ H22) among the participants who interact with Human Sales Agent, compared to those who interact with an Artificial Intelligent Agent.

Secondly, within the use of such high technological environment, creepiness can also take a key role when relating with an interaction type. The emotional role on virtual privacy environment brings concerns and can dictate the end of business (Zhang & Xu, 2016). *Creepiness* is a newly studied concept that is usually allied to human-computer interaction for

understanding purpose, describing the feeling towards a virtual or robot interaction (Langer & König, 2018). Such concept consists on emotional response to a certain situation but can also have a cognitive response perspective, where individuals rationalize the unpredictability of the situation (Langer & König, 2018). It can be defined as a hypothetical uncomfortable emotional response that comes with uncertainty toward a person, technology or even during a situation. (Langer & König, 2018). This mix-feeling can be a generator of different emotional responses towards the selling agent's on-line interaction on organismic-response connections. Also, Creepiness when not carefully accessed, might have the counter expected effect, but in some specific cases, for example on the phone app market, creepiness might be used with the intention to remove the individual from a comfort and safe zone (Shklovski et al., 2014). An additional study shows the emotion power of the sense of creepiness which can demotivate online consumers' purchase intention (Zhang & Xu, 2016). Based on the same S-O-R framework model, Li et al. (2011), registered consumers with fear and joy while disclosing information at on-line store platform vendor interaction, and found that consumers are extremely afraid of any information disclosure during on-line navigation and are suspicious of any orientation. Such approach can significantly explain the role of privacy and protection concerns on on-line environment with emotional creepiness perception from users (Li et al., 2011; Zhang & Xu, 2016). Such emotion can disappear when the number of interaction increase (Li et al., 2011). Thus, the presence and possible influence on interaction type will be addressed and analysed in further chapters.

H24: The presence of Emotional Creepiness strengths the differences between participants who interact with Human Sales Agent and those who interact with an Artificial Intelligent Agent.

Finally, the presence of Customized Content-Based Recommendation Systems, that can work with base information provided by the user will also be tested as a possible moderator. This is done so that is possible to understand the role of the recommendation system on the relationship between emotion and cognitive responses and purchase intention during the use of a social virtual presence. Recommendation system takes an important role at on-line environment by allowing the understatement of the user segment (Pazzani & Billsus, 2007). The use of recommendation systems, at a normal e-commerce shopping experience, increases the user exploration onsite due to curiosity and can also improve information quality perception by the consumer, both increasing the satisfaction (A. Lee & Chau, 2011). This makes this variable a

pertinent and suitable possible moderator within the model presented. Thus, we propose the following hypothesis:

H25: Stronger effects occur in the results of the above hypotheses (H1 ~ H22) among the participants who have access to customized recommendation product system, compared to those who have no customized product recommendation system.

All hypothesis conceptual model can be seen in figure 3.1. at the beginning of the chapter.

4.   Methodology

4.1. Considerations

The main objective of the present study is to understand the impact of Social Virtual Presence and Customized Content-Based Recommendation Systems on purchase intention at on-line shopping framework. Considering the S-O-R model, it is expected that Stimulus, through SVP, affects the Organism internal state (Cognitive Response, Emotional Response and Benefits) and Reponses (with participants showing increased purchase intention). Thus, a quantitative research was conducted, allowing to gather data from a larger sample and enabling the generalization of results and the disclosure of patterns. The data were retrieved from a collectable sample on an on-line innovative service experiment. For a well-done scientific research several criteria were considered, and an on-line platform was developed from scratch (where both the experiment and final questionnaire took place), through coding and the use if the following technology: Hypertext Markup Language (HTML), Cascading Style Sheets (CSS), Hypertext Pre-processor (PHP), JavaScript and Structured Query Language (SQL). The process in which this on-line platform was developed will be explained further in this chapter.

4.2. Research Design

A 2x2 matrix design was used, two different conditions of Social Virtual Presence were created leading the participant in the experiment (interaction with AI or with Virtual Human) and two levels of customized suggestions were formed (with or without recommendation system) (see table 4.1). The table 4.2 summarizes the main distinct characteristics and overall concept of each condition during the experiment.

Table 4.1 - Research Design Matrix

		Interaction Agent	
		With Human	With AI
Recommendation System	With	**Variation 1**	**Variation 2**
	Without	**Variation 3**	**Variation 4**

Table 4.2 - Concept Guidelines

	Concept	Notes
With Human	During the experience, the SVP agent is a pre-recorded human voice and pre-recorded human video	Both agents have the same script text and similar appearance
With AI	During the experience, the SVP agent is Siri by Apple and have a human like imagery created with the help of http://voki.com	
With Recommendation System	At the end of the experience, the product that is suggested by the platform considers the residential area and preferred characteristic of the participant	
Without Recommendation System	At the end of the experience, the product that is suggested by the platform is a general product without any consideration and equal to all participants	

To retrieve strong and pertinent data, that can easily fit on the conceptual experiment, the study fictitious product had to appear in different prices range, take form in multiple product variations and should be easily handled by most people. Thus, from all different kind of products that fit these criteria, the product in used on the study are bicycles. Additionally, a made-up brand by the name of E-Fiv was created (see simple brand guide version in Annex A).

The entire platform user experience was divided into three moments, (1) Explanation briefing, context and consent form; (2) Experiment and (3) Final form. The experiment took place during the second half of the month of May 2020 in an on-line private server and domain by the name of http://impactodoaitese.org/. All information was recorded at a data base allocated on the server. When the domain was accessed participants were briefed with user terms, experiment overall content, general objectives and instructions to start the experiment (Annex B). When followed the instruction, participant initiated the second moment – Experience - and were provided with a randomized one number code from 1 to 4, without their knowledge, according with variations from table 4.1. For each variation the platform shown different specific content regarding Agent Interaction and Customized Content-Based Recommendation Systems and all other content was kept the same (as seen on table 4.2).

At the experiment phase, participants listen to audio instructions from the agent and answer questions regarding participant preferences and basic demographic information. After answering all questions, a bicycle product is suggested by the platform as a Video, containing the suggested bicycle image, the selling agent image and sound from a pre-recorded base. An example can be seen on Figure 4.1.

Figure 4-1 - Product Suggestion Video Example (delivered with AI)

Finally, comes the third moment – The Final Form – with 47 items measuring all research model variables: Brand Experience, Attention, Emotional Creepiness, Hedonic Benefits, Utilitarian Benefits, Symbolic Benefits, Emotional Responses, Relation Quality and Purchase Intention (Bradley & Lang, 1994; Brakus et al., 2009; Castellanos-Verdugo et al., 2009; Groen et al., 2019; Langer & König, 2018; Mclean & Osei-frimpong, 2019; Phan & Mai, 2016). Such items will be address in detail later in the chapter. As an on-line questionnaire, it was coded that all questions had to be answered for a correct submission.

4.3. Experimental Design

In this section, the experimental development process is explained. A persona and scenario method are used providing a representation of experiment group on their personal characteristic, they are fictitious characters created based on knowledge of real users (Gudjonsdottir, 2010). Such persona should be given a name, a life, a personality as well as a portrait (Gudjonsdottir, 2010). Firstly, two personas are presented in scenarios in which the platform is used on the fully capacity with recommendation system active and a presence of both virtual agents on comparison. The scenarios without recommendation system active can be seen in Annex C. Secondly, all features and functionalities of the on-line platform are shown on detail.

4.3.1. Personas

Meet Rui.

Rui is 35 years old, divorce and has one child. He works as a night shift security guard at a museum in the centre of Lisbon, when most public transportations are closed. He enjoys shopping but being a night shifter makes him tier during daytime for shopping and struggles to have social interactions.

Figure 4-2 - Persona Portrait: Rui

And now meet Eva.

Eva is 22 years old Bachelor student, dislocated from home and placed in Bragança at university residential area with a student scholarship. The university campus and residential area are outside the city centre. She struggles to find product variety in such small city context and is afraid of choosing products that do not fit her needs.
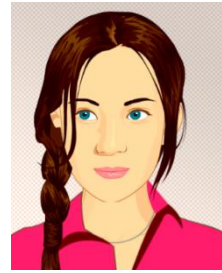
Figure 4-3 - Persona Portrait: Eva

4.3.2. Scenarios – Understanding The full platform capacity

4.3.2.1. Scenario 1

Rui shift just finished and its 7 a.m., he really needs to buy a new bicycle for daily use to get to work, but all stores are closed and only open at 10 a.m. Alone, from the comfort of his home, Rui open E-Fiv on-line store platform and interact with the virtual agent and provide some personal basic information and product preferences. In this question he answers his Urban residential area and how he values price and technology when buying a bicycle. While answering he feels happy interacting with someone and knowing that the Artificial Intelligent agent will provide him the product that best fits his needs.

As he answers all the question the virtual agent shows him the product that best fit his preferences and lifestyle, an electrical bicycle for an affordable price from E-Fiv. While the virtual agent in video explains the crucial characteristics, Rui goes through all product images provided. Rui loves how perfectly the product fits him and how the agent took him during the all sale pipeline. As he checks out, the platform registered in his account all the information given for future purchases and interactions.
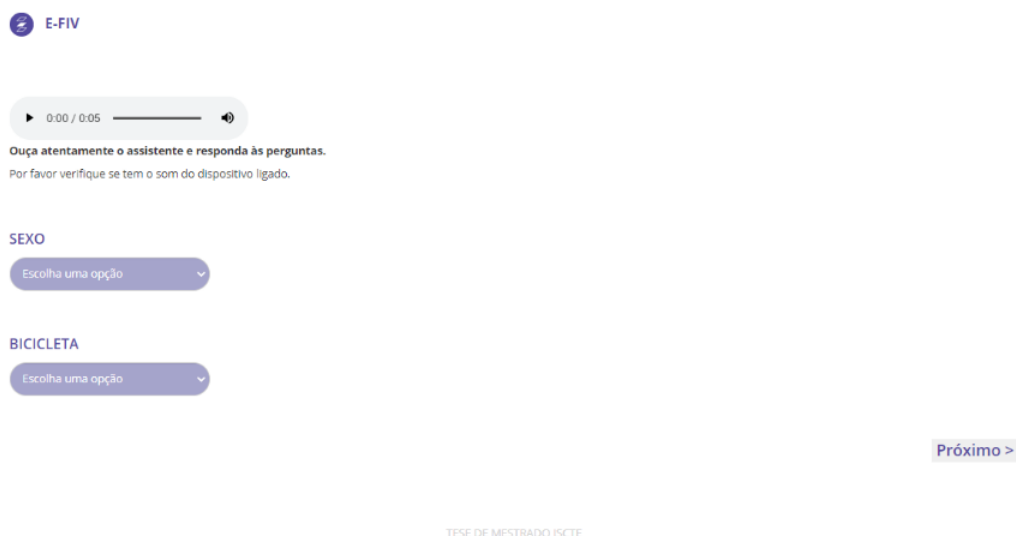
4.3.2.2. Scenario 2

Is exams week at university and Eva is studying all day and night. She usually goes to the municipal library to focus on her studies, but her bike just broke and needs to be replaced. She doesn't know anything about bicycles and does not have the time to learn on-line about the subject. Eva, from her room, opens E-Fiv on-line store platform and interact with the virtual agent and provide some personal basic information and product preferences. She immediately connects with the agent since it is a model just like with her age and personality. Within the questions, Eva answers her Rural residential area and how she values comfort and fitness usage when buying a bicycle.

