

FUNDAÇÃO GETULIO VARGAS  
ESCOLA DE ADMINISTRAÇÃO DE EMPRESAS DE SÃO PAULO

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**FROM E-COMMERCE TO V-COMMERCE: AN EMPIRICAL STUDY ON  
CONSUMERS ACCEPTANCE IN BRAZIL.**

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Thesis presented to Escola de  
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of Fundação Getúlio Vargas, as a  
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International Management (MPGI).

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## **ABSTRACT**

Although Virtual Reality (VR) is considered to be one of the new technologies with the highest potentiality, especially in the retail field, research into customers' acceptance and intentions to use this technology is currently limited. This study investigates the variables that can influence the degree of intention to use VR along the purchasing process and it has been conducted in the Brazilian market. In particular, the tested variables are: effort (of purchasing and of using the technology), enjoyment, and convenience. Moreover, it has been taken into account the possible moderator role of the Need for Touch (NFT). Data have been collected mainly through a survey. Results have shown that enjoyment, convenience and purchasing effort are statistically significant. However, there is no evidence for the effect of the perceived effort/easiness to use the technology and neither for the mediating effect of the NFT. The value of this research is that it shows what the factors and the obstacles are that can affect the use of VR for shopping.

**KEY WORDS:** virtual reality, retail, technology, e-commerce, consumers intentions, online retailing, digital innovation.

## RESUMO

Embora a Realidade Virtual (VR) seja considerada uma das novas tecnologias com a maior potencialidade, especialmente no campo de varejo, as pesquisas sobre a aceitação dos clientes e as intenções de usar essa tecnologia são atualmente poucas. Este estudo investiga as variáveis que podem influenciar o grau de intenção de usar VR ao longo do processo de compra e tem sido realizado no mercado brasileiro. Em particular, as variáveis testadas são: esforço (de compra e uso da tecnologia), prazer e conveniência. Além disso, foi levado em conta o possível papel moderador do Need for Touch (NFT). Os dados foram coletados principalmente por meio de um questionário. Os resultados mostraram que o prazer, a conveniência e o esforço de compra são estatisticamente significativos. No entanto, não há evidências para o efeito do esforço percebido / facilidade em usar a tecnologia e nem para o efeito mediador do NFT. O valor desta pesquisa é que ela mostra quais são os fatores e os obstáculos que podem afetar o uso de VR para compras.

**PALAVRAS CHAVES:** realidade virtual, varejo, tecnologia, comercio eletrônico, comportamento do consumidor, varejo online, inovação digital.

## TABLE OF CONTENT

<b>1. Introduction.....</b>	<b>10</b>
<b>2. Omnichannel Technologies.....</b>	<b>11</b>
2.1 The importance of new technologies in retail .....	12
2.2 The use of virtual reality in retailing .....	14
<b>3. Brazilian market .....</b>	<b>18</b>
3.1 Brazilian internet usage and e-commerce market .....	19
3.2 Brazilian e-commerce consumers.....	21
<b>4. The role of experience and senses along the purchasing process .....</b>	<b>23</b>
4.1 Shopping experience.....	24
4.2 The role of senses and the need for touch.....	26
<b>5. Theoretical framework .....</b>	<b>28</b>
5.1. Technology acceptance model.....	29
5.2 Choice of channel model .....	34
<b>6. Research model .....</b>	<b>36</b>
6.1 Effort .....	38
6.2 Convenience.....	38
6.3 Enjoyment .....	39
6.4 Need for touch .....	40
6.5 Hypotheses and model recap.....	41
<b>7. Methodology .....</b>	<b>42</b>
7.1 Instrument development and pretesting.....	42
7.2 Data collection and respondent characteristics .....	46
<b>8. Data analysis.....</b>	<b>46</b>
8.1 Model evaluation .....	46
8.2 Results analysis of structural model.....	47
8.3 Moderator analysis .....	53



8.4 Cluster analysis .....	57
<b>9. Discussion.....</b>	<b>60</b>
9.1 Analysis of valid hypotheses .....	61
9.2 Analysis of rejected hypotheses.....	63
<b>10. Implications .....</b>	<b>65</b>
10.1 Implications for the research .....	65
10.2 Managerial implications .....	66
<b>11. Final considerations.....</b>	<b>67</b>
11.1 Limitations and future researches .....	67
11.2 Conclusions .....	70
<b>Appendix .....</b>	<b>73</b>
<b>References .....</b>	<b>80</b>

## 1. Introduction

The retail industry is undergoing one of the biggest changes of all times due to digitalization and new technologies. Offline and online channels are becoming complementary ways of purchasing goods and the experience of shopping has become a paramount must-have for retail companies as part of the “product to sell” (Edelman, Singer, 2015), in their constant effort to be more and more competitive in the present dynamic environment.

This phenomenon has been called *omnichannel*, a transversal channel business model which aims at providing the same user experience across a variety of shopping means. To implement omnichannel strategies and gain customers’ loyalty, a lot of companies are developing and applying new technologies along the whole customer journey.

*“The speed of innovation is so fast today that even companies which embrace transformative innovation are finding that the pace of change, rather than being incremental, is far more rapid than they could ever have imagined”*

Lucie Greene, worldwide director of the Innovation Group at J. Walter Thompson Intelligence

Virtual reality has a special spot in the new technologies environment: according to a Statista research (2015)<sup>1</sup>, virtual reality global market will reach the size of 24.5 million by 2021, and retailers are starting to invest proportionately. Experts, such as Guillaume Charny-Brunet of Space 10 (A future living lab based in Copenhagen), think that virtual reality could disrupt the retail industry in 10-15 years’ time<sup>2</sup>.

This study has the goal to analyze the Brazilian consumers’ acceptance of the use of virtual reality in retail. Being the technology at its first phases of development in the

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<sup>1</sup> Statista, [www.statista.com](http://www.statista.com)

<sup>2</sup> Arthur, 2016, “Future of retail: Artificial Intelligence and Virtual Reality”, Forbes

retail sector (it is indeed more evolved in the video game and entertainment industries) and its usage at an experimental stage, it comes that the consumers' behaviors cannot be tested. For this reason, the study has adopted the TAM principle (Davis, Bagozzi, Warshaw, 1989) and the UTUAT Model (Venkatesh, Davis, 2003), for which the intentions to use technology affect the actual use of it (figure 1).

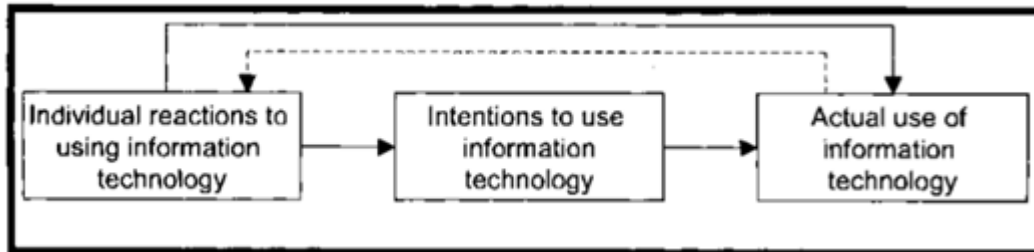


Figure 1. The basis of acceptance models

Although numerous studies have identified effective models to measure technology acceptance of consumers of a specific tool/ innovation, little analytic attention has been paid to the use of tech innovation in the purchasing process. In particular, given the fast growth of virtual reality in this sector, there are not many analyses on the topic. In this respect, this study provides an additional insight into the evolving retail industry and the role of new technologies on customers' intentions.

As hinted at before, the analysis has been developed in Brazil for reasons which will be illustrated later. The research framework, specifically devised for this purpose, has been a synthesis of the UTAUT2 and Wang, Lin, Tai and Fan models, integrated with elements and notions (i.e. enjoyment, need for touch) derived from a reasoned literature review. Finally, the chosen methodology has mainly been that of the survey.

## 2. Omnichannel Technologies

With the accelerated advancements in the field of information technology in the last ten years, the use of digital devices and tools has become indispensable in many aspects of our daily life, shopping included. This disrupting change can be identified

with the so-called Internet of Things (IoT), which represents the foundation of Industry 4.0. IoT has been defined as the integration of technology in our daily activities which are thus enriched with sensing, customization and networking; different technologies and devices are able to communicate to each other and all together they contribute to accomplish a specific objective (Whitmore, Agarwal, Xu, 2015). The IoT applied to retail is the fuel for omnichannel technologies, which enhance the relation between the company and the consumer, resulting into the co-creation of value. For this reason, this dissertation will start with an overview of the role of new technologies in retail and, in particular, of virtual reality.

## 2.1 The importance of new technologies in retail

As Ayaz and Mazur stated in their book *Advances in Neuroergonomics and Cognitive Engineering* (pp 308), “nothing stands still in the world of the internet”. Because of the constant transformation provoked by the digital disruption and the IoT, many activities and models now in use might no longer be applicable soon. This implies that enterprises need to adapt their strategies and competitive advantages to the dynamic environment in which they operate. Looking more in detail at the definition and the role of IoT in the current revolution, it can be stated that IoT technologies are characterized by being internet-oriented, object-oriented and semantic-oriented (Yang, Plotnick, 2013). Broadly speaking, technology changes the nature of our reality, integrating devices and technologies, providing customized services from the data analytics and we are active participants of this change.

As in many other industrial sectors, the digital revolution brought about many changes in retailing. The arrival of the e-commerce (both through desktop, mobile and social network streams) has changed the retail business models, the execution of the retail mix and the shoppers' behavior (Verhoef, Kannan, Inman, 2015). Nowadays, with the development of the IoT technologies and systems, which can capture real-time data and allow stakeholders to make the decision making process more effective (Balaji,

Roy, 2017), firms have a wide range of opportunities to foster their services. Consequently, companies are looking for new ways to compete and are exploring the application of advanced technologies along the entire purchase process.

An increasing number of firms are focusing their effort on implementing solutions for blurring the borders between their different kinds of purchasing channels, treating their distribution network as a unique entity (Kaczorowska, 2017). Omnichannel solutions (implemented by the use of IoT technologies) are based on the interdependence between different purchasing experiences, able to raise conversion and enhance the shopping experience thanks to the synergies generated by the combination of a variety of channels. In addition to this, IoT can anticipate customers' needs and provide customized products, offers and services: it widens the chances for multiple interactions between customers and products and so it creates a better customers' experience (Hoffman, Novak, 2015). Considering that IoT technologies can have a significant effect on the value proposition and value capture of a business (Iansiti, Lakhani, 2014), founding a new retail strategy is mandatory for firms if they want to stand out.

For these reasons, the role of new technologies is fundamental for companies operating in the retail sector as they are able to create a large range of opportunities in the way of purchasing. They can also give a contribution to the evolution of the consumers and help to maximize their benefits.

New technologies in this field are a stimulus for those changes leading to a sort of digital egalitarianism, defined as the creation of equal opportunities, declined in three interconnected dimensions: business, consumer and society (Kaczorowska, 2017).

The use of new technology is able to enhance the customer's buying experience and, in the majority of cases, to simplify the purchasing process. The use of IoT can produce a more personalized and involving retail shopping experience, increasing the

convenience of the service (Neuhofer, Buhalis, Ladkin, 2015). Under the influence of technology and IoT, which are increasingly becoming indispensable elements of the consumer's life, the *Homo Oeconomicus* evolved into the *Homo Cyberoeconomicus*. Consumers, indeed, have developed new digital skills and competences which are leading to a modification of behaviors and actions (Ayaz, Mazur, 2017, pp 308). They are taking an active part in the process of creating and shaping values, in which involvement and convenience are fundamental. These changes have converted into a tough challenge for firms which have to live up to the dynamic digital transformation and changes in consumers' mindset and attitudes.

Although new technologies in retail (and omnichannel strategies), especially the ones linked to the IoT such as Virtual Reality, seem to be at their initial phases, they have the potential to effectively be applied in the industry and to be the development factor of the actual e-commerce, improving the quality of customers' overall shopping experience (Pantano, Timmermans, 2014).

Thanks to these technologies, in the near future online shopping could be transformed into a 360 degrees immersive experience, reproducing in detail the brick and mortar environment, providing a more involving customer experience in terms of choice, price and customer services as well as customized and accurate benefits.

## 2.2 The use of virtual reality in retailing

Having in mind a clearer picture of the use of technologies in retail, virtual reality will now be explored and analyzed in a deeper way.