As she answers all the question the virtual agent shows her the product that best fit her preferences and lifestyle, a traditional bicycle with the best comfortable sit on the market. Once again, Eva goes through all images but does not hear any characteristic since she truly believes on the agent selling honesty. As she checks out, the platform registered in her account all the information given for future purchases and interactions.

4.3.3. Features and Functionalities of the platform

The on-line platform of E-Fiv store was simplified on customization variability and interaction made with the agent, focusing on creating an enough experience example intended to evaluate the use of a Social Virtual Presence as a Human or AI and the role of Customized Content-Based Recommendation Systems. At the beginning, depending on the randomized version input, is possible to ear either a robotic voice assistance from Siri or a human pre-recorded voice guiding the participants throughout the same set of questions and saying to the participants the same text script. (see Annex D) This questions have the intention to create a minimum interaction points from the agent and the participant (see figure 4.4).

Figure 4-4 - First set of question with the agent voice

While proceeding on the form set, participants answer the two decisive questions for product suggestion purpose: (1) What is the participants normal Residential Area; and (2) Provide two characteristics that the participant value the most while shopping bicycles. The participant can choose from Technology, Price, Aesthetics and Quality, all characteristics are randomly presented on screen to minimize tendencies problems (see figure 4.5). This product characteristics were chosen as representation of the most generic and up to date used terms.

Figure 4-5 - Final set of question with the agent voice

Once the form is finish, participants continue the experiment interacting with the same agent. Now they can either have a personalized product suggestion according with the answer from the two decisive questions or a generic product suggestion that is already pre-defined, as shown on table 4.4. Both suggestions are presented via pre-recorded video with agent imagery, product imagery and characteristics presented in audio (see figure 4.6 and annex D). The Agent imagery can take a form of Human or, in case of the Siri as an avatar with a human like imagery created with help of http://voki.com. Each bicycle model has their own characteristics and imagery related.

Table 4.3 - Product Suggestion per Variation Possible

	Residential Area	Preferred Characteristic	Bicycle Model Suggested
1 and 2	Urban	Aesthetics	Bicycle UE
		Quality	Bicycle UQ
		Technology	Bicycle UT
		Price	Bicycle UP
	Rural	Aesthetics	Bicycle RE
		Quality	Bicycle RQ
		Technology	Bicycle RT
		Price	Bicycle RP
3 and 4		N/D	Bicycle NC
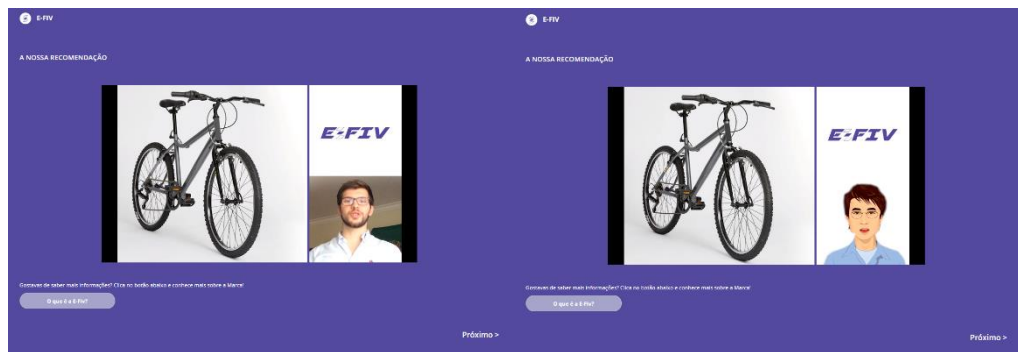
Figure 4-6 - Product Suggestion page video: with Human (left) and with AI (right)

4.4.Measurement Scales

The last moment of the study focused on understanding the participants' motivations, emotions and general experience, under the form of an extension of the on-line platform usage. Thus, the focus of this research relied on explore how the type of agent interaction used and a product suggestion element can influence consumer purchase intention from their emotional and cognitive responses to the experience. In order to measure and create comparison points from participants response to the experience, 47 items were active (all randomly presented to the participant during form time), based on different scales found in the literature. Exhibit 4.4 present each variable scale to the number of items and respective scale's author. The items from the final form were translated to Portuguese in order to reduce misinterpretations of questions by participants due to language barriers and, some items were adapted to better suit the experience context. Additionally, five items took place as control variables asked during the experience, such as, consumer's age, gender, first time buying a bicycle, usual residence and characteristic value the most when buying a bicycle. The questionnaire presented to the participants can be found in Annex E. When all information was compiled, a file with 674 rows and 56 columns was created for data assessment.

Table 4.4 – Constructs Scales items per author

	Construct Dimension	Author	Scale	Nº Items
Brand Experience	Sensory	(Brakus et al., 2009)	Likert 7-points	3
	Affective	(Brakus et al., 2009)	Likert 7-points	3
	Intellectual	(Brakus et al., 2009)	Likert 7-points	3
	Behavioural	(Brakus et al., 2009)	Likert 7-points	3
Attention	-	Adapted from (Groen et al., 2019)	Everyday Life Attention Scale (ELAS)	3
Creepiness	Emotional Creepiness	(Langer & König, 2018)	Likert 7-points	5
Emotional Response	Arousal	(Bradley & Lang, 1994)	Self-Assessment Manakin (SAM)	1
	Pleasure	(Bradley & Lang, 1994)	Self-Assessment Manakin (SAM)	1
	Dominance	(Bradley & Lang, 1994)	Self-Assessment Manakin (SAM)	1
Benefits	Hedonic Benefit	Adapted from (Mclean & Osei-frimpong, 2019)	Likert 7-points	3
	Utilitarian Benefit	Adapted from (Mclean & Osei-frimpong, 2019)	Likert 7-points	4
	Symbolic Benefit	Adapted from (Mclean & Osei-frimpong, 2019)	Likert 7-points	4
Relation Quality	Satisfaction	Adapted from (Castellanos-Verdugo et al., 2009)	Likert 5-points	4
	Trust	Adapted from (Castellanos-Verdugo et al., 2009)	Likert 5-points	5
Purchase Intention	-	Adapted from (Phan & Mai, 2016)	Likert 5-points	4

Brand Experience, Creepiness and Benefit Constructs were measured according with a seven-point Likert scale (1= Strongly Disagree; 7= Strongly Agree). Additionally, four specific items from Brand Experience construct (be_3; be_5; be_8 and be_12) were consider reversed values and took form of 7= Strongly Disagree; 1= Strongly Agree, on the same seven-point Likert scale.

Relation Quality and Purchase Intention construct was measured according with a five-point Likert scale (1= Strongly Disagree; 5= Strongly Agree).

Attention construct was measured according with everyday life attention scale with an eleven-point semantic differential scale (0 to 100).

Emotional Response construct was measured according with self-assessment manakin scale with a five-point semantic differential scale. Despite the scale measuring pleasure, arousal, and dominance, only the dimensions of pleasure and arousal were considered as previously explained.

Regarding control variables, gender was measured and divided in three groups ("1" to "3" denotes male, female and other respectively). Age was measured and divided in six groups ("1" to "6" denotes 18-24 years old, 25-34 years old, 35-44 years old, 45-54 years old, 55-64 years old and over 65 years old, respectively). First time buying a bicycle was measured between "yes" and "no". Usual residence was measured between "Urban" and "Rural". Characteristic value the most when buying a bicycle was measured and divided in four groups ("1" to "4" denotes Aesthetics, Quality, Technology and Price, respectively).

5. Results

5.1.Prototype, Sample and Data Preparation

Before launching the questionnaire, a prototype platform was built with ten random participants. With this prototype test, the questionnaire flow and the different questions sentence construction and instructions were target of a review. This way, it was possible to understand the redundancies in the questionnaire flow and modify it before the implementation of the platform. The pre-test led to no suggestions, doubts or critics by the participants.

The on-line questionnaire was than disseminated using snowball sampling (Naderifar et al., 2017) through a link published on Facebook groups, University channels and WhatsApp Groups. The Sample demographics records 673 participants, all valid with 352 females, 319 males and 2 others. Other demographic information on the participants are presented in table 5.1.

Table 5.1 - Demographic Sample Data

	Frequency	Percentage (%)
Age		
18-24	266	39.52
25-34	226	33.58
35-44	84	12.48
45-54	33	4.9
55-64	64	9.51
+65	0	0
Gender		
Male	319	47.4
Female	352	52.3
Other	2	0.3
First time buying a bicycle		
Yes	622	92.42
No	51	7.58
Residential Area		
Urban	434	64.49
Rural	239	35.51
Characteristics value the most		
Aesthetics	115	17.09
Quality	247	36.7
Technology	139	20.65
Price	172	25.56

After the due date for the volunteers, the file was retrieved from SQL Server and transferred as an CSV. File for data preparation, and all submission were confirmed. After the confirmation, two look-like binary indicators were added to the data set: (1) Interaction Type, where "1" are

the participants who were exposed to an interaction with a pre-recorded human and "2" are the participants who were exposed to an interaction with an Artificial Intelligence agent; and (2) Customized Content-Based Recommendation Systems, where "1" are the participants who were exposed to a product suggestion that changes according with the answers provided and "2" are the participants who were exposed to a not customized and general product suggestion.

5.2.Model Evaluation

The following analysis of the results uses a partial least square structural equation modelling (PLS-SEM) with SmartPLS 3 software to test the model and SPSS Statistics for the emotional creepiness analysis. PLS-SEM modelling tool is being extensively used in business research and specially marketing and operations practices with a combination of over 245 studies from 1981 until 2010 (Hair et al., 2014; Picot-Coupey & Troiville, 2015). The PLS-SEM is considered a modelling tool that allows a more forward treatment of complex models and data, also provides advantages when working with structural equation models (Hair et al., 2014).