Virtual reality (VR), otherwise known as *immersive multimedia or computer-simulated reality*, is defined as a fictional environment generated by a software but shown to the users as a real setting giving them a spatial perception, a realistic-looking world which responds to users' inputs. It combines technology and experience design in order to build an immersive environment that provokes in the user the feeling of being in that

setting, thanks to the IoT system and data analytics. Burdea and Coiffet, authors of several Virtual Reality Technology books, define VR as “a high-end user computer interface that involves real time simulation and interactions through multiple sensorial channels” (Burdea and Coiffet, 2003, page 3). As shown in figure 2, VR consists of three main principles: Interaction, Immersion, Imagination (Burdea and Coiffet, 2003). Through VR, the user is able to perceive a rich sensory experience (Immersion) and he/she is able to modify and change the reality thanks to the interaction with the (virtual) environment. In addition, the authors underline the importance of imagination: VR, indeed, works and depends on human creative power and capacity to devise images.

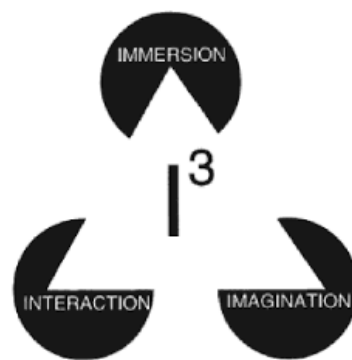


Figure 2. The 3-Is of Virtual Reality: immersion, interaction and imagination

So far, considering its storytelling potential, VR (immersive technology) has especially been used and tested in the film and video-gaming sectors. However, taking into account the wave of change the retail industry is going through, and considering the fact that companies are embracing customers' needs for omnichannel experiences, it seems to be likely that VR will have interesting applications in the retail sector, too.

VR brings items to life and it is able to catch the full-sensory experience of offline shops and the information-rich experience of online shops (Rigby, 2011). Matching the “wow” factor and the simple shopping practice (Arthur, 2016), VR could enhance the experience of e-commerce, overpassing the limited interaction between consumer and

item, without losing the digital information richness (Chesney, Chuan, Dobeles, Hoffmann 2017). Moreover, VR can provide customized solutions, such a personalized product selection, thanks to its use of the IoT. As a consequence of all these elements of novelty, the new term “v-commerce” has been coined to indicate virtual shopping (Moskovitz, 2016).

All these features characterizing the cutting-edge technology make VR the next logical step in the evolution of e-commerce marketing and engagement. With innovations like 3D printing, facial recognition software, and wearable tech, more and more customers are beginning to demand and expect experiential retail practices that emphasize delight factors. Moreover, there are some schools of thought that have pointed out that VR may be for generation Z what smartphones are for Millennials <sup>3</sup>.

For retailers, the use of VR could present the advantage of having “infinite shelves” (Goldman Sachs definition) of products (virtual stocks); it allows items customization and provides more details and information on items. Furthermore, in the case of VR used at home, the user has the gain of the brick-and-mortar experience, always accessible and without any time constraints; finally, when VR is used in physical stores, it enhances the customer experience.

Even though VR shopping is still considered a niche sector, several retailers have started to experiment it with shoppers. As all technological revolutions, VR requires pioneers, companies willing to risk in order to have a long term benefit on competitive advantage. VR applications in retail have two specific objectives: firstly to generate sales opportunities and secondly to enrich the consumer’s brand experience (JWT, 2015). To reach the latter, for example, Tommy Hilfiger uses Samsung Gear VR headset in order to make clients participate in their latest fashion show<sup>4</sup>.

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<sup>3</sup> Burkan, Welcome to the future: Virtual reality in ecommerce, 2017

<sup>4</sup> Tabuchi, New York Times, 2015



Another outstanding example is the one of Myer, an Australian retailer that, in partnership with eBay, launched the first ever VR department store. Thanks to the usage of cardboard VR head-setter, consumers can be involved in a personalized in-store experience, wherever they are. Furthermore, as soon as they add products to their cart, through data analytics, they receive advice and suggestions about additional items based on personal preferences and needs.

As far as the luxury sector is concerned, the luxury boutique/concept store The Apartment has used Samsung's technology to attract customers from all over the world to its New York flagship store. Thanks to technology, the boutique has been represented in high definition: music, lighting, sound and storytelling gave life to the store. The user could interact with the items and see them in action and settled in their context (i.e. how clothes fit a human body, how furniture is positioned in the space). In addition, the user could check information about the products, such as price, brand and composition, and add the items directly to the shopping bag linked to his/her account. The Apartment experience tested the use of VR in the purchase process, creating a new dimension in e-commerce characterized by a new level of engagement.

To sum up, VR could be the natural development of e-commerce, enhancing the digital experience of on-line shopping leveraging the main aspects of the new technology, such as discovery and immersion. With VR, consumers have the opportunity to experience the items they are buying from every angle with the freedom to move, zoom, rotate. The perception of the product is realistic (i.e. vibrant colors, shadows, dimensions) and the interaction is enhanced.

In conclusion, it is undeniable that content marketing engine is going towards a more immersive way of displaying and buying products, starting from augmented reality (i.e. Ikea has developed an augmented reality technology called *Ikea Place* thanks to which the item you want to buy is displayed in the real environment, having the possibility to

try it before buying it<sup>5</sup>) and naturally going to a more intensive and developed use of VR. As the founder of BuildDirect.com<sup>6</sup> Jeff Booth said, “interaction leads to immersion, and immersion leads to conversion.”

### **3. Brazilian market**

The general objective of exploring the consumers' acceptance of VR is now going to be restricted to the Brazilian buyers. Brazil has been chosen for the role and sharp development of e-commerce and the dramatic growth of digital market in the last few years. Before assessing the internet usage and Brazilian consumers' behaviors in using technology, it is key to provide an overview on the economic and social context of the country and to give a description of its main peculiarities.

Brazil is the largest and most populous country in Latin America (the 5th largest and the 6th most populous in the world). The sharp growth and development of the last decades, which have brought about an increasing importance of Brazil in the World's trade and economy and a growth of the PIL, together with some peculiarities like its huge population, the extensive territory and its vast availability of natural resources, have made Brazil one of the BRICS<sup>7</sup> (Brazil, Russia, China, South Africa). According to the website Investopedia (data of 2018, Bajpai), Brazil is the 8th most powerful economy in the world - and the first one in Latin America - and it has an estimated GDP (PPP) of \$3,24 trillion and a nominal one of \$2,05 trillion. Even if it is currently experiencing a political and economic unstable moment, it has been estimated by IMF that its future growth will revive to 2.5% by 2019.

Furthermore, it is important to consider the internal differences within the country. Brazil is officially divided into 5 regions: North, Northeast, Center-West, Southeast and

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<sup>5</sup> Retrieved from [www.ikea.com](http://www.ikea.com)

<sup>6</sup> Technology company based in Vancouver. It is a marketplace for heavyweight home improvement products.

<sup>7</sup> The term BRICS has been used the first time by Jim O'Neill in 2001 in a Goldman Sachs report

South<sup>8</sup>, which are very different concerning climate, culture, population and, above all, for the development and the state of economy. The main region is the one of Southeast, in which the 3 principal cities of Brazil are located: São Paulo (São Paulo state), Rio de Janeiro (Rio de Janeiro state) and Belo Horizonte (Minas Gerais state). The Southeast is, indeed, the vital and economical center of the country, the main industrial, commercial and financial region, employing 70% of the national working class<sup>9</sup>. This region is very important also for the technological development of the country and it is the center of Brazilian innovation.

Even though Brazil is classified as a developing country and an emerging economy, it is quite developed referring to the use of internet and technology, hence it is a good field to try new technologies. In the next topic, technology and e-commerce in Brazil will be addressed in order to have a more detailed vision of the national market and give a deep-seated explanation about the reason why the country has been chosen for this enquiry.

### 3.1 Brazilian internet usage and e-commerce market

The choice of selecting Brazil as the country to be analyzed derives from its important role as an e-commerce powerhouse. Brazil is the largest internet market in Latin America and the fourth largest in the world for the number of users. Moreover, its internet penetration is constantly growing: in 2017 it was 57.13% of the total population and it is estimated to grow until roughly 62% in 2022<sup>10</sup>. In general, Brazilians are heavy users of the internet (and particularly of social media) with 90% of them navigating every day for personal reasons (job reasons are not considered).

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<sup>8</sup> Official division adopted from the Brazilian Government

<sup>9</sup> Duran R., (2013), ' Brazilian regions', The Brazil Business

<sup>10</sup> Data retrieved from Statista

According to the annual E-commerce Radar<sup>11</sup> (2017, p. 7), considered to be the most complete report on Brazilian e-commerce, marketplaces have the leadership in e-commerce industry in almost all product categories: as a matter of fact, roughly 32% of sales are done through this channel. Moreover, searches on google have a key role in the Brazilian e-shopping. Fifty-one percent of purchases are finalized after a google search.

Brazil has always had a good position in the World Economic Forum Information Technology report. As the last document declares (2016, p. 28-29), ICT infrastructures adoption and usage is widely accepted both by individuals and businesses, and are offered at reasonable prices; in fact Brazil is the 14th country worldwide for the cheapness of its fixed broadband internet connections. Moreover, in 2017, Brazil enhanced a lot the improving in individual usage of the internet (going up of 5 places). This is particularly important if we consider that other countries are moving rapidly on individual adoption.

The country is, indeed, the only LATAM country in the top ten online retail markets in the world and it is growing at a steady pace annually. In the last years, thanks to the higher internet penetration and the spreading of smartphones all over the country, the use of e commerce has increased sharply. Between 2016 and 2017, the market grew 11.5%, and it is predicted to grow approximately at the same pace in 2018<sup>12</sup>. In 2017, 55 million Brazilian clients (roughly 30% of the total population) did at least one shop online. The Brazilian Consumer and Retail Association has evaluated that in the next years, online sales will account for roughly half of the retail total purchasing<sup>13</sup>. In absolute terms, the institution Statista has estimated a 29 Billion US\$ e-commerce

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<sup>11</sup> Annual Report made by Atlas, Brazilian company for e-commerce intelligence. Retrieved from [www.neoatlas.com.br](http://www.neoatlas.com.br)

<sup>12</sup> Nathan Lusting., 201, 'E-Commerce in Brazil: Latin America's E-commerce Powerhouse'

<sup>13</sup> Data from US embassies abroad, [export.gov](http://export.gov)

revenues in Brazil in 2021. The best seller online product category is household appliances: roughly 60% of internet users have bought this kind of item online.

Finally, it is important to remark the important role of credit and debit cards payment. The use of digital payment tools is key both in offline and online purchases in Brazil. Concerning the online, even though the banking billet is still used, especially in the North and NorthEast regions, credit and debit cards are the most frequently used, representing 62% of the total purchases<sup>14</sup>.

The *Federação Brasileira dos Bancos* (Brazilian federal association of banks) has developed a new platform with the aim of modernizing and digitalizing the payment through *boletos* (banking billets)<sup>15</sup>. This has provoked the reaction of retailers who, in order to guarantee a higher approbation rate (share of approved transactions), which is generally higher for card payments (88% against 48,7%), provide better conditions and discounts for purchases made by cards.

To conclude, e-commerce is quite developed in Brazil and it has been projected to grow at a steady pace in the next years. This could be a good starting point to begin testing new technologies in retail and to estimate their effectiveness.

### 3.2 Brazilian e-commerce consumers

Considering that the study is based exclusively on Brazilian consumers' perceptions and intentions, an analysis of e-commerce consumer behavior and characteristics in Brazil may be useful.

Broadly speaking, consumption in Brazil has grown a lot in the last decade, due to the expansion of purchasing power of class C, the low-medium class of the country

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<sup>14</sup> Annual Report made by Atlas, Brazilian company for e-commerce intelligence. Retrieved from [www.neoatlas.com.br](http://www.neoatlas.com.br)

<sup>15</sup> Data and information retrieved from the *Federação Brasileira dos Bancos* website <https://portal.febraban.org.br/pagina/3150/1094/pt-br/servicos-novo-plataforma-boletos>

representing roughly 45% of the total population. The wide spreading of the internet penetration, together with this phenomenon caused the rise of online purchases.

However, an Ibope<sup>16</sup> research of 2010 which classified Brazilian e-consumers, following their behaviors when surfing in the internet, particularly looking at their frequency and time browsing and the kind of acceded websites, stated that class C is not very active in e-commerce. The upper classes A and B (Elite and Medium-high classes), indeed, are the buyers of 61% of the total purchases, while class C only 31%.

Looking at the Brazilian e-commerce consumers' profile (demographics), 50,4% of the total buyers are women and 49.6% are men. Thus, there are no huge gender differences among the population. The product category with the largest relevance in terms of sales is the one of electronic devices and home appliances, with the highest average spending of R\$ 558 (roughly \$ 152)<sup>17</sup>.

On the other hand, the country presents sharp discrepancies in the number of e-purchases among the different regions of the country. Figure 3 shows that the majority of e-purchases (roughly 70%) are done by the consumers of the Southeast region, which is the most developed and in which technology and infrastructures are particularly advanced.



Figure 3. Regional differences in e-commerce sales share

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<sup>16</sup> Research institute, leader in Latin America

<sup>17</sup> Exchange rate considered: 0,27 \$/R\$ (Retrieved on 18/10/2018)

In addition, the region's purchasing power directly affects the sale conversion rate (it is defined as the number of sales divided for the number of total website visits, multiplied by 100): the Southeast region, followed by the South region, is the one with the highest conversion rate in terms of sales (highest value of the total purchases), especially in Rio de Janeiro, and in terms of volume (highest number of items purchased), especially in São Paulo.

According to Neoatlas report (2018, p. 7) the use of mobiles for shopping is a key trend in the market: the percentage of purchases done from smartphones grew from 22% to 31% in 2017. This proves the high new technology acceptance in Brazil and the willingness to try new purchase channels. Concerning consumers' acceptance of new technology in Brazil and their purchase patterns, Brazilians tend to be early adopters of technologies. As reported by a research done by Nielsen in 2015, nine out of eleven countries with the highest percentage of early adopters of technologies are developing countries and Brazil is the one with the highest score. Specifically, in Brazil 39% of the population is defined as an early adopter.

To conclude, because of the market size of the e-commerce and the consumers' propensity in adopting new technology and products, Brazil has been individuated as one of the possible markets to test and assess the intention to use VR applied to retail and purchase process.

#### **4. The role of experience and senses along the purchasing process**

Pursuing the aim of testing the effectiveness of VR as a purchase channel, it is key to proceed to an overview on the purchase process, particularly stressing the importance of the shopping experience and the role of the five senses during the buying. This section wants to integrate the general framework of the topic of retail technology and consumers' acceptance, providing further information on the subject matter of the research.

## 4.1 Shopping experience

Consumers' experience notion has been formulated by Holbrook and Hirschman (1982) as a personal happening, rich of emotional significance, founded on the interaction with the product or the service and on the stimuli received during the shopping. Consequently, new technologies started to be used in retail with the aim of enhancing the consumers' experience.

The notion of the consumer's experience in purchasing has become fundamental to understand consumers' intentions and behaviors (Addis, Holbrook, 2001). As a matter of fact, the consumer is an individual emotionally involved in the shopping process and he/she is not indifferent to multisensorial and emotive stimuli (Carù, Cova, 2003). Referring to VR, it has a strong potentiality to foster consumers' emotions and involvement along the purchasing process. Thus, considering the high storytelling potentiality and the immersion feature of the technology, it is essential to analyze the role of experience and the related enjoyment to test the use of VR.

Experience definition, or more precisely, experiential consumption definition, lies on the concept of the urgency of giving space to emotions: the experience of buying itself adds value to the bought item (Carù, Cova, 2003). Meyer and Schwager (2007, p. 118) affirm that "Customer Experience is the internal and subjective response customers have to any direct or indirect contact with a company. Direct contact generally occurs in the course of purchase, use, and service and is usually initiated by the customer. Indirect contact most often involves unplanned encounters with representatives of a company's products, service or brands and takes the form of word-of-mouth recommendations or criticisms, advertising, news reports, reviews and so forth."

Experience can be classified in pre-consumption experience, purchase experience, core consumption experience and remember consumption experience (Arnould, Price, Zinkhan, 2002). In this study, we are going to focus just on the purchase experience, described as everything involved in the choice, payment, packaging, service and the



environment in general.

Following Hirschman and Holbrook's classification (1982), consumers can be categorized as "problem solvers" or "fun and enjoyment seekers". Many researches have been done on the dichotomy of utilitarian shopping (Fisher, Arnold, 1990; Sherry, McGrath, Levy, 1993) and hedonistic shopping (Bellenger, Steinber, Santon, 1976; Bloch, Richins 1983; MacInnis, Price, 1987) and the central role of the experience during purchasing. The priority of enjoyment during the shopping experience has been underlined by different theories and authors (Bloch, Bruce, 1984; Sherry, 1990) . Thus, the dichotomy between "shopping as work" versus "shopping as fun" has a particular centrality in retail studies (Babin, Darden, Griffin, 1994). As a matter of fact, shopping has a big entertainment potential in itself and the enjoyment of shopping is part of the experience. The amusement of the experience reflects the "shopping adventure", in contrast with the achievement of any other specific goals (Holbrook, Hirschman, 1982).

An enjoyable experience is considered to be fundamental in the current retail environment and it is a source of competitive advantage. As Firat and Dholakia's definition of experience points out (1998, pp 96), "Life is to be produced and created, in effect, constructed through the multiple experiences in which the consumer immerses". Items interactivity, which implies sensory-richness, can predict shopping enjoyment (as well as online shopping enjoyment), with a stronger effect through the display of 3D images (Kim, Fiore, Lee, 2017). Thus, the concept of immersion goes along with the one of experience and it can be particularly relevant for testing VR acceptance. Moreover, immersion has a key role because it implies the use of (almost) all senses: a research done by CXLab<sup>18</sup> pointed out how altering sensory elements of a consumer experience can change the perception and the satisfaction of clients. Thus, consumers experience can be positively or negatively affected by sensory influences.

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<sup>18</sup> Consultancy firm specialized in Customer Experience Strategies

Considering that experience is generated by a set of interactions between a customer and a product/ company/ service, and each individual catches information through senses, “Experience is strictly personal and implies the customer’s involvement at different levels (rational, emotional, sensorial, physical, and spiritual)” (Gentile, Spiller, and Noci 2007, p. 397)

At present, the enjoyment part of shopping is essential to leverage the consumers’ experience, which is shaped and affected by what they grasp using senses. Nowadays, consumers consider the experience they have while shopping as an integral element of the product/service they want to buy and, accordingly, companies are trying to foster experience in the purchasing process.

## 4.2 The role of senses and the need for touch

As already said, senses have a central role in the creation of customer experience and on the shaping of consumers’ attitudes. In particular, touch is a fundamental channel to evaluate and experience a product/service: several researches have proved that the information got through touching, affect purchase decisions consistently (e.g. Peck, Childers, 2003; Peck, Shu, 2009; Peck, Johnson Wiggins, 2011).

While the general trend of commerce and retail is going towards digitalization and virtualization (v-commerce), some consumers still have the need to touch, feel and try items: their perceptive flow is based on gathering information and stimuli through the haptic system. Even though VR is a rich sensorial experience and provides the spatial dimension (and also permits to try items), it is still mainly based on sight.

Therefore, to examine the consumers’ acceptance of VR applied to shopping, we should consider the individual need of touching. It is assumed that a customer has a cost in virtual purchasing, which is connected to the product evaluation, in particular to

the evaluation of the product tangible attributes.

When the channel is digitalized (e.g. virtual, online), the consumer often values the items less than in a brick and mortar store, due to the fact that virtual contexts cannot exploit the use of touch, taste and smell and this can generate evaluation mistakes (Wang, Wang, Wang, 2016). The lack of sense use could lower the consumer's perception on the value of the channel and affect the choice on how to shop, in this case, the use of VR for purchases. For this reason, it is important to consider in more detail the Need For Touch (NFT) and its implications. According to the definition of Peck and Childers (2003, p. 38), NFT is the "preference for the extraction and utilization of information obtained through the haptic system", which is the process through which it is possible to recognize objects by touching them. Touching is more effective in the evaluation of "material properties" of items such as temperature, texture, harness and weight (Ledermanand, Klatzky, 1987).

Touch can affect attitude and behavior in assessing and purchasing a product (Hornik, 1992). Touch can be conceptualized as a kind of direct interaction and experience with the product, and its evaluation is affected both by individual and situational factors: the influence of touch varies among individuals (Peck, Childers, 2003). According to Holbrook and Hirschman (1982), individual differences derive from personality traits and allied variables such as sensation seeking, creativity, perceived time pressure and spirituality.

Peck and Childers (2003) have underlined the importance of the dual nature of the NFT and the fundamentality of considering the two constructs in order to evaluate individual attitude. Based on the Motivational Model Theory (McClelland, 1989), the authors defined the *instrumental* need for touch (i.e. goal-directed touch) and the *autotelic* need for touch (i.e. touch for enjoyment, pleasurable emotions and to seek variety). The former indicates "those aspects of pre-purchase touch that reflect outcome-directed touch with a salient purchase goal" (Peck and Childers, 2003, p.

431), and so it refers to the necessity to touch an item in order to gather relevant information about those characteristics that cannot be collected through other senses (e.g. vision, product description), with the specific aim of purchasing.

On the other hand, the autotelic dimension is “related to touch as an end in and of itself, which involves a hedonic-oriented response seeking fun, arousal, sensory stimulation and enjoyment”. It, indeed, indicates the sensory element of product touch, an irresistible need to engage in exploratory touch, without having necessarily a purchase goal in mind.

Although the limitations of sensory information in digital environments can affect consumers’ intentions, images can be conceptualized as a result of a cognitive process reducing the gap between a haptic stimulus and an imagined product’s properties (De Vries, Jager, Tijssen, Zandstra, 2018). Thus, retailers could compensate the lack of information derived from touch with verbal descriptions and, especially, with visual immersive tools, such as 3D images which better approximate tactile experiences in reality.

Therefore, in a virtual context, the need of touch propensity could really affect the attitude, and consequently the behavior, of some individuals, inducing them to choose different ways of purchasing; yet VR could be an effective strategy in order to limit the negative effect of the NFT.

## **5. Theoretical framework**

In order to explore consumers’ acceptance of VR in retail and consumers’ attitudes and intentions in purchasing, it is fundamental to analyze the main model in the literature of technology acceptance and the choice of purchasing channel. It is important to highlight that the approach followed to analyze the consumers’ behaviors in this study, is the cognitive approach by Fishbein (1975), which will better explained in the next chapter.

Human choices can be explained through the cost/benefit examination (Hardly, 1982): individual benefits and costs vary according to the personal motivation system (based on values, benefits and product attributes) and influence the choice of the way of buying (Shim, Eastlick, Lotz, 2004).

Consumers select a way of purchasing through a push-pull analysis based on how able the channel is to satisfy their research and purchase needs (Lee, 1966). Push factors drive people to quit their current condition, while pull factors engage people to a determined situation. This concept can be applied to the use of technology to purchase (different channels): push factors lead consumers to use that specific way of buying, while pull factors discourage them.

In addition, it is important to consider the individual perceptive flow in purchasing, which can be defined as the whole of customers' beliefs and knowledge structures (Best, 2012). This flow has its starting point with the gathering of information and stimuli through the use of senses and the haptic system.

Therefore, it is opportune to test the effectiveness of a technology applied to retail, measuring customers' acceptance and their propensity to use it, and the variables that influence the use of the technology in the purchasing process, following the perceptive flow and individual characteristics.

## 5.1. Technology acceptance model

The theme of acceptance of technologies has been vastly approached by literature from many different perspectives. First of all, it is important to underline the role of the *Theory of reasoned action (TRA)* (Fishbein, Ajzen, 1975) in marketing studies, in particular to analyze and explain human attitudes and intentions. The most important contribution of the theory is that attitude is a fundamental determinant of behavior; for this reason, by assessing people attitude towards a specific technology, we can have a proxy of future and possible actual behavior (in this case, the purchase behavior).