The study considers four assessments of Measurement Model Metrics: Indicator Reliability, Convergent Validity, Discriminant Validity and Consistency. Looking first at Indicator Reliability, the criteria goes for the item's loadings, where loadings to be significant should be higher than 0,7 (Hair et al., 2011). If the loading item is between 0,4 and 0,7, Hair et al. (2014) considers in deleting the item if the composite reliability increases, otherwise should be kept. Regarding Convergent Validity the criteria goes for the Composite Reliability (CR) and Average Variance Extract (AVE), which should be higher than 0,7 and 0,5 respectively for a passing evaluation (Hair et al., 2011; Sharma & Kim, 2012). Furthermore, the Heterotrait-Monotrait ratio (HTMT) and Fornell-Larcker criteria were chosen to evaluate Discriminant Validity (Ab Hamid et al., 2017). To be considered relevant HMTM need to report values less than 0,9 and the second criteria compares AVE squared routes with the correlation of latent constructs (Ab Hamid et al., 2017; Henseler et al., 2014; Sarstedt et al., 2020). Finally, all constructs need to meet two criteria for Reliability, having a Cronbach Alpha above 0,7 and have Inner and Outer Variance Inflation Factor (VIF) lower than 5 (Hair et al., 2011; Ringle et al., 2014) (see table 10.6 in annex F). All results needed are summarized in table 5.2 (can also see table 10.2 in annex F). Constructs from Emotional Reponses; Arousal and Pleasure; have only one item and do not appeared on the summarized table.

By data confirmation, all constructs items passed the different testing. Only cr_1, cr_4 and cr_5 had an Outer VIF of more than 5 but, for Hair et al. (2011), a VIF lower than 10 can also be accepted. Furthermore, almost all constructs passed the discriminant validity, as the confidence intervals for the Heterotrait-Monotrait ratio (HTMT) were lower than 0,9 except for the correlations between hedonic benefit and utilitarian benefit (table 10.5 in annex F). Such correlation might be considered less conservative but is acceptable. Additionally, looking at the Fornell-Larcker criterion results, all constructs were confirmed (table 10.4 in annex F).

Table 5.2 - Construct Summarized Evaluation

	Item	Loadings	VIF	CR	Alpha	AVE
Sensory	be_1	0.849	1.733	0.881	0.797	0.711
	be_2	0.852	1.773			
	be_3	0829	1.611			
Affective	be_4	0.881	2.085	0.899	0.832	0.749
	be_5	0.887	2.150			
	be_6	0.827	1.700			
Intellectual	be_7	0.884	2.325	0.861	0.761	0.675
	be_8	0.800	2.092			
	be_9	0.776	1.276			
Behavioural	be_10	0.882	2.018	0.859	0.754	0.671
	be_11	0.772	1.309			
	be_12	0.798	1.801			
Attention	at_1	0.836	1.709	0.883	0.801	0.715
	at_2	0.853	1.705			
	at_3	0.848	1.733			
Emotional Creepiness	cr_1	0.930	5.379	0.966	0.957	0.852
	cr_2	0.891	3.372			
	cr_3	0.928	4.728			
	cr_4	0.932	5.017			
	cr_5	0.934	5.350			
Hedonic Benefit	bnf_1	0.840	1.694	0.872	0.781	0.695
	bnf_2	0.851	1.705			
	bnf_3	0.810	1.508			
Utilitarian Benefit	bnf_4	0.807	1.714	0.879	0.816	0.644
	bnf_5	0.790	1.607			
	bnf_6	0.800	1.690			
	bnf_7	0.813	1.716			
Symbolic Benefit	bnf_8	0.843	2.065	0.911	0.870	0.720
	bnf_9	0.854	2.130			
	bnf_10	0.848	2.132			
	bnf_11	0.848	2.064			
Relation Quality	rq_1	0.829	2.603	0.956	0.948	0.706
	rq_2	0.820	2.471			
	rq_3	0.863	3.163			
	rq_4	0.837	2.696			
	rq_5	0.837	2.812			
	rq_6	0.832	2.693			
	rq_7	0.861	3.154			
	rq_8	0.851	2.957			
	rq_9	0.833	2.738			
Purchase Intention	pi_1	0.861	2.380	0.919	0.882	0.738
	pi_2	0.817	2.090			
	pi_3	0.881	2.686			
	pi_4	0.877	2.514			

Regarding model fitness, is important to assess the reporting value of SRMR. SRMR can measure model structural suitability and avoid model misspecification (Henseler et al., 2014).

The study model reports, as Estimated value, 0,098 that according with Hu & Bentler (1999) is lower than 0,10 and can be accepted, as a less conservative criteria (table 10.1 in annex F).

5.3.Inner Model Analysis

The following table 5.3 helps the evaluation of the structural model by reporting Stone-Geisser's Q2 values, f2 effect size, standardized path coefficients (β) for the relationship between two constructs and p-values. For Chin (1998) R2 of endogenous latent variables enter in a scale with three criteria where the value should be higher than 0.67; 0.33 and 0.19 to be consider a strong, moderate and weak relationship, respectively. Also, Q2 values should be higher than zero for model's predictive validity. According to Cohen (1977), the effect size (f2) also enter in a scale with three criteria where the values should be higher than 0.02, 0.15 and 0.35 to be consider a small, medium and large effect at the structural level. Finally, as for path coefficient it can vary between -1 and 1 and reports the strength of the relationship between two constructs, where an higher value equals higher strength relationship (Hair et al., 2014). Table 5.3 represents a complete bootstrap run with parallel processing, subsample of 500 and a significance level of 0.05.

Table 5.3 - Bootstrapping Results

	Relation	Std β	p-value	F2
H1	S → Ar	0.394	0.000	0.125
H2	A → Ar	0.302	0.000	0.073
H3	S → Pl	0.380	0.000	0.113
H4	A → Pl	0.299	0.000	0.070
H5	S → Att	0.231	0.000	0.054
H6	I → Att	0.292	0.000	0.094
H7	B → Att	0.283	0.000	0.091
H8	S → HB	0.448	0.000	0.202
H9	A → HB	0.340	0.000	0.117
H10	I → UB	0.250	0.000	0.066
H11	B → UB	0.231	0.000	0.058
H12	S → SB	0.184	0.000	0.024
H13	A → SB	0.429	0.000	0.147
H14	B → SB	0.122	0.001	0.147
H15	Att → UB	0.297	0.000	0.088
H16	Ar → RQ	0.024	0.412	0.001
H17	Pl → RQ	0.062	0.054	0.007
H18	Att → RQ	0.050	0.158	0.004
H19	HB → RQ	0.085	0.061	0.007
H20	UB → RQ	0.262	0.000	0.067
H21	SB → RQ	0.136	0.000	0.026
H22	RQ → PI	0.603	0.000	0.572

Through the inner model analysis and presented results from table 5.3, it is possible to verify that all hypotheses are supported, with exception of the hypotheses H16, H17, H18 and H19.

Firstly, analysing R2 reported values through PLS-Algorithm (table 10.3 in annex F), the model predicts 42% of the variance in Arousal, 40.1% of variance in Pleasure, 53.8% of variance in Hedonic Benefit, 42.7% of variance in Symbolic Benefit, 46.4% of variance in Attention, 43.1% of variance in Utilitarian Benefit and 36.4% of variance in Purchase Intention, all indicating a moderated prediction. Only Relation Quality predicted 67.5% indicating a strong prediction value.

Secondly, analysing Q2 reported values through Blindfolding, all values are higher than zero therefore confirm the model's predictive validity. Also, analysing effect size (f2) through PLS-Algorithm, H16 to H19 show the least values under 0.02 and only H22 show higher values above 0.35 with a high effect at the structural level. Also, H8 have a medium effect size. All other relations have weak effect sizes.

Finally, analysing standardized path coefficients (β) is worth of mention the strong relation for H1 (with β = 0.384), H3 (with β = 0.380), H13 (with β = 0.429) and H22 (with β = 0.603).

5.4. Creepiness Presence

Creepiness was added to the model with the purpose of understanding their presence influence when comparing the two different social virtual presence agents' samples. An independent sample t-test was conducted using SPSS Statistic Software.

Before proceeding is important to mention the 6 assumptions associated with t-testing: independent variables should consist of two categorical groups; dependent variables should be measuring a continuous scale; independence of the observation; no significant outliers; dependent variables should be approximately normally distributed for each sample and homogeneity of variance. Also, it is known that one or more of these assumptions are likely to be violated with real data.

Another CSV. File was created with two distinct columns with the two variables, the interaction type (independent variable) and creepiness (dependent variable). Afterwards a SPSS file with the CSV. Data was created. Several variable characteristics adjustments were made, and independent sample t-test was run with a 95% confidence interval.

Table 5.4 - Group Statistics

	Interaction Type	N	Mean	Std. Deviation	Std. Error Mean
Creepiness	w/ Human	341	1.55	0.708	0.38
	w/ Artificial Intelligence	332	3.92	1.741	0.96

Table 5.5 - t-test for Equality of Means

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Creepiness	**Equal Variances Assumed**	193.797	0.000	-23.305	671	0.000	-2.376	0.102	-2.577	-2.176
	Equal Variances Not Assumed			-23.083	435.216	0.000	-2.376	0.103	-2.579	-2.174

Table 5.4 and 5.5 show the results of the running test. Creepiness values can vary between 1 and 7, as 1 being consider nonexistence of emotional creepiness and 7 as being high level of emotional creepiness. The sample from Interaction type 1 (with Human as SVP) counts with 341 answers and a mean of 1.55 and, sample from Interaction type 2 (with AI as SVP) counts with 332 answers and a mean of 3.92.

In order to understand equal variance assumption Levine test took place with a sig lower than 0.05 so the Null hypothesis should be rejected. Further analysis will be done by looking to Equal variance not assumed line, where significance value is lower than 0.05 and then the null hypothesis should be rejected claiming that the difference between the two groups is significant. Providing a clean overview on H24.

5.5. Multi-Group Analysis

This dissertation uses a permutation test for a multi-group analysis (MGA) to detect the potential differences between the participants that, during the experience, interact with Humans Social Virtual Presence, and those who interact with an Artificial Intelligence Social Virtual Presence (H23). Also, the same permutation test is used to detect differences between participant who had access to a Customized Content-Based Recommendation Systems and those who don't (H25).