Starting from this principle, an important research on the topic is the “*User Acceptance of Information Technology: Toward a Unified View (also called UTAUT Theory)*” (Venkatesh, Morris, Davis, Davis, 2003). The study examines eight previous theories focused on individual acceptance, and delivers an integrated vision on the subject. The analyzed theories are: the theory of reasoned action (Fishbein, Ajzen, 1975), the technology acceptance model (Davis 1989), the motivational model (Davis, 1992), the theory of planned behavior (Harrison, Mykytyn, Riemen- schneider, 1997), a combined theory of planned behavior/ technology acceptance model (Taylor, Todd 1995), the model of personal computer use (Thompson, Higgins, Howell, 1991), the diffusion of innovation theory (Rogers, 1995) and the social cognitive theory (Bandura, 1986).

UTAUT theory explores the intention of usage of IT technologies, dependent variable of the model (Compeau, Higgins, 1995), in order to check their success and task-fit (Goodhue, Thompson, 1995) in the corporate//work environment. The UTAUT considers the variables of performance expectancy, effort expectancy, social influence, facilitating conditions and the mitigating factors of gender, age, experience and voluntary use.

However, the model does not explore the consumer attitude (but just the employees’ attitude), hence for this study, the *Consumer Unified Theory of Acceptance and Use of Technology* (called UTAUT 2) has been considered. The latter is an updated UTAUT focused on the consumer’s perceptions and intentions that incorporates three constructs into the previous one: hedonic motivation, price value and habit, plus the individual differences (age, gender and experience) as moderators (figure 4).

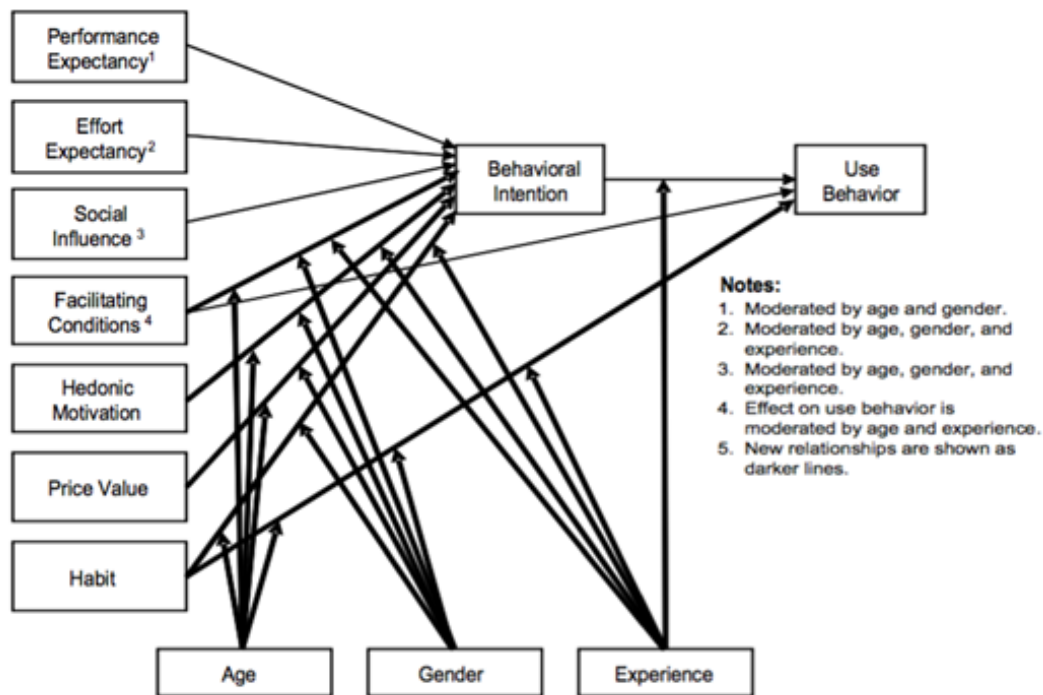


Figure 4. Unified theory of acceptance and use of technology for customers (UTAUT 2)

In order to better understand the process developed in this research and its starting points, a brief definition of the UTAUT2 variables, describing in detail the construct and concepts lying beyond the variables building, is given below.

*Performance expectancy* refers to the level of benefits provided to the consumer using technology. In particular, the author describes it as “the degree to which the user expects that using the system will help him or her to attain gains in job performance” (Venkatesh et al., 2003, p. 447). It means that individuals tend to use the technology when they think it can provide them several advantages. The construct derives from the original definition given in the UTAUT theory and it has been developed from five concepts: *perceived usefulness*, *extrinsic motivation*, *job-fit*, *relative advantage* and *outcome expectations*. The first concept, the one of *perceived usefulness* which is very similar to the variable of *performance expectancy*, refers to the people perception on the likelihood that the use of the system will get better his/her performance (Davis, 1986). Moreover, it is linked to *extrinsic motivation*. The latter is the motivation and the

encouragement to accomplish an action, in this case in using the technology (Davis, Bagozzi, Warshaw, 1992).

*Job-fit*, which is the perceived degree for which the technology can lead to a gain in the job performance (Thompson, Higgins, Howell, 1991), is generalized, in the UTUAT2, for a generic context in which a new technology is used.

Finally, *relative advantage* is the extent to which a consumer perceives that using a new technology has more advantages than using the previous one (Rogers, 1995).

*Outcome expectations* is described as the wished results in using the technology.

*Effort expectancy*, the second construct of UTUAT2 theory, is defined by Venkatesh (2003, p. 450) in the UTUAT model as the level of easiness linked to the use of technology, and has been built using the three concepts of *perceived ease of use*, *complexity* and *ease of use*. The first construct comes from the Technology Acceptance Model (TAM model, Davis, 1986): it describes the perceived ease starting from the concept that using the new technology is effortless. The second concept is *complexity* which indicates the degree of perception on the difficulty to use a certain technology (Thompson, Higgins, Howell, 1991). The last construct, *ease of use*, differs from the complexity just for one aspect (Rogers, 1995): the definition of ease of use deals with an innovation while the one of complexity concerns a general system (Plouffe, Hulland, Vandenbosh, 2001).

*Social Influence* is the degree of consumers' perception of the importance of others' opinions in using technology. Precisely, in the UTUAT model, it is described as "the degree to which an individual perceives that important others believe he or she should use the new system" (Venkatesh, 2003, p. 451). It has been built on three main concepts: *subjective norm*, *social factors* and *image*. These all stress the importance of the social environment and the effect it can have on individuals' decisions and actions. The construct of *subjective norm* has been introduced by Ajezen and Fishbein (1977) for the first time. Successively, the concept has been reused by Venkatesh and



Davis and was included in TAM2 as an extra concept for the prediction of behavioral intention. The second construct, *social factors*, indicates the internalization of culture and social elements that a person shares with the others and the community (Thompson, Higgins, Howell, 1991). Lastly, *image* concept refers to the perception that the use of the technology can upgrade a person's image (Rogers, 1995).

*Facilitating conditions* refer to the degree of consumers' perception about resources and support provided to implement a behavior. It refers to the system and the environment which support the new technology and allows the good and effective functioning of it. Facilitating condition variable is based on three constructs. The first is the one of *Perceived Behavioral Control* (Ajzen 1991, Taylor and Todd, 1995) and it reflects the perception of internal and external constraints on behaviors. The second one is *facilitating conditions*, defined by Thompson, Higgins and Howell (1991). It indicates the objective factors in the setting that facilitate the use of the technology. Finally, the last construct is *compatibility* (Moore, Benbasat, 1991) which is defined as the level to which an innovation is consistent with the existing value and need systems.

*Hedonic motivation* has been introduced in the UTUAT2 by Venkatesh, Thong and Xu (2012, p 2012): it does not derive, indeed, from the original UTUAT model but it is rather an enrichment of it, considering the essential aspect of fun. Hedonic motivation reflects the enjoyment in using the technology throughout the experience of usage, which has been proved by Brown and Venkatesh (2005) to have a fundamental role in determining the technology acceptance.

*Price value* is defined as the tradeoff between the monetary value and the benefits in using technology (Dodds, Monroe, Grewal, 1991). In the marketing field, the monetary cost, simply called "price", is usually considered together with the quality and the benefits of products/services to determine its perceived value (Zeithaml, 1988). Thus, the price value has a positive impact on consumers' perceptions and intentions when

the benefit of using the technology is considered to be higher compared to the monetary and non-monetary (i.e. time) costs.

*Habit* refers to the degree to which people are inclined to behave automatically because of training (Limayem, 2007). *Experience* refers to the transition from the preliminary use of a technology to the actual action of the consumer (Venkatesh, Thong, Xu, 2012). Even though Habit and Experience are strictly linked, it is important to stress their difference. Habit is, indeed, generated by the recurring action of an experience and so experience is necessary but not sufficient for the habit formation. Moreover, the positive or negative feedback of past experiences influence and affect (positively or negatively) future intentions and behaviors. Consequently, habit reflects previous experiences.

Although the model is the best starting point to evaluate the acceptance of technology, it does not take into account the purchase journey, which is at the basis of the retail value chain. For this reason, an additional model on purchase channel evaluation has been examined and it has been used with the aim of having a complete overview of consumers' acceptance of VR.

## 5.2 Choice of channel model

The study done by Wang, Lin, Tai and Fan (2015) aims at analyzing how channel characteristics and ways of purchasing influence consumers' attitudes and shopping behavior. Starting from the push-pull view and the previous literature, the authors list six main channel characteristics and their associated benefits and costs (table 1).

Type	Channel characteristics
Perceived search benefits	Information availability
Perceived search costs	Search effort
Perceived purchase benefits	Purchase convenience, service quality
Perceived purchase costs	Purchase effort, purchase risk

Table 1. Channel characteristics and respective perceived costs and benefits

Source: Wang, Lin, Tai and Fan (2015)

*Perceived search benefits* are defined as consumers' perception on quality and quantity information deriving from the choice of a channel to assess and purchase the item.

*Perceived search costs* refer to the consumers' perception about the effort to search the item on that channel.

*Perceived purchase benefits* are related to purchase convenience (monetary, time and possessions) and service quality (shopping experience). In addition, service quality is related to the pre-purchase, the purchase and the post-purchase phases.

*Perceived purchase costs* include consumers' cost in time (to purchase an item using that specific channel) and its complexity. Another kind of cost considered is the purchase risk: the higher is the level of uncertainty, the higher the level of consumers' perceived risk.

To sum up, Wang, Lin, Tai and Fan's research model (figure 5) shows the effects of the perceived costs and benefits of purchasing methods on the choice of the channel. The authors classify the features of the channel in *perceived search benefits*, *perceived search costs*, *perceived purchase benefits* and *perceived purchase costs*. Consequently, the variables (channel characteristics) associated to the costs (i.e. search effort, purchase effort, purchase risk) have a pull effect on consumers' attitude.

On the contrary, *information availability*, *purchase convenience* and *service quality* have a push effect on clients.

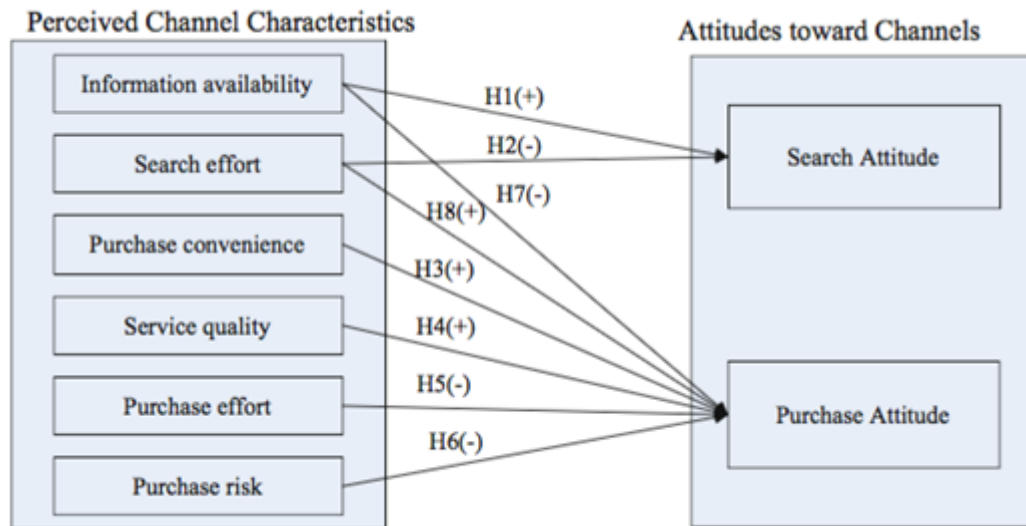


Figure 5. Wang, Lin, Tai and Fan's research model.