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5.5.1. Interaction Type

Table 5.6 - PLS-MGA: Interaction Type

		Path Coeffiecients		p-value		Path Coefficient Differences	p-value
		w/ Human	w/ AI	w/ Human	w/ AI		
H1	S → Ar	0.313	0.311	0.000	0.000	0.001	0.980
H2	A → Ar	0.301	0.249	0.000	0.000	0.052	0.551
H3	S → Pl	0.292	0.267	0.000	0.000	0.025	0.776
H4	A → Pl	0.206	0.321	0.001	0.000	-0.115	0.159
H5	S → Att	0.166	0.152	0.004	0.002	0.014	0.860
H6	I → Att	0.412	0.181	0.000	0.000	0.231	0.001
H7	B → Att	0.119	0.295	0.038	0.000	-0.176	0.018
H8	S → HB	0.360	0.355	0.000	0.000	0.005	0.957
H9	A → HB	0.294	0.341	0.000	0.000	-0.047	0.544
H10	I → UB	0.276	0.212	0.000	0.000	0.064	0.405
H11	B → UB	0.180	0.184	0.004	0.001	-0.005	0.960
H12	S → SB	0.219	-0.005	0.000	0.945	0.224	0.019
H13	A → SB	0.436	0.345	0.000	0.000	0.091	0.247
H14	B → SB	0.113	-0.021	0.017	0.694	0.134	0.070
H15	Att → UB	0.176	0.161	0.005	0.003	0.015	0.847
H16	Ar → RQ	0.068	0.021	0.232	0.597	0.047	0.494
H17	Pl → RQ	0.177	-0.043	0.001	0.221	0.221	0.000
H18	Att → RQ	0.048	0.061	0.374	0.003	-0.013	0.847
H19	HB → RQ	0.180	0.017	0.010	0.754	0.163	0.050
H20	UB → RQ	0.204	0.265	0.011	0.000	-0.061	0.488
H21	SB → RQ	0.058	0.249	0.387	0.000	-0.191	0.016
H22	RQ → PI	0.531	0.589	0.000	0.000	-0.058	0.264

After running a multi-group analysis test, the summarized results are reported on table 5.6 with both cases of the Social Virtual Presence interaction with a Human and with an Artificial Intelligence and reveals significant differences. The sample have 342 results from interaction with Human and 332 results from interaction with AI. While analysing the table it reveals that for both interaction type S→Ar to B→UB, A→SB, Att→UB, UB→RQ and RQ→PI are supported. But only S→HB and RQ→PI demonstrate a strong effect size, with values over 0.35 for both interactions. Also, S→Ar to S→Att, A→HB to B→UB, Att→UB and UB→RQ present a moderate effect for both samples, with a path coefficient between 0.15 and 0.35. Looking to the other connection relevant in both samples are I→Att, having high effect for the sample with Human and moderate effect for the other group; B→Att, with weak for the sample with Human and moderate effect for the other group and A→SB, with high for the sample with Human and for the other group moderate.

Overall looking to the results, the differences between samples are fully supported for I→Att, B→Att, S→SB, Pl→RQ and SB→RQ, and have relevant values.

Starting with Intellectual stimuli to Attention Organism, the relationship proved to be positive for both interactions but with a high value positive path coefficient difference of 0.231. This

represents a strong relation for samples who interact with a Human against a low moderate relation for samples who interact with Artificial Intelligence. Also, Behaviour stimuli to Attention Organism, proved to be significant but with a negative path coefficient difference showing a stronger relation for samples interact with Artificial Intelligence against Human interactions.

Furthermore, both Sensory Stimuli to Symbolic Benefit Organism and Pleasure Organism and Relation Quality Response, have a highly relevant difference value of 0.224 and 0.221 respectively. Turning a negative path coefficient value for samples who interact with an Artificial Intelligence to positive path coefficient value for samples who interact with Human. For Symbolic Benefit Organism to Relation Quality Response, Human interaction sample takes a lower value with a weak relation against Artificial interaction sample with a moderate effect. These results confirm the importance of the interaction type on on-line shopping experience. Further analysis is on next chapter.

5.5.2. Customized Content-Based Recommendation Systems

Table 5.7 - PLS-MGA: Customized Content-Based Recommendation Systems

		Path Coeffiecients		p-value		Path Coefficient Differences	p-value
		w/ RS	no RS	w/ RS	no RS		
H1	S → Ar	0.405	0.395	0.000	0.000	0.011	0.902
H2	A → Ar	0.316	0.285	0.000	0.000	0.031	0.712
H3	S → Pl	0.456	0.301	0.000	0.000	0.155	0.064
H4	A → Pl	0.277	0.330	0.000	0.000	-0.054	0.524
H5	S → Att	0.221	0.231	0.000	0.000	-0.010	0.885
H6	I → Att	0.313	0.272	0.000	0.000	0.041	0.558
H7	B → Att	0.328	0.255	0.000	0.000	0.073	0.320
H8	S → HB	0.547	0.355	0.000	0.000	0.192	0.005
H9	A → HB	0.227	0.443	0.000	0.000	-0.215	0.003
H10	I → UB	0.200	0.290	0.000	0.000	-0.090	0.215
H11	B → UB	0.263	0.199	0.000	0.000	0.064	0.403
H12	S → SB	0.091	0.269	0.211	0.000	-0.178	0.049
H13	A → SB	0.425	0.433	0.000	0.000	-0.009	0.905
H14	B → SB	0.206	0.040	0.000	0.436	0.166	0.012
H15	Att → UB	0.308	0.296	0.000	0.000	0.012	0.876
H16	Ar → RQ	0.038	-0.033	0.235	0.462	0.071	0.197
H17	Pl → RQ	0.017	0.071	0.569	0.116	-0.053	0.339
H18	Att → RQ	0.062	0.011	0.264	0.821	0.051	0.485
H19	HB → RQ	0.013	0.181	0.753	0.006	-0.168	0.037
H20	UB → RQ	0.311	0.286	0.000	0.000	0.025	0.750
H21	SB → RQ	0.234	0.014	0.000	0.787	0.220	0.001
H22	RQ → PI	0.765	0.432	0.000	0.000	0.334	

After running a multi-group analysis test, the summarized results are reported on table 5.7 with both cases of the Customized Content-Based Recommendation Systems from feedback active and without any type of customization. The sample have 344 results from experience with

Customized Content-Based Recommendation Systems active and 329 results from experience without Customized Content-Based Recommendation Systems active. Only S→Ar, S→HB, A→SB and RQ→PI demonstrate a strong effect size, with values over 0.35 for both experiences while being supported. Also, A→Ar, A→Pl to B→Att, I→UB, B→UB, Att→UB and UB→RQ are supported and have a moderate effect size with value between 0.15 and 0.35 for both cases. As regarding other relevant connection are S→Pl, having high effect for the sample with recommendation system and moderate effect for the other group and A→HB, with moderate effect for the sample with Customized Content-Based Recommendation Systems and high effect for the other group.

Overall looking to the results, the differences between samples are fully supported for S→HB, A→HB, S→SB, B→SB, HB→RQ and SB→RQ, and have relevant values. RQ→PI have no p-value associated but is important to mention the strength of path difference.

Starting with Sensory stimuli to Hedonic Benefit Organism, the relationship proved to be positive for both interactions but with a high value positive path coefficient difference of 0.192. This represents a stronger relation for samples who had Customized Content-Based Recommendation Systems active against those without it. Also, Affective Stimuli to Hedonic Benefit Organism, Sensory Stimuli to Symbolic Benefit Organism and Hedonic Benefit Organism to Relation Quality Response proved to be significant but with a negative path coefficient difference showing a stronger relation for samples that did not had the recommendation system active. From the 3 connection, only A→HB had the sample p-values relevant for both cases and with a higher coefficient path difference of -0.215.

Furthermore, both Behavioural Stimuli to Symbolic Benefit Organism and Symbolic Benefit Organism and Relation Quality Response, have a highly relevant path coefficient difference value of 0.166 and 0.220 respectively, but with a nonrelevant p-value for the sample with no Customized Content-Based Recommendation Systems. Finally, Relationship Quality Response to Purchase Intention Response is worth of mention beside the nonexistence of a p-value for the path coefficient difference. The relation strength shows to be highly significant when comparing both samples. These results confirm the importance of Customized Content-Based Recommendation Systems on on-line shopping experience. Further analysis is on next chapter.

6.   Discussion

This research approaches a new technological and unexplored tendency to improve the on-line shopping experience ecosystem. It does so by studying the potential application of the technology with an on-line retail fictitious platform, following consumer searching process from beginning to end and retrieve the main data information. Previous studies found that social presence and Customized Content-Based Recommendation Systems can improve customer product searching experience, leading to an increase value on revenue and brand loyalty (Lee & Chau, 2011; Reynolds & Beatty, 1999). The same logic is applied to on-line shopping where all the interactions are made by an agent, that can either take form of Artificial Intelligent agent or a Human Agent and, where recommendation system effect can unleash the possibility of a higher level of customized product suggestion for each user.

In order to measure the different responses and relations on a high-technological context, a S-O-R model was applied, studying consumers responses to the different stimulus of the main brand. S-O-R was already proven to be a well structural modelling tool that usually include not only emotional responses to a stimulus but also cognitive responses, as seen on chapter 3. We will first address the overall model and later the different moderation effects.

Firstly, both Sensorial and Affective stimulus are proven to be, from previous studies, predictors of direct positive emotional responses (Jones et al., 2013). In fact, the results indicate on the overall model a positive path coefficient from a significant sample, yet with a consider weak effect size, lower than 0,15, for all connections. Looking more closely, **Hypothesis 1** (S→Ar: $\beta=0.394$, p-value<0.05 and $0.02<f2<0.15$)**, Hypothesis 2** (A→Ar: $\beta=0.302$, p-value<0.05 and $0.02<f2<0.15$)**, Hypothesis 3** (S→Pl: $\beta=0.380$, p-value<0.05 and $0.02<f2<0.15$) and **Hypothesis 4** (A→Pl: $\beta=0.299$, p-value<0.05 and $0.02<f2<0.15$) were all accepted in the overall model with moderate relation levels. The relatively high level of path coefficient is expected since the experience took place on a high-technological environment with innovativeness and visual appeal, that is consider by S. Lee et al. (2011) an important factor on emotional response strength. The affective stimuli, when compared with Sensory stimuli, represents a less strong relation and a weaker significant lower effect size with values near 0.07. These results might be explained by the lack of brand touchpoints on a recurrent basis timeline creating barrier on delivering a subconscious message (Russell & Pratt, 1980). On the other hand, senses were extremely used with recurrent imagery and sound throughout the entire experience.

Moving forward in the model, the cognitive response vary from different sources and have the third highest prediction effect from the model. The Sound semantically, thinking process and cultural background can guide users' visual attention on a specific on-line and retail searching task (Knoeferle et al., 2016). The **Hypothesis 5** (S→Att: β=0.231, p-value<0.05 and 0.02<f2<0.15), **Hypothesis 6** (I→Att: β=0.292, p-value<0.05 and 0.02<f2<0.15) and **Hypothesis 7** (B→Att: β=0.283, p-value<0.05 and 0.02<f2<0.15) are supported, but with a lower effect size comparing with the previous seen Sensory relations to Emotional Response.

Emotional and cognitive responses are the usual core aspects on brand perception, but also delivering high quality benefits improve customers loyalty and the establishment of perceived product quality and purchase intention (E. S. T. Wang, 2017). For Schuitema et al. (2013), Hedonic Benefits sustain a positive perception on how the search engine experience is deliver, with a high-technological presence, and it success relies on the increase of the hedonic or entertainment value and the increase level of perceived security in the shop (Sarkar, 2011). Accepting **Hypothesis 8** (S→HB: β=0.448, p-value<0.05 and 0.02<f2<0.15) and **Hypothesis 9** (A→HB: β=0.340, p-value<0.05 and 0.02<f2<0.15)**,** where Sensory leverage makes H8 the second highest relation within the model. A smaller tendency frame is **Hypothesis 15** (Att→UB: β=0.297, p-value<0.05 and 0.02<f2<0.15), that is also accepted but with much lower size effects and path coefficient. This result sustains a positive relation between cognitive responses and Utilitarian Benefit, that was previous proven (see chapter 3). With even lower effect sizes are **Hypothesis 10** (I→UB: β=0.250, p-value<0.05 and 0.02<f2<0.15), **Hypothesis 11** (B→UB: β=0.231, p-value<0.05 and 0.02<f2<0.15) and **Hypothesis 12** (S→SB: β=0.184, p-value<0.05 and 0.02<f2<0.15)**,** but they keep a significant p-values and positive relation levels. Sensory to Symbolic benefit organism is the lowest accepted f2 value with a value near 0.02, making it a doubtful relation. This might happen because the relation exists, but is associated to the sense of self perception on a fitness cultural scale from the brand and is not seen by the users a conscious contact (Schuitema et al., 2013). As for Affective and Behavioural size effect on Symbolic Benefit, the values are near moderation of 0,15 and positive path coefficient, with Affective to Symbolic Relation having the third highest value. Thus, **Hypothesis 13** (A→SB: β=0.429, p-value<0.05 and 0.02<f2<0.15) and **Hypothesis 14** (B→SB: β=0.122, p-value<0.05 and 0.02<f2<0.15) are accepted. Differently from Sensory stimuli, for Schmitt (1999) Affective goal is the creation of a subconscious positive mood link with the main brand being directly connected with the symbolic benefit objective, therefore the relation is stronger.

With the objective of retaining and generating loyal consumers, the client perception needs to be address. It was expected that emotional and cognitive response have a strong positioning on increasing relationship quality, but when it comes to on-line retail experience and the presence of virtual agents, no significant results are found, meaning that **Hypothesis 16** (S→RQ: p-value>0.05 and f2<0.02), **Hypothesis 17** (A→RQ: p-value>0.05 and f2<0.02) and **Hypothesis 18** (Att→RQ: p-value>0.05 and f2<0.02) are rejected. The same rejection happens in market sector such as PC-Home banking, because consumers expect a weak/moderate level of user friendliness and higher level of virtual security (C. L. Wang, 2016).

Furthermore, O'Brien (2010) results show an important role of Hedonic Benefit and Utilitarian Benefit on perceived quality of user experience in the on-line environment from websites interactions; but when it comes to on-line retail experience and the presence of virtual agents, no significant results are found for Hedonic Benefit presence. **Hypothesis 19** (HB→RQ: p-value>0.05 and f2<0.02) is also rejected. As for Symbolic and Utilitarian benefits importance in delivering high quality process on-line experience are significant, yet with low effect size values. Support is found for **Hypothesis 20** (B→SB: β=0.262, p-value<0.05 and 0.02<f2<0.15) **and Hypothesis 21** (B→SB: β=0.136, p-value<0.05 and 0.02<f2<0.15), in both the results obtained and previous research.

Finally, it is stablish from many authors the Relation Quality overall power on Purchase Intention, causing a direct impact on consumer action (Mittal et al., 1999; Zeithaml & Berry, 1996). Such strong relation is verified within the study experience making Relation Quality to Purchase Intention the connection with highest value on effect size (f2=0.572) and the highest relation strength (β=0.603 and p-value<0.05), thus giving support to the proposed **Hypothesis 22.**

Lastly, the shown multigroup analysis allowed the interpretation of several differences in the consumer response where the social virtual presence is delivered by a Human agent or an Artificial Intelligent agent (H23). Furthermore, the possibility of emotional creepiness role is address (H24). Also, it is analysed the effect on consumers actions by having Customized Content-Based Recommendation Systems active or inactive (H25). According to Chérif & Lemoine (2019), positive overall effects on brand trust and social perception, were seen more relevant on on-line interaction using a human pre-recorded voices than synthetic voices. The results suggest a similar outcome, where relevant difference relationship between Intellectual and Attention, Sensory and Symbolic Benefit, and Pleasure and Relation Quality, are

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significantly stronger in the experiment version with Human Agent Interaction (p-values<0.05), partially supporting **Hypothesis 23**. The opposing strength also occurs with relationships between Behavioural and Attention, and Symbolic Benefit and Relation Quality, showing a significantly stronger relation in the experiment version with Artificial Intelligence Agent Interaction, yet with a lower absolute registered difference. This contrary results might be partial explained with emotional creepiness presence observer in chapter 5.4, where the group interacting with an AI agent had a moderate creepiness presence with an average respond of 3.92 and the group interacting with an Human with 1.55, having near no incidence at all, fully supporting **Hypothesis 24**. Also, the results support the existence of a significant difference between both groups, in some cases, like Sensory to Symbolic Benefit and Pleasure to Relation Quality the participants who interact with AI did not had significant values to support such relations. The contrary happens in Symbolic Benefit to Relation Quality relation where no significant results were present for the group interacting with Human Agent. Costumer perceive AI interaction as a more technological asset to "show-off" and therefore the Symbolic Value takes more importance in AI interaction context. Sustaining the claim that Artificial Intelligence actors take vital role on having symbolic attributes, provide a sense of self and social identity (Schuitema et al., 2013)

Looking to the group differences between the two levels of Customized Content-Based Recommendation Systems , the results propose a relevant change between Sensory and Hedonic Benefit, Behavioural and Symbolic Benefit, Symbolic Benefit and Relation Quality, and Relation Quality and Purchase Intention, in which are significantly stronger in the experiment version with recommendation system active (p-values<0.05), partially supporting **Hypothesis 25**. Relation Quality to Purchase Intention connection register the highest path coefficient difference value leading by Recommendation system presence. This was already expected since it provides a sense of customers' expectations understand, and facilitate the information overload (Pazzani & Billsus, 2007). Other recommendations on-line systems we already positively tested as having a core effect on purchase intention of the customers (Shih & Liu, 2008). In more practical terms, these results imply that Recommendation system have impact on how people are perceived at a status level and have a huge positive effect on purchase intention of consumers. The opposing strength also occurs with relationships between Affective and Hedonic Benefit, Sensory and Symbolic Benefit, and Hedonic Benefit and Relation Quality, showing a significantly stronger relation in the experiment version without Customized Content-Based Recommendation Systems.

7.   Conclusion and practical implications

The main aim of the present study was to examine the role of humanization and computed anthropomorphic characteristics on voice assistance role, as a social virtual presence and, understand the impacting on customers purchase intention of implementing a Customized Content-Based Recommendation Systems at on-line shopping platform.

Previous studies have tended to focus on the role of anthropomorphic characteristics, converging only on voice, or imagery personification, registering a positive attribute effect presence on retail (Chérif & Lemoine, 2019). The present research confirms the importance of both those characteristics simultaneously on the relation quality perception and purchase intention, within a human/computer interaction on a shopping on-line platform context. Also, the results indicate that human voice and pre-recorded imagery can upgrade the emotional and cognitive responses of customers while interacting with anthropomorphic characteristics, when comparing with the use of synthetic voice and computed imagery. The synthetic voice and computed imagery are shown to be relevant on cases where customers want to receive a better perception from others, increasing their status level by using high technological products.

Also, studies suggest that on-line shopping recommendation system gains a lot with the integration of collaborative filtering recommendation system, that tends to be less evasive and less time consuming for users (Pazzani & Billsus, 2007). The present study provides an overview on an alternative recommendation system, that uses users consented provided data and recommend according with their preferences. The results confirm the importance of such system on changing customers purchase intention during their interaction with a customization centre.

Furthermore, after analysing the results, its present four key conclusions that can have practical implication on day-to-day on-line business development:

Prioritize the use of Social Presence. Brick-and-mortars traditional retail gains a lot with social interaction, the same can be replicated at on-line retail context. This study proves the importance of SVP brand stimulus on customers purchase intention, satisfaction and trust. SVP can prioritize customer interests and guide them throughout the on-line platform to have the highest possible level of experience without leaving the customer "lost" on-line. Such technology provides the possibility for shy customers to address social interaction without having to feel nervous and increase the investment on relational level with the interaction

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intervenient. It was verified that both emotional response and cognitive response from customers had positive responses from all SVP agents.

Implement Customized Content-Based Recommendation Systems. The current findings show that, between the two groups, that used and not used Recommendation system, the relationship between Relation Quality and Purchase Intention is highly strengthen by Recommendation system activation. Collecting all type of user information and actively suggesting a product according with that data, allows on-line platforms to help customers choose products that better fit their need and improve conversion rates and overall client satisfaction in the purchase. The same environment has a contrary effect on main symbolic benefit relations but does not have major importance in overall panorama while leading with positive customer purchase intention.