## 6. Research model

Being the present research focused on consumers' purchase intention through the use of VR technology, a combination of the elements derived from the literature and models previously illustrated has been used to build the model applied.

Starting from the literature review and the examination of the main theories, a synthesis of the UTAUT2 theory and the model on the choice of the channel has been done considering the main variables. Given the importance of senses, and especially the central role of touch, the NFT has been added as moderator variable. The new model has been built taking into account the following variables: effort, convenience and enjoyment, and the mitigating factor of NFT.

Taking a close look at the two main initial frameworks, it can be said that some constructs have common attributes. The variables *effort expectancy* (Venkatesh, 2003) and *perceived purchase effort* (Wang, Lin, Tai and Fan, 2015) have similar

definitions: looking at their items, both are related to the easiness of use referred to both technology and channel. Consequently, the variable of the new model called *effort* is a synthesis of the two. The variable, besides, embraces also the concept of purchase risk, which is part of the purchase cost and affects the perceived effort of buying through a certain channel.

*Convenience* is based on the constructs *performance expectancy* (Venkatesh, 2003) and *perceived purchase* (Wang, Lin, Tai and Fan, 2015), which are built on the concepts of time saving and making life easier.

The variable *enjoyment* is related to the UTAUT2 element *Hedonic Motivation*, and has been introduced given its importance in the purchasing process (paragraph 4.3).

Finally, the indirect effect of the NFT on the outcome of the research has been analyzed.

On the other hand, some of the variables included in the UTAUT2 and in the choice of channel models have not been considered for different reasons. The present research is focused on purchase attitude and technology acceptance, without considering search attitude. Consequently, the variables *search attitude* and *perceived information* have not been included.

Although retailers have started a few experiments with VR (e.g. Ikesaki, one of the main cosmetic stores in the country, offers to its customers a virtual journey inside its biggest shop in Sao Paulo<sup>19</sup>), this kind of technology has not been applied in Brazil and is not well known among customers. Therefore, the constructs *habit*, *experience* and *social influence* lose their validity in this context.

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<sup>19</sup> Vtex Day- Sao Paulo, Brazil, 14-15 of May 2018

## 6.1 Effort

The predictor *effort* includes two dimensions: the *purchase effort* and the *effort expectancy in using the technology*. The *purchase effort* is related to consumers' costs and pains across the purchasing process through a specific channel (physical and virtual), based on its characteristics (Bhatnagar, Ratchford, 2004).

Consumers' choices are affected negatively when they perceive that buying through a specific channel is too complicated or requires too much effort. In addition, the limited use of senses, in particular touch, influences the perceived spent effort, because consumers spend more time in evaluating the product (Wang, Lin, Tai, Fan, 2015). This is related to the concept of perceived risk in purchasing: the limited use of senses increases the uncertainty and potential undesirable consequences of the shopping (Forsythe, Liu, Shannon, Gardner, 2006). So, the following hypothesis is proposed:

H1: Perceived purchase effort of shopping through the technology has a negative effect on consumer attitudes.

Considering that the usage of a new technology needs to be learnt, an additional hypothesis on the effort expectancy in using technology is presented (UTAUT model):

H1a: Perceived effort in using the technology has a negative effect on consumer attitudes.

## 6.2 Convenience

*Convenience* relies on three main attributes: possession convenience, monetary convenience and time convenience (Forsythe, 2006; Schroder, Zaharia, 2008). *Convenience*, though, is meant to satisfy functional and non-functional needs related to shopping (Workman, Siwon, 2013), and obviously it affects the choice of purchasing means.

Possession convenience is the functional benefit in having that product. Monetary convenience is the trade-off between the price value and the benefits provided: in this case, price and benefits are related both to the use of technology to purchase and to the product itself (i.e. the total price of the purchase, considering any possible delivery and technology acquisition costs). In addition, time convenience is linked to time savings (e.g. no lines and no in-store traffic, the product is easy to find and to evaluate). Thus, the variable convenience is associated to a utilitarian view of shopping, in which consumers want to finalize their purchase in a timely and efficient manner.

Purchase convenience affects positively the consumer's shopping attitudes: if individuals have a high perception of convenience, they will tend to choose that channel/technology to do shopping (Wang, Lin, Tai, Fan, 2015). Therefore, the following further hypothesis is proposed:

H2: Perceived convenience from the use of a technology to purchase has a positive effect on consumer attitudes.

### 6.3 Enjoyment

As the literature review has shown, enjoyment could really affect shopping choices, above all the choice of the channel, or more precisely, in this case, the use of VR to purchase.

Looking at Brown and Venkatesh (2005), *hedonic motivation* is defined as the fun or the pleasure in using a special technology. In this respect, the authors prove that *hedonic motivation* has a fundamental role in determining acceptance and intention towards the use of a certain technology.

For this reason, *enjoyment* is included as a variable in order to test on which degree the enjoyable use of technology, in this case VR, can affect the consumer's acceptance as a tool to purchase:

H3: Perceived enjoyment in the use of technology to purchase has a positive effect on consumer attitude.

## 6.4 Need for touch

Peck and Childers (2003) have proved that NFT varies across individuals and can affect their choices. Some people rather assess items through touch and they are more disheartened when purchasing in a virtual context: when the possibility of touching is unavailable, the lack of touch information about a product could really affect high NFT consumers in v-commerce purchasing (Ching-Jui, Tze-Hsien, Yu-I, 2012). Purchase decision, when buying virtually, is a longer and a more complex process (requiring higher effort) than in other buying modes. For a high-NFT person, shopping in a virtual environment might be very risky and costly; consequently, it is less convenient, as well as less enjoyable.

This kind of individuals are more confident when touch is a component of their customer journey. As the research done by Lee, Yang and Johnson (2017) has shown, autotelic and instrumental NFT have an impact as moderators for technology acceptance. Consequently, people with high NFT are less likely to use VR for shopping and so it happens that NFT has an influence on the effect of the other variables on customer intention.

H4: NFT will moderate the effect of effort, convenience and enjoyment on behavioral intention, such that the effect will be weaker among people with high NFT.



## 6.5 Hypotheses and model recap

In order to provide a clear vision of the model built and the hypotheses meant to be tested, Table 2 summarizes the previous chapter and highlights the main references used to build the constructions.

Hypotheses	References
<b>H1:</b> Perceived purchase effort of shopping with the technology has a negative effect on consumer attitudes	Wang, Lin, Tai, Fan (2015)
<b>H1a:</b> Perceived effort in using the technology has a negative effect on consumer attitudes	Venkatesh et al. (2003)
<b>H2:</b> Perceived convenience from the use of a technology to purchase has a positive effect on consumer attitudes	Venkatesh et al. (2003) Wang, Lin, Tai, Fan (2015)
<b>H3:</b> Perceived enjoyment in the use of technology to purchase has a positive effect on consumer attitude	Brown and Venkatesh (2015)
<b>H4:</b> NFT will moderate the effect of effort, convenience and enjoyment on behavioural intention, such that the effect will be weaker among people with high NFT	Peck, Childers (2003)

Table 2. Hypotheses of the research model

Figure 6 shows the framework and the effect of the variables on consumers' intentions. Especially, the variable effort has a negative effect on the dependent variable (hypotheses 1 and 1a), while convenience and enjoyment have positive effects (hypothesis 2 and 3). Besides, it can be noticed how NFT is a negative indirect variable which can strengthen the variables' final outcomes.

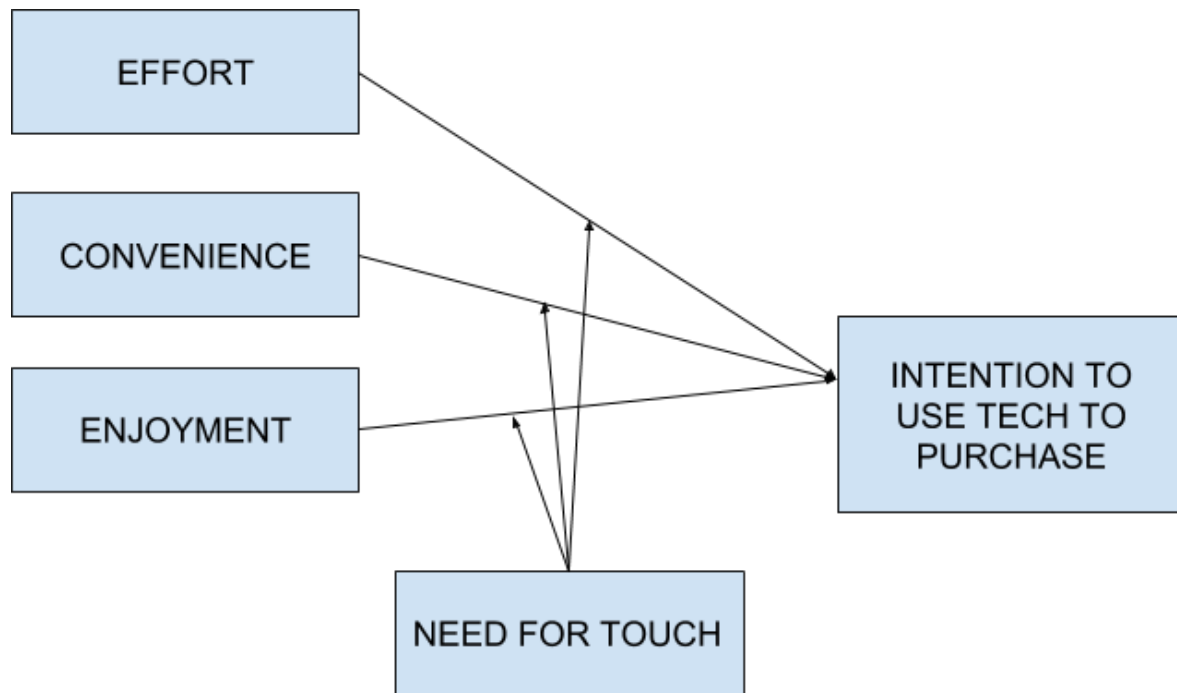


Figure 6. Model of VR technology intention to use

## 7. Methodology

This chapter of the dissertation presents the design of the research method and the demographic features of participants.

### 7.1 Instrument development and pretesting

In order to collect empirical data, a survey made up of 46 questions was designed and the supposed minimum time to finish the questionnaire was 5 minutes (Appendix). The survey has been developed with *Qualtrics software* and it has been translated into Portuguese in order to reach a higher number of people.

Under the assumption that consumers' level of NFT can affect the intention to use VR in purchasing, the survey has been designed to classify, at the beginning, the different kinds of respondents through 12 questions (7 points Likert scale). In addition, the questions had the aim to measure both instrumental and autotelic need for touch.

Subsequently, a video example of 40 seconds on how VR works has been presented in order to make the purchase situation clear to all the respondents. The clip is on Alibaba's introduction of virtual reality, and shows a Chinese boy doing shopping virtually at Macy's, in New York. All the parts of the video that could affect the consumers' opinion (for instance too enthusiastic exclamations about the pleasure of using VR) have been cut off in order to keep the example as neutral as possible. The video is mute but its images are self-explanatory. Figures 7, 8 and 9 show some framework of the clip.