Understand when to use Human Agent and Artificial Intelligent Agent. Both agents improve the quality of customer experience and customer final purchase intention but each one has their own environment fitness advantages. In this study, was verified that Human Agent presence improves the intellectual stimulus and the Hedonic Benefit overall organism and has a better impact on purchasing intention action. On the other hand, Artificial Intelligence Agent needs to be more carefully addressed, given the presence of emotional creepiness; however, it has a higher positive impact on symbolic benefits, improving the people network perception from the user.

Improve Guided Product Search Experience. Overall, was proven by other studies that the use of sound and imagery to assist during searching moments improves customer attention (Bartneck, 2001; Chérif & Lemoine, 2019). The same is seen in this study, where cognitive and emotional levels are positively impacted by the brand that target the use of human senses during their shopping path and maintain customers sustained attention throughout the all user experience.

8.   Limitations and implications for future research

Although this research makes a clear contribution to research on on-line shopping channel improvement, it is also subject to several limitations.

Firstly, due to participants time restriction and being an on-line platform experiment, it was not possible to restrict contributors tastes to meet bicycles market, being a possible attention grabber fragility. Also, participants time restriction only allows a moderate use of interactive touchpoints with agents to keep their volunteer interest to the end. Secondly, the possible set of characteristics, concepts and the recommendation system algorithm model had to be shortened, to have the most participants possible and a control research environment according with the given time frame. It is possible that participants did not privilege any of the given characteristics. Furthermore, the made-up brand its new in the market and there are not enough time-based touchpoints to educate participants on the all brand identity and goals. Participants did not have the time to create connection between the newly presented brand. To eliminate such limitation the study context should be separated through a controlled timeline for more than one experience moment.

Finally, the technology is yet new on the market and some people might consider a strange experience when using for the first time. The recurrent use of the technology is expected to improve customer perception and being comprehensive towards the experience mechanics. Also is expected for the users to better understanding the goals and objectives of the technology by using it more and more.

9.   References

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10.   Appendix

Appendix A Simple Brand Guide

TESE DE MESTRADO ISCTE

BEM-VINDO

Obrigado por aceitar fazer parte deste estudo.

O presente estudo, no âmbito da tese de mestrado do curso de Gestão de Serviços e Tecnologia do Iscte, visa explorar alguns aspectos da compra online. **Imagine que vai adquirir uma bicicleta de uma nova marca no mercado.**

Irá demorar aproximadamente 15 minutos.

A participação no estudo é voluntária e todas as respostas são anónimas e confidenciais. A coleção de informação será apenas usada com o propósito académico e ciêntifico.

Para informações adicionais contacte fpsao@iscte-iul.pt

Por favor verifique se tem o som do dispositivo ligado.

Iniciar

TESE DE MESTRADO ISCTE

Appendix C: Personas and Scenarios without recommendation System active

Meet Luis.

Luis is 45 years old, divorce with no family. He is known to be a workaholic on a multinational company based in Lisbon and spends every day working. He enjoys going to work by bicycle.

And now meet Maria.

Maria is 32 years old freelancer in design, living in Madrid. She enjoys her leisure time and do not like to spend hours on irrelevant tasks. She hates shopping and only buys if it is extremely necessary.

- Scenario 3

Luis just broke is old bicycle while going to work. Alone, from the comfort of his home, after a working day, Luis open E-Fiv on-line store platform and interact with the Artificial Intelligence virtual agent by skipping all queries to give his personal information.

As he skips all the question the virtual agent shows him the most sold product within last week, an electrical bicycle for an affordable price from E-Fiv. While the virtual agent in video explains the crucial characteristics, Luis goes through all product images provided. As he checks out, the platform registered in his account the purchase information and any feedback provided by Luis for future purchases and interactions.

- Scenario 4

Maria entered in a new project on the other side of the city. As she want to go green and do not want to travel by any petrol motor transportation, Maria open E-Fiv on-line store platform and interact with the Human virtual agent by skipping all queries to give his personal information.

As she skips all the question the virtual agent shows her the most sold product within last week, an electrical bicycle for an affordable price from E-Fiv. While the virtual agent in video explains the crucial characteristics, Maria goes through all product images provided. As she checks out, the platform registered in her account the purchase information and any feedback provided by Maria for future purchases and interactions.

Appendix D: Social Presence Agents Audio and Video text scripts

	w/ AI	w/ Human
First page interaction Audio	Olá bem-vindo à loja on-line. Primeiro, indique-nos a sua idade.	
Second page interaction Audio	Agora que sabemos a sua idade, por favor indique-nos o seu sexo e, se alguma vez, comprou alguma bicicleta.	
Third page interaction Audio	Agora, para terminar, indique-nos a sua área de residência habitual e, uma característica que valorize quando está a comprar uma bicicleta.	
Without recommendation system (Video Page)	Olá sou o assistente! Vejo que está interessado na compra de uma bicicleta nova da nossa marca. Nesta última semana a bicicleta mais popular é a BT 3000. Uma bicicleta elétrica com mais de 40km de autonomia e que pode atingir os 20km/h. Inclui sistema anti-roubo, garantia de 2 anos, selim ergonómico e luzes LED!	Olá sou o Francisco! Vejo que está interessado na compra de uma bicicleta nova da nossa marca. Nesta última semana a bicicleta mais popular é a BT 3000. Uma bicicleta elétrica com mais de 40km de autonomia e que pode atingir os 20km/h. Inclui sistema anti-roubo, garantia de 2 anos, selim ergonómico e luzes LED!
For people that choose Price as main characteristic and Urban as residential area (Video Page)	Olá sou o assistente! Vejo que está interessado na compra de uma bicicleta nova da nossa marca. De acordo com a sua área de residência Urbana e carateristica selecionada, Preço. A bicicleta que sugerimos é a BT 3000. Uma bicicleta tradicional preparada para a sua vida na cidade. Com quadro em aço, 6 velocidade e ideal para andar pela cidade sem ser de carro. Com o preço de 99€.	Olá sou o Francisco! Vejo que está interessado na compra de uma bicicleta nova da nossa marca. De acordo com a sua área de residência Urbana e carateristica selecionada, Preço. A bicicleta que sugerimos é a BT 3000. Uma bicicleta tradicional preparada para a sua vida na cidade. Com quadro em aço, 6 velocidade e ideal para andar pela cidade sem ser de carro. Com o preço de 99€.
For people that choose Aesthetics as main characteristic and Urban as residential area (Video Page)	Olá sou o assistente! Vejo que está interessado na compra de uma bicicleta nova da nossa marca. De acordo com a sua área de residência Urbana e carateristica selecionada, Estética. A bicicleta que sugerimos é a BT 3000. Uma bicicleta tradicional preparada para a sua vida na cidade. Com design simples e aeródinamico agradável à vista, ideal para andar pela cidade sem ser de carro.	Olá sou o Francisco! Vejo que está interessado na compra de uma bicicleta nova da nossa marca. De acordo com a sua área de residência Urbana e carateristica selecionada, Segurança. A bicicleta que sugerimos é a BT 3000. Uma bicicleta tradicional preparada para a sua vida na cidade. Com design simples e aeródinamico agradável à vista, ideal para andar pela cidade sem ser de carro.
For people that choose Quality as main characteristic and Urban as residential area (Video Page)	Olá sou o assistente! Vejo que está interessado na compra de uma bicicleta nova da nossa marca. De acordo com a sua área de residência Urbana e carateristica selecionada, Qualidade. A bicicleta que sugerimos é a BT 3000. Uma bicicleta tradicional preparada para a sua vida na cidade. Com acabamentos em couro, selim ergonómico e quadro e garfo em aço para longa duração,ideal para andar pela cidade sem ser de carro.	Olá sou o Francisco! Vejo que está interessado na compra de uma bicicleta nova da nossa marca. De acordo com a sua área de residência Urbana e carateristica selecionada, Qualidade. A bicicleta que sugerimos é a BT 3000. Uma bicicleta tradicional preparada para a sua vida na cidade. Com acabamentos em couro, selim ergonómico e quadro e garfo em aço para longa duração,ideal para andar pela cidade sem ser de carro.
For people that choose Technology as main characteristic and Urban as residential area (Video Page)	Olá sou o assistente! Vejo que está interessado na compra de uma bicicleta nova da nossa marca. De acordo com a sua área de residência Urbana e carateristica selecionada, Tecnologia. A bicicleta que sugerimos é a BT 3000. Uma bicicleta elétrica preparada para a sua vida na cidade sem esforço maior. Com luzes LED, autonomia de 40km, velocidade máxima	Olá sou o Francisco! Vejo que está interessado na compra de uma bicicleta nova da nossa marca. De acordo com a sua área de residência Urbana e carateristica selecionada, Tecnologia. A bicicleta que sugerimos é a BT 3000. Uma bicicleta elétrica preparada para a sua vida na cidade sem esforço maior. Com luzes LED, autonomia de 40km/h,

	de 25km/h e ecrã de auxilio com todas as informações,ideal para andar pela cidade sem ser de carro.	velocidade máxima de 25km/h e ecrã de auxilio com todas as informações,ideal para andar pela cidade sem ser de carro.
For people that choose Price as main characteristic and Rural as residential area (Video Page)	Olá sou o assistente! Vejo que está interessado na compra de uma bicicleta nova da nossa marca. De acordo com a sua área de residência Rural e carateristica selecionada, Preço. A bicicleta que sugerimos é a BT 3000. Uma bicicleta tradicional preparada para a sua vida no meio rural. Com quadro em aço, 6 velocidade e ideal para andar por todo o terreno sem ser de carro. Com o preço de 99€.	Olá sou o Francisco! Vejo que está interessado na compra de uma bicicleta nova da nossa marca. De acordo com a sua área de residência Rural e caraterista selecionada, Preço. A bicicleta que sugerimos é a BT 3000. Uma bicicleta tradicional preparada para a sua vida no meio rural. Com quadro em aço, 6 velocidade e ideal para andar por todo o terreno sem ser de carro. Com o preço de 99€.
For people that choose Aesthetics as main characteristic and Rural as residential area (Video Page)	Olá sou o assistente! Vejo que está interessado na compra de uma bicicleta nova da nossa marca. De acordo com a sua área de residência Rural e caraterista selecionada, Estética. A bicicleta que sugerimos é a BT 3000. Uma bicicleta tradicional preparada para a sua vida no meio rural. Com design simples e aeródinamico agradável à vista, ideal para andar por todo o terreno sem ser de carro.	Olá sou o Francisco! Vejo que está interessado na compra de uma bicicleta nova da nossa marca. De acordo com a sua área de residência Rural e caraterista selecionada, Estética. A bicicleta que sugerimos é a BT 3000. Uma bicicleta tradicional preparada para a sua vida no meio rural. Com design simples e aeródinamico agradável à vista, ideal para andar por todo o terreno sem ser de carro.
For people that choose Quality as main characteristic and Rural as residential area (Video Page)	Olá sou o assistente! Vejo que está interessado na compra de uma bicicleta nova da nossa marca. De acordo com a sua área de residência Rural e caraterista selecionada, Qualidade. A bicicleta que sugerimos é a BT 3000. Uma bicicleta tradicional preparada para a sua vida no meio rural. Com acabamentos em couro, selim ergonómico e quadro e garfo em aço para longa duração,ideal para andar por todo o terreno sem ser de carro.	Olá sou o Francisco! Vejo que está interessado na compra de uma bicicleta nova da nossa marca. De acordo com a sua área de residência Rural e caraterista selecionada, Qualidade. A bicicleta que sugerimos é a BT 3000. Uma bicicleta tradicional preparada para a sua vida no meio rural. Com acabamentos em couro, selim ergonómico e quadro e garfo em aço para longa duração,ideal para andar por todo o terreno sem ser de carro.
For people that choose Technology as main characteristic and Rural as residential area (Video Page)	Olá sou o assistente! Vejo que está interessado na compra de uma bicicleta nova da nossa marca. De acordo com a sua área de residência Rural e caraterista selecionada, Tecnologia. A bicicleta que sugerimos é a BT 3000. Uma bicicleta elétrica preparada para a sua vida no meio rural. Com luzes LED, autonomia de 40km, velocidade máxima de 25km/h e e ecrã de auxilio com todas as informações,ideal para andar pela cidade sem ser de carro.	Olá sou o Francisco! Vejo que está interessado na compra de uma bicicleta nova da nossa marca. De acordo com a sua área de residência Rural e caraterista selecionada, Tecnologia. A bicicleta que sugerimos é a BT 3000. Uma bicicleta elétrica preparada para a sua vida no meio rural. Com luzes LED, autonomia de 40km/h, velocidade máxima de 25km/h e e ecrã de auxilio com todas as informações, ideal para andar pela cidade sem ser de carro.
Brand Exposure Audio (Video Page)	Somos uma nova marca com loja online no mercado de bicicletas. Com diferentes modelos em produção procuramos satisfazer as necessidades de cada um e estar mais próximo dos nossos clientes. Iniciámos a nossa comercialização em 2020 e utilizamos um sistema de feedback rigoroso para conhecer melhor o consumidor final.	

Appendix E: Final Questionnaire

TESE DE MESTRADO ISCTE

Quando mencionado "vendedor" refere-se ao assistente que interagiu consigo por audio e video.

Inquérito

Por favor expresse o grau de concordância com as afirmações.

Envolvo-me em ações e comportamentos de interação física ou motora quando uso esta marca.

○ Discordo Totalmente   ○ Discordo   ○ Discordo de Alguma Forma   ○ Indeciso   ○ Concordo de Alguma Forma   ○ Concordo   ○ Concordo Totalmente

Esta marca não me faz pensar.

○ Discordo Totalmente   ○ Discordo   ○ Discordo de Alguma Forma   ○ Indeciso   ○ Concordo de Alguma Forma   ○ Concordo   ○ Concordo Totalmente

Penso muito quando me deparo com a marca.

○ Discordo Totalmente   ○ Discordo   ○ Discordo de Alguma Forma   ○ Indeciso   ○ Concordo de Alguma Forma   ○ Concordo   ○ Concordo Totalmente

Esta marca não é orientada para a resolução de um problema ou situação.

○ Discordo Totalmente   ○ Discordo   ○ Discordo de Alguma Forma   ○ Indeciso   ○ Concordo de Alguma Forma   ○ Concordo   ○ Concordo Totalmente

Esta marca resulta em experiências de interação físicas ou motoras.

○ Discordo Totalmente   ○ Discordo   ○ Discordo de Alguma Forma   ○ Indeciso   ○ Concordo de Alguma Forma   ○ Concordo   ○ Concordo Totalmente

Esta marca disperta sentimentos.

○ Discordo Totalmente   ○ Discordo   ○ Discordo de Alguma Forma   ○ Indeciso   ○ Concordo de Alguma Forma   ○ Concordo   ○ Concordo Totalmente

Não sinto conecção emocional com a marca.

○ Discordo Totalmente   ○ Discordo   ○ Discordo de Alguma Forma   ○ Indeciso   ○ Concordo de Alguma Forma   ○ Concordo   ○ Concordo Totalmente

Esta marca é uma marca emocional.

○ Discordo Totalmente   ○ Discordo   ○ Discordo de Alguma Forma   ○ Indeciso   ○ Concordo de Alguma Forma   ○ Concordo   ○ Concordo Totalmente

Esta marca é visualmente forte ou disperta algum outro sentido.

○ Discordo Totalmente   ○ Discordo   ○ Discordo de Alguma Forma   ○ Indeciso   ○ Concordo de Alguma Forma   ○ Concordo   ○ Concordo Totalmente

Esta marca não disperta qualquer um dos meus sentidos.

○ Discordo Totalmente   ○ Discordo   ○ Discordo de Alguma Forma   ○ Indeciso   ○ Concordo de Alguma Forma   ○ Concordo   ○ Concordo Totalmente

Acho esta marca interessante no sentido sensorial.

○ Discordo Totalmente ○ Discordo ○ Discordo de Alguma Forma ○ Indeciso ○ Concordo de Alguma Forma ○ Concordo ○ Concordo Totalmente

Esta marca estimula a minha curiosidade e resolução de problemas.

○ Discordo Totalmente ○ Discordo ○ Discordo de Alguma Forma ○ Indeciso ○ Concordo de Alguma Forma ○ Concordo ○ Concordo Totalmente

Próximo >

● **TESE DE MESTRADO ISCTE**

Inquérito

Quando mencionado "vendedor" refere-se ao assistente que interagiu consigo por audio e video.

Por favor expresse o grau de concordância com as afirmações.

Qual o grau de motivação durante a interação com o vendedor para reter as caraterísticas principais da bicicleta?

0 = sem motivação durante a interação para reter as caraterísticas.

50 = motivado durante a interação para reter as caraterísticas em 50%

100 = motivado durante a interação para reter as caraterísticas em 100%

○ 0 ○ 10 ○ 20 ○ 30 ○ 40 ○ 50 ○ 60 ○ 70 ○ 80 ○ 90 ○ 100

Qual o grau de foco no que é transmitido durante a interação com o vendedor caso haja distrações à sua volta? (exemplo: crianças a brincar)

0 = sem foco durante a interação

50 = 50% de foco durante a interação

100 = 100% de foco durante a interação

○ 0 ○ 10 ○ 20 ○ 30 ○ 40 ○ 50 ○ 60 ○ 70 ○ 80 ○ 90 ○ 100

Qual o grau de foco no que é transmitido durante a interação com o vendedor?

0 = sem foco durante a interação

50 = 50% de foco durante a interação

100 = 100% de foco durante a interação

○ 0 ○ 10 ○ 20 ○ 30 ○ 40 ○ 50 ○ 60 ○ 70 ○ 80 ○ 90 ○ 100

Próximo >

Inquérito

Quando mencionado "situação" refere-se ao momento com o assistente que interagiu consigo por audio e video.

Por favor expresse o grau de concordância com as afirmações.

Tive um pressentimento que havia algo estranho durante a situação.

○ Discordo Totalmente   ○ Discordo   ○ Discordo de Alguma Forma   ○ Indeciso   ○ Concordo de Alguma Forma   ○ Concordo   ○ Concordo Totalmente

Durante a situação, senti-me enjoado/a.

○ Discordo Totalmente   ○ Discordo   ○ Discordo de Alguma Forma   ○ Indeciso   ○ Concordo de Alguma Forma   ○ Concordo   ○ Concordo Totalmente

Esta situação de alguma forma fez-me sentir ameaçado.

○ Discordo Totalmente   ○ Discordo   ○ Discordo de Alguma Forma   ○ Indeciso   ○ Concordo de Alguma Forma   ○ Concordo   ○ Concordo Totalmente

Tive um medo indiscritivel durante a situação.

○ Discordo Totalmente   ○ Discordo   ○ Discordo de Alguma Forma   ○ Indeciso   ○ Concordo de Alguma Forma   ○ Concordo   ○ Concordo Totalmente

Senti-me inquieto durante a situação.

○ Discordo Totalmente   ○ Discordo   ○ Discordo de Alguma Forma   ○ Indeciso   ○ Concordo de Alguma Forma   ○ Concordo   ○ Concordo Totalmente

Próximo >

Inquérito

Quando mencionado "vendedor" refere-se ao assistente que interagiu consigo por audio e video.

Por favor expresse o grau de concordância com as afirmações.

Ser atendido por este vendedor faz-me parecer mais prestigiado do que aqueles que não são atendidos da mesma forma.

○ Discordo Totalmente   ○ Discordo   ○ Discordo de Alguma Forma   ○ Indeciso   ○ Concordo de Alguma Forma   ○ Concordo   ○ Concordo Totalmente

A interação com este vendedor é uma forma conveniente de gerir o meu tempo.

○ Discordo Totalmente   ○ Discordo   ○ Discordo de Alguma Forma   ○ Indeciso   ○ Concordo de Alguma Forma   ○ Concordo   ○ Concordo Totalmente

Esclarecer questões com este vendedor é um uso eficiente do meu tempo.

○ Discordo Totalmente   ○ Discordo   ○ Discordo de Alguma Forma   ○ Indeciso   ○ Concordo de Alguma Forma   ○ Concordo   ○ Concordo Totalmente

Esclarecer questões como este vendedor faz-me ser mais rápido.

○ Discordo Totalmente   ○ Discordo   ○ Discordo de Alguma Forma   ○ Indeciso   ○ Concordo de Alguma Forma   ○ Concordo   ○ Concordo Totalmente

Achei a interação com este vendedor agradável.

○ Discordo Totalmente ○ Discordo ○ Discordo de Alguma Forma ○ Indeciso ○ Concordo de Alguma Forma ○ Concordo ○ Concordo Totalmente

O processo de interação com este vendedor foi divertido.

○ Discordo Totalmente ○ Discordo ○ Discordo de Alguma Forma ○ Indeciso ○ Concordo de Alguma Forma ○ Concordo ○ Concordo Totalmente

Ser atendido por este vendedor melhora a percepção dos meus colegas sobre mim.