Figure 7. The Consumer with a VR headsetter

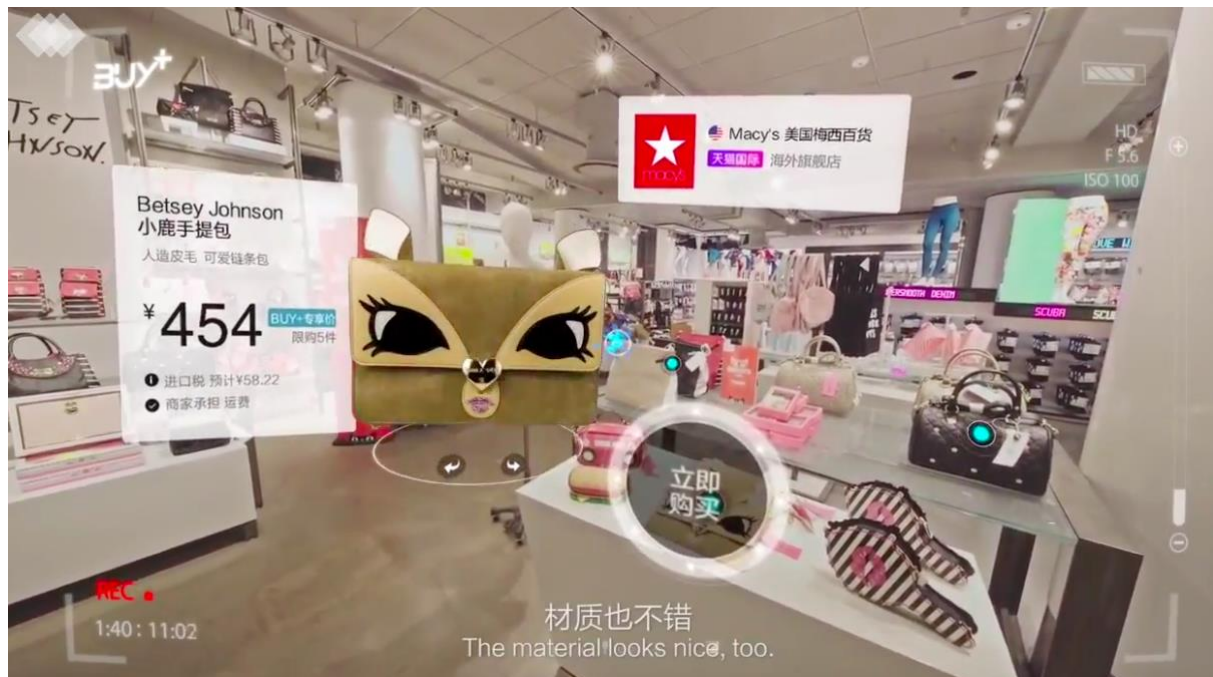


Figure 8. The consumer is browsing in the shop and he is reading the information about the products.

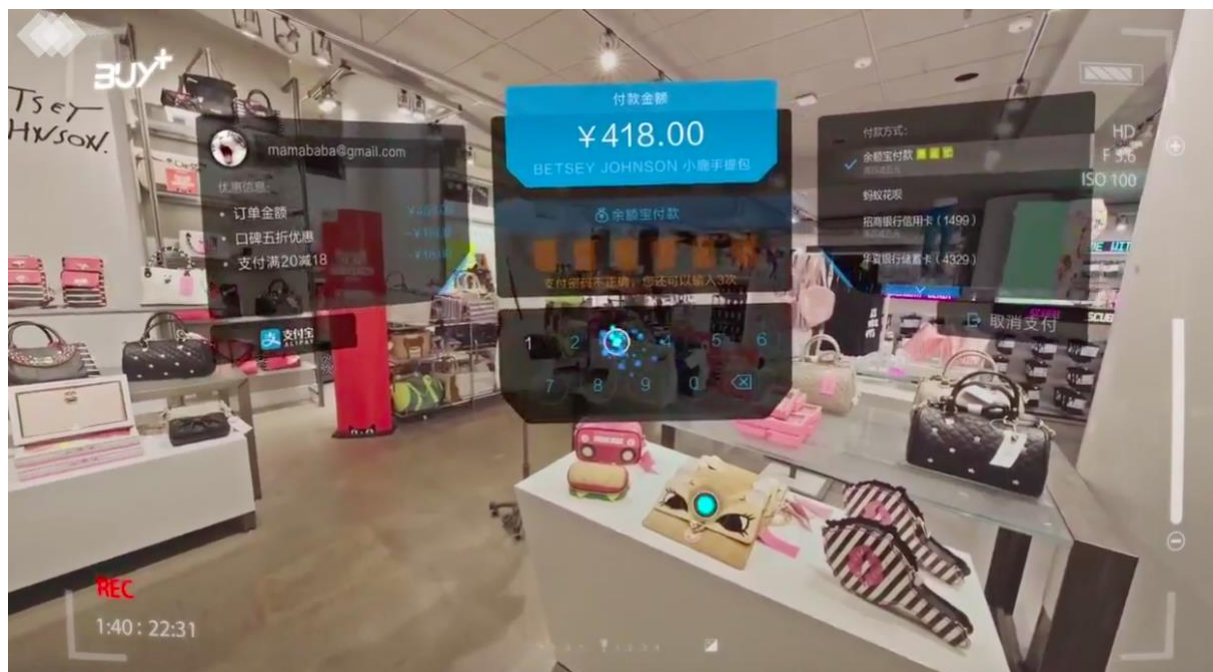


Figure 9. The consumer is purchasing the item

Respondents were asked to answer 26 questions, keeping in mind the purchase situation shown in the clip. To conclude, 8 questions on their online purchase habits and their level of connectivity (i.e. how many tech tools they use in their daily life) have

been included in the questionnaire. Table 3 sums up the question characteristics and the scales used in the survey.

Variable and definition	Scale type
<b>Need for touch:</b> 12 statements regarding touching products while shopping and its motivations	7-point Likert; 1= Strongly disagree, 7= Strongly agree
<b>Purchase effort:</b> 6 statements regarding the pros and risks of buying with VR	7-point Likert; 1= Strongly disagree, 7= Strongly agree
<b>Technology effort:</b> 2 statements on the degree of easiness to use VR	7-point Likert; 1= Strongly disagree, 7= Strongly agree
<b>Convenience:</b> 6 statements regarding the time-convenience and performance expectancy of buying with VR	7-point Likert; 1= Strongly disagree, 7= Strongly agree
<b>Enjoyment:</b> 3 statements on hedonic motivation of using VR to buy	7-point Likert; 1= Strongly disagree, 7= Strongly agree
<b>Intention:</b> 6 statements testing the degree of interest in using VR to buy	7-point Likert; 1= Strongly disagree, 7= Strongly agree
<b>Connectivity level:</b> 1 statement measuring the number of technological tools used in everyday life	9 multiple choices, more than 1 option
<b>Online purchase frequency:</b> 2 statements regarding how often the consumer buys online and when it was the last time	Multiple choice, 1 option; 1= Weekly, 5=Never 1= This week, 5=Never

<b>Qualitative questions:</b> 3 statements regarding the kind of products they buy online and which they would buy (and not) with VR	1 Multiple choice and 2 open questions
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Table 3. Survey questions summary

## 7.2 Data collection and respondent characteristics

The survey reached 496 Brazilians. However, only 249 answers have been considered usable (50%): uncompleted and under the minimum time required (five minutes) responses have been discarded.

The survey has been spread through social networks, in particular it was posted on several Brazilian Facebook groups. 51% of the sample is made up of males (128) and 49% (121) of females. Interviewed people are between 16 and 69 years old ( $M = 32.91$ ;  $SD = 12.4$ ). Finally, 60% of them are from São Paulo metropolitan area.

## 8. Data analysis

The analysis of the collected data has started with an assessment of the internal consistency of the model. Then, a data examination through the *Multiple Regression method*, investigating the hypothesis validity, has followed. Moreover, with the aim of having a deeper overview of VR potential user, a cluster analysis has been done: thanks to this kind of assessment, we have the possibility to target the potential heavy user segment and identify the common characteristics of the group. The whole analysis has been done using the statistic software *SPSS*.

### 8.1 Model evaluation

As stated before, the first step of the analysis was to test the internal consistency reliability in order to assess the structure of the model used, considering that the framework is an updated version of the UTAUT2 including consumers' purchasing

Table 4. Cronbach's Alpha results

channels choices. Internal consistency reliability is a way to determine to what extent a survey is apt to measure the variables and the accuracy of the used scales. One of the commonest methods in use is Cronbach's Alpha; Table 4 reports the results on the variables.

Constructs	Cronbach's Alpha
Purchase Effort	0.81
Technology Effort	0.67
Convenience	0.87
Enjoyment	0.84
Intention	0.92
Need for touch	0.92

Table 4. Cronbach's Alpha results

According to Hair, Hult, Ringle and Sarstedt (2013), Cronbach's Alpha values being greater than 0.7 show that the constructs are acceptable. In our case, all constructs have a value higher than 0.7, with the exception of *technology effort*. However, the difference is very small and therefore irrelevant.

## 8.2 Results analysis of structural model

In order to have more precise and reliable results, the dataset has been normalized. It means that the whole dataset has been scaled on a range between 0 and 1 (*Rescaling method, min-max normalization*): to be clearer, data have been converted in values

$$x_{new} = \frac{x - x_{min}}{x_{max} - x_{min}}$$

from 0 to 1 using the following formula , in which X is the value of the considered data,  $x_{min}$  the minimum value of the scale and  $x_{max}$  the maximum value

of the scale. This operation has been done with the aim of simplify the data reading and comparison.

Such a measure has also been taken to avoid consistency anomalies deriving from possible insertion, cancellation or modification operations. Moreover, the values of the variables have been computed summing the results of the single questions and calculating the average to make the results comparable and homogeneous. Table 5 summarizes the descriptive of the model.

<b>Descriptive Statistics</b>			
	Mean	Std. Deviation	N
INTENTION	,639227642	,187148204	246
PURCHASE EFFORT 24	,455171635	,200389462	246
TECH EASINESS TO USE	,703590786	,181851093	246
CONVENIENCE	,690153568	,181085739	246
ENJOYMENT	,697154472	,190572550	246
AGE	32,89	12,439	246
GENDER (1=M, 2=F)	1,48	,501	246
NFT (TOT 84)	,539238934	,206451218	246

Table 5. Summary of the variables (means and standard deviations)

After the data cleansing phase, the first step was to analyze the results and to test the formulated hypothesis (Hair, Hult, Ringle and Sarstedt, 2013); the following step has been taken to test the collinearity between the variables. Collinearity is present when a variable has a tight correlation with (or it is function of) another variable. The possible presence of collinearity could bias the results, invalidating the whole examination.

Looking at Table 6, it can be noticed that convenience and intention, enjoyment and intention, have the highest (positive) correlations. However, so as to verify collinearity, the method used is the one of *tolerance* and *variance inflactor factor (VIF)*, reported in Table 7. The tolerance for significant variables is >20% and VIF<10. This means that collinearity problems are not present and consequently the analysis is valid.



Correlations									
		INTENTION	PURCHASE EFFORT 24	TECH EASINESS TO USE	CONVENIENC E	ENJOYMENT	AGE	GENDER (1=M, 2=F)	NFT (TOT 84)
Pearson Correlation	INTENTION	1,000	-,527	,493	,691	,697	,029	-,080	-,122
	PURCHASE EFFORT 24	-,527	1,000	-,483	-,369	-,412	-,014	,120	,347
	TECH EASINESS TO USE	,493	-,483	1,000	,428	,435	-,062	-,077	-,105
	CONVENIENCE	,691	-,369	,428	1,000	,571	,034	,019	-,031
	ENJOYMENT	,697	-,412	,435	,571	1,000	-,045	-,077	-,015
	AGE	,029	-,014	-,062	,034	-,045	1,000	,083	-,259
	GENDER (1=M, 2=F)	-,080	,120	-,077	,019	-,077	,083	1,000	,153
	NFT (TOT 84)	-,122	,347	-,105	-,031	-,015	-,259	,153	1,000
Sig. (1-tailed)	INTENTION	.	,000	,000	,000	,000	,324	,104	,028
	PURCHASE EFFORT 24	,000	.	,000	,000	,000	,414	,030	,000
	TECH EASINESS TO USE	,000	,000	.	,000	,000	,168	,113	,050
	CONVENIENCE	,000	,000	,000	.	,000	,299	,382	,315
	ENJOYMENT	,000	,000	,000	,000	.	,241	,115	,409
	AGE	,324	,414	,168	,299	,241	.	,097	,000
	GENDER (1=M, 2=F)	,104	,030	,113	,382	,115	,097	.	,008
	NFT (TOT 84)	,028	,000	,050	,315	,409	,000	,008	.
N	INTENTION	246	246	246	246	246	246	246	246
	PURCHASE EFFORT 24	246	246	246	246	246	246	246	246
	TECH EASINESS TO USE	246	246	246	246	246	246	246	246
	CONVENIENCE	246	246	246	246	246	246	246	246
	ENJOYMENT	246	246	246	246	246	246	246	246
	AGE	246	246	246	246	246	246	246	246
	GENDER (1=M, 2=F)	246	246	246	246	246	246	246	246
	NFT (TOT 84)	246	246	246	246	246	246	246	246

Table 6. Correlations analysis

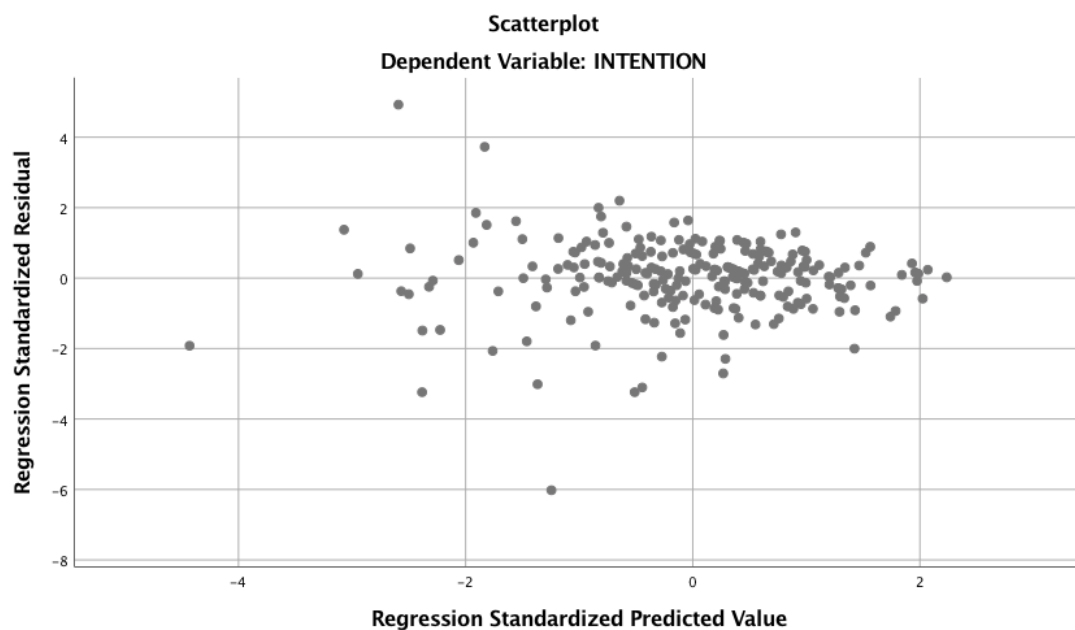
Coefficients <sup>a</sup>												
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B		Correlations			Collinearity Statistics
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance
1	(Constant)	,162	,033		4,967	,000	,098	,226				
	ENJOYMENT	,685	,045	,697	15,204	,000	,596	,774	,697	,697	,697	1,000
2	(Constant)	,022	,032		,677	,499	-,042	,086				
	ENJOYMENT	,442	,048	,450	9,255	,000	,348	,536	,697	,511	,369	,674
	CONVENIENCE	,448	,050	,434	8,925	,000	,349	,547	,691	,497	,356	,674
3	(Constant)	,196	,045		4,395	,000	,108	,284				
	ENJOYMENT	,375	,047	,382	8,012	,000	,283	,468	,697	,458	,303	,627
	CONVENIENCE	,402	,048	,389	8,310	,000	,307	,497	,691	,471	,314	,652
	PURCHASE EFFORT 24	-,211	,039	-,226	-5,367	,000	-,289	-,134	-,527	-,326	-,203	,804
a. Dependent Variable: INTENTION												

Table 7. Collinearity analysis

Before starting the regression assessment, it is important to prove that there are no heteroscedasticity problems: they can make regression parameters and p-values

unreliable because their variances and co-variances are underestimated. Consequently, the least-squared regression analysis cannot be used because its main hypotheses are not confirmed.

Graph 1 shows the standardized errors of the variables. As we can see from the table underneath, data have similar statistical dispersion (same variance among the sample), hence, there is no heteroscedasticity.



Graph 1. Heteroscedasticity analysis

After the preliminary validity examination, a linear regression has been run with the aim of evaluating the relevance and significance of constructs, summed up in Table 8. This analysis wants to test the validity of the hypotheses done to build the research model. In particular, a *Stepwise* method has been done. It is to be noticed that this regression has been run without the moderator effect: this has been done to better test the individual effect of the moderator and its changes on the outcomes.

Stepwise allows to fit a regression model testing step by step, trying out one independent variable at the time, the effect of the inclusion of a new construct on the validity of the model, using the technique of the T-test. It measures the effect of the variables and their statistical validity. The test assesses the statistical validity of the construct through the p-value. It is, indeed, the calculated probability of finding the observed results of the formulated hypothesis.

Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics			
						F Change	df1	df2	Sig. F Change
1	,697 <sup>a</sup>	,486	,484	,134383633	,486	231,165	1	244	,000
2	,783 <sup>b</sup>	,613	,610	,116860748	,127	79,660	1	243	,000
3	,809 <sup>c</sup>	,654	,650	,110699555	,041	28,802	1	242	,000

a. Predictors: (Constant), ENJOYMENT  
b. Predictors: (Constant), ENJOYMENT, CONVENIENCE  
c. Predictors: (Constant), ENJOYMENT, CONVENIENCE, PURCHASE EFFORT 24

Table 8. Model summary

The model has a good R square value, which grows with the addition of significant variables: in the analysis, the variables that do not enhance the model validation have been excluded. Also, adjusted R square is very close R square.

What is more, checking the Test-F in the ANOVA (Table 9), we have got further evidence that the model is statistically significant and that it comes to be appropriate to assess the hypotheses done to build the research model.

ANOVA <sup>a</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4,175	1	4,175	231,165	,000 <sup>b</sup>
	Residual	4,406	244	,018		
	Total	8,581	245			
2	Regression	5,262	2	2,631	192,674	,000 <sup>c</sup>
	Residual	3,319	243	,014		
	Total	8,581	245			
3	Regression	5,615	3	1,872	152,746	,000 <sup>d</sup>
	Residual	2,966	242	,012		
	Total	8,581	245			

a. Dependent Variable: INTENTION

b. Predictors: (Constant), ENJOYMENT

c. Predictors: (Constant), ENJOYMENT, CONVENIENCE

d. Predictors: (Constant), ENJOYMENT, CONVENIENCE, PURCHASE EFFORT 24

Table 9. Variance analysis

Looking at our results in Table 10, it can be noticed that the independent variable *Easiness to use the technology* (i.e. *technology effort*) has been excluded through the stepwise analysis because its p-value is >0,05.

Coefficients <sup>a</sup>													
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95,0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	,162	,033		4,967	,000	,098	,226					
	ENJOYMENT	,685	,045	,697	15,204	,000	,596	,774	,697	,697	,697	1,000	1,000
2	(Constant)	,022	,032		,677	,499	-,042	,086					
	ENJOYMENT	,442	,048	,450	9,255	,000	,348	,536	,697	,511	,369	,674	1,484
	CONVENIENCE	,448	,050	,434	8,925	,000	,349	,547	,691	,497	,356	,674	1,484
3	(Constant)	,196	,045		4,395	,000	,108	,284					
	ENJOYMENT	,375	,047	,382	8,012	,000	,283	,468	,697	,458	,303	,627	1,595
	CONVENIENCE	,402	,048	,389	8,310	,000	,307	,497	,691	,471	,314	,652	1,533
	PURCHASE EFFORT 24	-,211	,039	-,226	-5,367	,000	-,289	-,134	-,527	-,326	-,203	,804	1,244
a. Dependent Variable: INTENTION													

a. Dependent Variable: INTENTION

Table 10. Regression analysis- Stepwise method

On the other hand, constructs of *Enjoyment*, *Convenience* and *Purchase Effort* are all statistically significant (p-value < 0.01). Moreover, the analysis suggests that the

variable with the greatest effect on *Intention* is *Enjoyment*, followed by *Convenience* and *Purchase Effort*. Thus the final equation of the model is:

$$y = 0,4 x_1 + 0,4 x_2 - 0,2 x_3$$

Where  $y$  is the *intention to use the technology*,  $x_1$  is *enjoyment*,  $x_2$  is the convenience and  $x_3$  the *effort to purchase*.

Finally, in the dataset there are no outliers using the rule of 3x interquartile range.

### 8.3 Moderator analysis

The second step of the data analysis has been to test the fourth hypothesis through a moderator assessment. It is a necessary operation in order to verify the truthfulness of the fifth hypothesis (H4), that is, the effect of NFT on the independent variable. NFT is considered a moderator because it does not have a direct effect on the dependent variable but it affects people's perception and opinion on the outcome.

An interaction is observed when the nature and the strength of two variables (in this case the independent and the dependent) change as function of a third variable, the moderator.

Firstly, variables have been centered, calculating the deviation of the data value from the mean of the group of data referring to the same construct. It has been done in order to limit collinearity problems. To test the moderator effect, indeed, a product term composed by the moderator and the variable must be created in order to run a new regression analysis. However, this could bring multicollinearity problems because the new term is made up of models' variables. For this reason, even though in this case correlation is not particularly strong, centering the variables was advisable to help to mitigate the potential threats of collinearity. Moreover, centering normally gives more straightforward interpretation of the lower-order terms ( Gwonen, 2011).

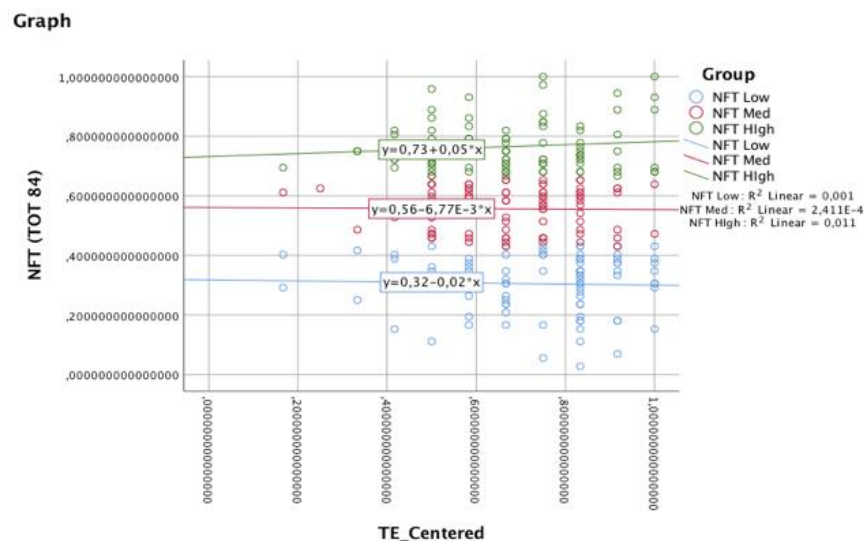
Thus, data have been cleansed and the average deviations have been considered. Consequently, four new constructs have been created: *Enjoyment\_Centered*

(*E\_Centered*), *Convinience\_Centered* (*C\_Centered*), *Purchase Effort\_Centered* (*PE\_Centered*), *Tech Easiness to Use\_Centered* (*TE\_Centered*). Even though *Tech Easiness to Use* does not have statistical validity, it has been decided to test the effect of the moderator with the intention to check if it could affect the variable validity.

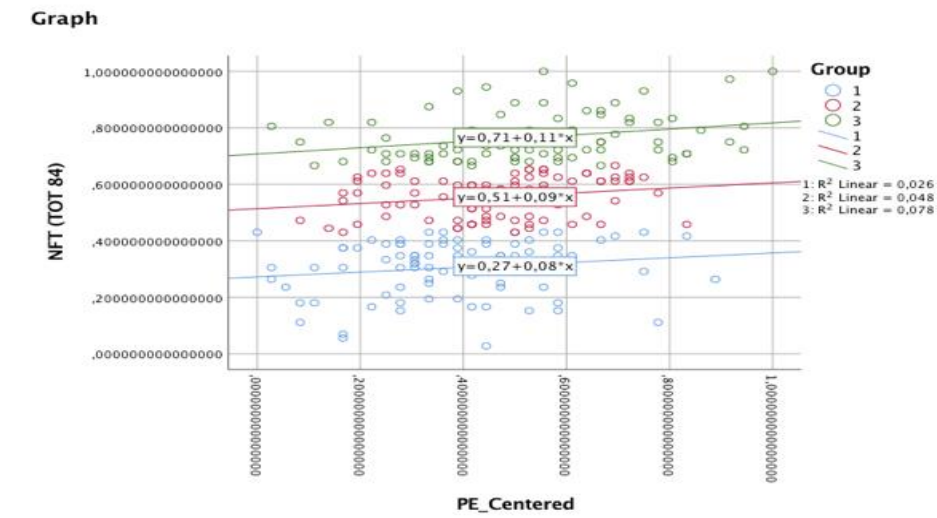
The methodology used for the moderator examination is the one of graph. Data variables have been classified in three groups *High NFT*, *Med NFT* and *Low NFT*.