○ Discordo Totalmente ○ Discordo ○ Discordo de Alguma Forma ○ Indeciso ○ Concordo de Alguma Forma ○ Concordo ○ Concordo Totalmente

Ser atendido por este vendedor faz-me parecer mais valioso junto dos meus colegas.

○ Discordo Totalmente ○ Discordo ○ Discordo de Alguma Forma ○ Indeciso ○ Concordo de Alguma Forma ○ Concordo ○ Concordo Totalmente

Achei divertida a interação com este vendedor para esclarecer questões.

○ Discordo Totalmente ○ Discordo ○ Discordo de Alguma Forma ○ Indeciso ○ Concordo de Alguma Forma ○ Concordo ○ Concordo Totalmente

Próximo >

⬤ **TESE DE MESTRADO ISCTE**

Inquérito

Quando mencionado "vendedor" refere-se ao assistente que interagiu consigo por audio e video.

Por favor expresse como se sentiu durante a interação com o vendedor.

Por favor expresse como se sentiu durante a interação com o vendedor.

Por favor expresse como se sentiu durante a interação com o vendedor.

Próximo >

Inquérito

Quando mencionado "vendedor" refere-se ao assistente que interagiu consigo por audio e video.

Por favor expresse o grau de concordância com as afirmações.

Este tipo de vendedor é honesto.

○ Discordo Totalmente   ○ Discordo   ○ Indeciso   ● Concordo   ○ Concordo Totalmente

Sinto-me satisfeito ao ser atendido por este tipo de vendedor.

○ Discordo Totalmente   ○ Discordo   ○ Indeciso   ○ Concordo   ○ Concordo Totalmente

Este tipo de vendedor coloca os interesses do cliente em primeiro lugar.

○ Discordo Totalmente   ○ Discordo   ○ Indeciso   ○ Concordo   ○ Concordo Totalmente

Sinto-me completo ao ser atendido por este tipo de vendedor.

○ Discordo Totalmente   ○ Discordo   ○ Indeciso   ○ Concordo   ○ Concordo Totalmente

Este tipo de vendedor mantém as suas promessas.

○ Discordo Totalmente   ○ Discordo   ○ Indeciso   ○ Concordo   ○ Concordo Totalmente

Este tipo de vendedor é confiável.

○ Discordo Totalmente   ○ Discordo   ○ Indeciso   ○ Concordo   ○ Concordo Totalmente

Acho a utilização deste tipo de vendedor algo favorável.

○ Discordo Totalmente   ○ Discordo   ○ Indeciso   ○ Concordo   ○ Concordo Totalmente

Este tipo de vendedor é sincero.

○ Discordo Totalmente   ○ Discordo   ○ Indeciso   ○ Concordo   ○ Concordo Totalmente

Sinto-me satisfeito com a marca no geral.

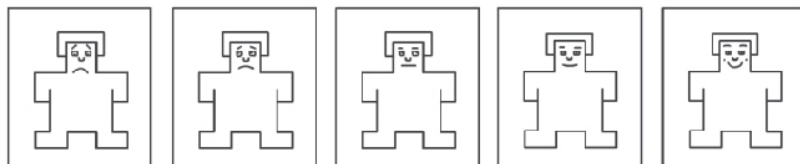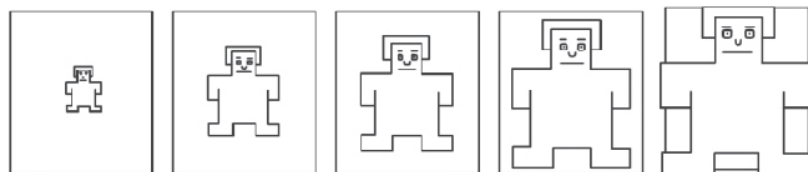○ Discordo Totalmente   ○ Discordo   ○ Indeciso   ○ Concordo   ○ Concordo Totalmente

Próximo >

TESE DE MESTRADO ISCTE

Quando mencionado "vendedor" refere-se ao assistente que interagiu consigo por audio e video.

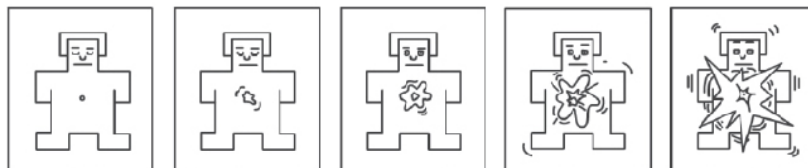Por favor expresse o grau de concordância com as afirmações.

Pretendo aumentar a frequência de compra de bicicletas desta marca.

○ Discordo Totalmente   ○ Discordo   ○ Indeciso   ○ Concordo   ○ Concordo Totalmente

Estou disposto a recomendar à minha familia e amigos a compra de bicicleta desta marca.

○ Discordo Totalmente   ○ Discordo   ○ Indeciso   ○ Concordo   ○ Concordo Totalmente

Compraria a bicicleta recomendada.

○ Discordo Totalmente   ○ Discordo   ○ Indeciso   ○ Concordo   ○ Concordo Totalmente

Compraria bicicletas desta marca anualmente.

○ Discordo Totalmente   ○ Discordo   ○ Indeciso   ○ Concordo   ○ Concordo Totalmente

Próximo >

TESE DE MESTRADO ISCTE

Submetido com sucesso! Obrigado.

TESE DE MESTRADO ISCTE

Obrigado por aceitar fazer parte deste estudo.
Para informações adicionais contacte fpsao@iscte-iul.pt

TESE DE MESTRADO ISCTE

Appendix F: SmartPLS 3 Results

Table 10.1 - Model Fitness

	Saturated Model	Estimated Model
SRMR	0.048	0.098
d_ULS	2.252	10.322
d_G	0.895	1.250
Chi-Sqaure	3541.626	4300.740
NFI	0.850	0.818

Table 10.2 - Construct Reliability and Validity

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance
Affective	0.832	0.836	0.899	0.749
Arousal	1.000	1.000	1.000	1.000
Attention	0.801	0.803	0.883	0.715
Behavioural	0.754	0.766	0.859	0.671
Creepiness	0.957	0.957	0.966	0.852
Hedonic Benefit	0.781	0.782	0.872	0.695
Intellectual	0.761	0.774	0.861	0.675
Purchase Intention	0.882	0.885	0.919	0738
Pleasure	1.000	1.000	1.000	1.000
Relation Quality	0.948	0.948	0.956	0.706
Sensory	0.797	0.797	0.911	0.720
Symbolic Benefit	0.870	0.871	0.911	0.720
Utilitarian Benefit	0.816	0.816	0.879	0.644

Table 10.3 - R Square

	R Square	R Square Adjusted
Affective	0.420	0.418
Attention	0.464	0.461
Hedonic Benefit	0.538	0.537
Purchase Intention	0.364	0.363
Pleasure	0.401	0.399
Relation Quality	0.675	0.671
Symbolic Benefit	0.427	0.425
Utilitarian Benefit	0.431	0.428

Table 10.4 - Discriminant Validity – Fornell-Larcker

	Affective	Arousal	Attention	Behavioural	Creepiness	Hedonic Benefit	Intellectual	Purchase Intention	Pleasure	Relation Quality	Sensory	Symbolic Benefit	Utilitarian Benefit
Affective	0.866												
Arousal	0.590	1.000											
Attention	0.505	0.505	0.846										
Behavioural	.0498	0.461	0.572	0.819									
Creepiness	-0.409	-0.440	-0.625	-0.520	0.923								
Hedonic Benefit	0.667	0.562	0.607	0.549	-0.527	0.834							
Intellectual	0.586	0.451	0.581	0.529	-0.431	0.571	0.821						
Purchase Intention	0.368	0.349	0.384	0.288	-0.350	0.414	0.384	0.859					
Pleasure	0.577	0.528	0.502	0.439	-0.450	0.602	0.416	0.321	1.000				
Relation Quality	0.526	0.500	0.608	0.509	-0.697	0.673	0.523	0.603	0.541	0.840			
Sensory	0.730	0.614	0.572	0.583	-0.507	0.696	0.602	0.367	0.599	0.582	0.843		
Symbolic Benefit	0.625	0.434	0.454	0.444	-0.314	0.678	0.603	0.383	0.446	0.560	0.569	0.848	
Utilitarian Benefit	0.606	0.511	0.575	0.534	-0.533	0.776	0.545	0.410	0.567	0.711	0.664	0.686	0.803

Table 10.5 - Discriminant Validity - Heterotrait-Monotrait

	Affective	Arousal	Attention	Behavioural	Creepiness	Hedonic Benefit	Intellectual	Purchase Intention	Pleasure	Relation Quality	Sensory	Symbolic Benefit	Utilitarian Benefit
Affective													
Arousal	0.645												
Attention	0.614	0.563											
Behavioural	0.619	0.525	0.728										
Creepiness	0.458	0.450	0.715	0.601									
Hedonic Benefit	0.825	0.636	0.766	0.708	0.610								
Intellectual	0.727	0.506	0.725	0.677	0.490	0.724							
Purchase Intention	0.433	0.371	0.455	0.348	0.378	0.499	0.646						
Pleasure	0.632	0.528	0.560	0.500	0.460	0.682	0.466	0.341					
Relation Quality	0.591	0.512	0.697	0.595	0.732	0.781	0.600	0.657	0.555				
Sensory	0.894	0.688	0.714	0.745	0.581	0.882	0.755	0.440	0.671	0.668			
Symbolic Benefit	0.734	0.465	0.541	0.541	0.344	0.822	0.722	0.446	0.477	0.616	0.683		
Utilitarian Benefit	0.734	0.566	0.709	0.672	0.602	0.972	0.674	0.484	0.628	0.808	0.823	0.813	

Table 10.6 - Collinearity Statistics - Inner VIF Values

	Affective	Arousal	Attention	Behavioural	Creepiness	Hedonic Benefit	Intellectual	Purchase Intention	Pleasure	Relation Quality	Sensory	Symbolic Benefit	Utilitarian Benefit
Affective		2.144				2.144			2.144			2.181	
Arousal										1.681			
Attention										2.104			1.770
Behavioural			1.638									1.541	1.629
Creepiness										1.871			
Hedonic Benefit										3.363			
Intellectual			1.697										1.653
Purchase Intention													
Pleasure										1.797			
Relation Quality								1.000					
Sensory		2.144	1.851			2.144			2.144			2.484	
Symbolic Benefit										2.179			
Utilitarian Benefit										3.154			