Afterwards, 4 graphs to test the interaction between the moderator and the single independent variables have been produced, classifying the data on the created groups. If Hypothesis four results to be valid, then the slopes of the lines representing the relation between the variable and the moderator must be different.

However, as it can be noticed from Graph 2, Graph 3, Graph 4 and Graph 5, the data turned out to follow the same trend, in spite of the NFT scores.

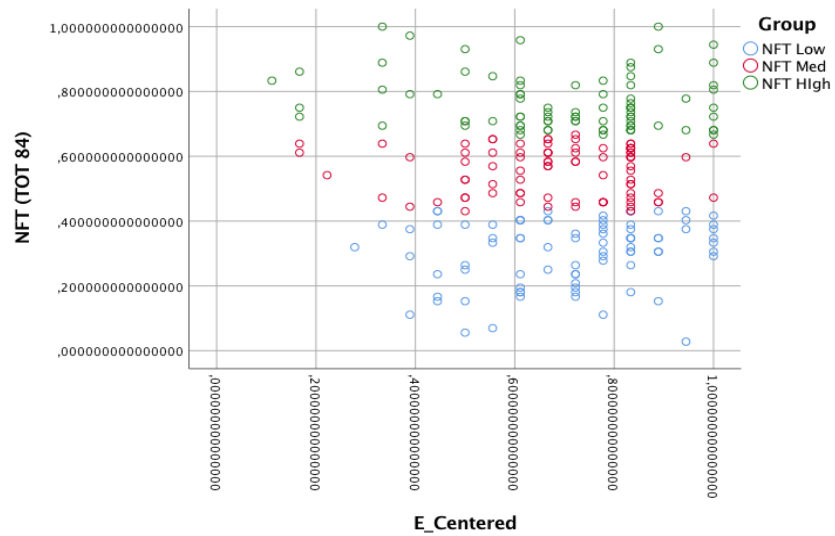


Graph 2. Moderator analysis between NFT and TE

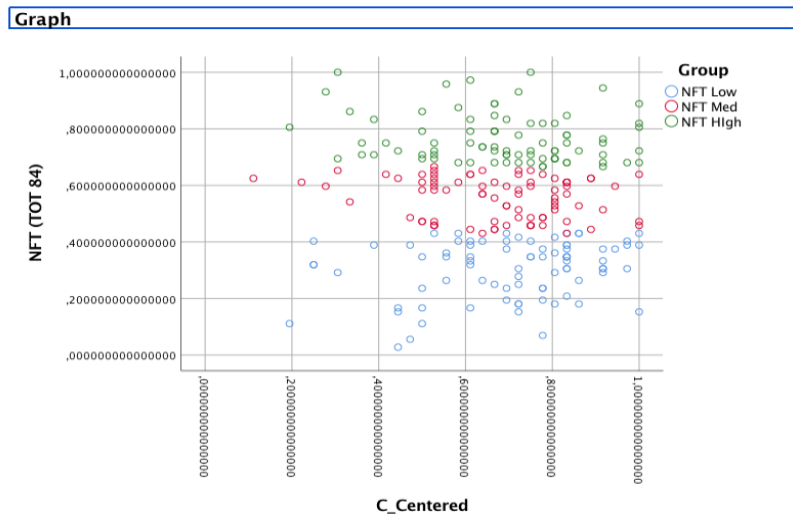


Graph 3. Moderator analysis between NFT and PE

➔ **Graph**



Graph 4. Moderator analysis between NFT and E



Graph 5. Moderator analysis between NFT and C

To sum up, the effect of the variables on the independent variables have not changed with a low, moderate or high score on NFT, as the graphs show. A further verification has been done by creating a new variable, multiplying the centered moderator per the centered independent variables: even in this case, the relation is not valid because the product variable is not statistically significant.

Furthermore, it has been proved that the same effect is obtained when NFT is separated into autotelic and instrumental. Even though differences in the moderation effect were expected, the result was that the NFT in absolute terms does not affect consumers' intentions at all. This is an interesting starting point to explore the reasons of this phenomenon.

Table 11 is a sum-up table of results, useful to have a clearer picture on the work done so far.

Hypotheses	Analysis
H1a	<b>Accepted.</b> The construct <i>Purchase Effort</i> is statistically significant. It has a negative relation with the dependent variable.



H1b	<b>Refused.</b> The construct <i>Tech easiness to use</i> is not statistically significant
H2	<b>Accepted.</b> The construct <i>Convenience</i> is statistically significant. It has a positive relation with the dependent variable.
H3	<b>Accepted.</b> The construct <i>Enjoyment</i> is statistically significant. It has a positive relation with the dependent variable and it is the one with the strongest effect on the y.
H4	<b>Refused.</b> The construct <i>Need for touch</i> does not moderate the effect of independent variables on the dependent one.

Table 11. Sum Up of the Hypothesis analysis

## 8.4 Cluster analysis

The third step of data analysis is clustering, devised with the goal to understand which kind of customer is the more inclined to use VR applied to retail. In the survey, it has been asked to respondents to answer some questions about their online shopping behaviors and habits and their relation with the usage of technology.

Three behaviors have been taken into account for the clustering examination.

- *Connectivity.* It is the level of consumers' technology usage. It has been asked respondents to indicate which of the listed technological services they usually employ: Spotify, Amazon Prime, Data plan, Facebook, Instagram, Twitter, Snapchat, YouTube account, cloud storage service (Dropbox/ Onedrive/ Google Drive/ Amazon Drive).
- *Number of categories of purchased items online.* Respondents were asked to check among these categories: event tickets, electrical appliances, clothes, flight tickets, wine, makeup and cosmetics, shoes, take-away food, books, furniture, groceries. Moreover, there was the possibility for the consumer to say

that he/she had never bought online. For our analysis, we used just the number of the product categories, without distinguishing among them.

- *Frequency of online shopping.* Respondents had to mark one option between: weekly, monthly, 2 or more times per year, annually, never.
- *Last online purchase.* Respondents had to point out when was the last time they had bought something online: this week, this month, in the last six months, in more than one year, never.

These data have been collected with the aim of exploring consumers' behavior and to find out which group of people is more willing to use VR to buy things.

Figure 10 illustrates how the clusters are divided, according to the *K-Means method*. Cluster 1 has the highest centers (nearest common mean). In particular, for connectivity and purchase frequency is 0,6 and for last purchase and number of purchased items 0,7. Comparing it with Cluster 3, the latter has lowest values in the centers, so these people are not heavy-users of e-commerce. Cluster 2 is the one with the lowest number of cases and the one with lowest centers. This is the proof that the majority of the people in the sample uses online shopping and it is familiar with technology appliances.

### Number of Cases in each Cluster

Cluster	1	107,000
	2	25,000
	3	117,000
Valid		249,000
Missing		17,000

	1	Cluster 2	3
Zscore: Connectivity (Nro.)	,60951	-1,02897	-,33755
Zscore: Purchase frequency (1= NEVER, 5=WEEKLY)	,58202	-2,05894	-,09233
Zscore: Last purchase (1=NEVER, 5=THIS WEEK)	,68432	-1,71774	-,25879
Zscore: PURCHASED ITEMS (Nro.)	,75748	-1,50850	-,37041

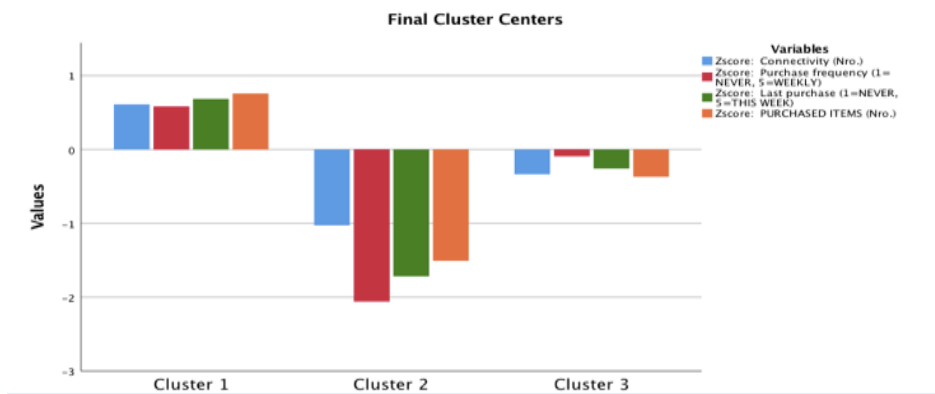
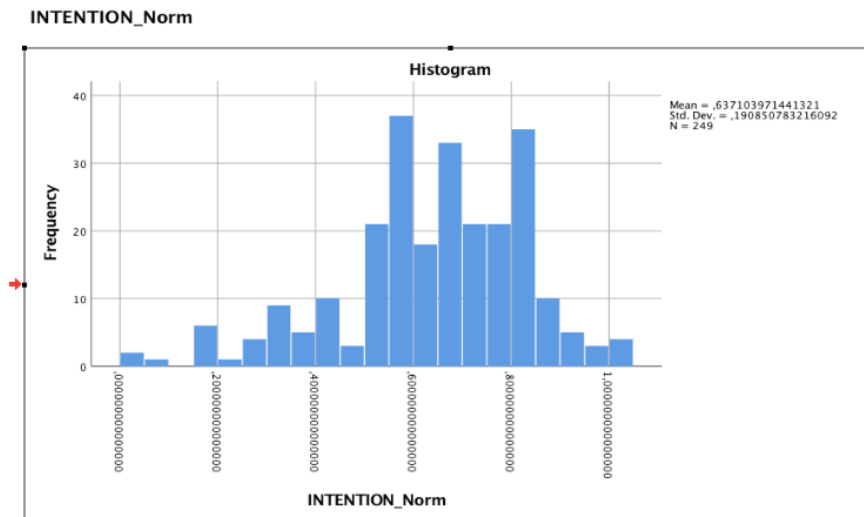


Figure 10. Clusters' composition and characteristics

After having individuated the clusters' composition and the number of people in each cluster, it was fundamental to understand which group of consumers is more willing to use VR in the purchase process.

The first step of the analysis has been oriented to examine the normal distribution of the dependent variable in order to identify the cases after the "peak" and the group of people with the higher acceptance of the technology. Looking at Graph 6, it is clear that the cases that have been taken into account are those greater or equal to 0.8.



Graph 6. Normal distribution of Intention

At a second stage, a comparison between the cases in the last tail of the Gaussian distribution and the clusters has been done. In particular, data have been analyzed to check the percentage of them belonging to each group: 51% of the cases are members of cluster 1.

The result of this assessment was, finally, that people with high connectivity, who often buy online and a lot of product categories and whose last online purchase was recent, are more willing to purchase with VR.

The finding stresses out the potential continuity of e-commerce and v-commerce: the VR purchase could be considered as a development of the online purchase: consumers who usually buy on the internet and use a greater number of technology appliances in their everyday life, are the ones with a stronger motivation and deep intention to use VR among their purchase procedures.

## 9. Discussion

VR is a technology with a high applicability potential in the field of retailing. However, it is still at its first stages of development and experimentation, thus the majority of

common consumers in Brazil do not have a clear idea about how it really works and about what its real advantages are. The research done had as its main objective to assess the factors that influence the consumers' intention to use VR and to discover how to leverage them so as to have a sapient future use of the technology in retail.

With this aim in mind, an assessment of the hypothesis which have proved to be valid has been conducted. It has followed an examination of the reasons why H1a and H4 are not statistically valid and of the obstacles to the use of VR. To this purpose, some interviews have been carried out. Accordingly, seven people who have participated in the survey have been interviewed. In particular, the interviewed people are four females and 3 males, they are between 24 and 50 years old. Due to the distance, the interviews have been done via Skype and each one lasted roughly twenty minutes. In the following paragraphs, the study findings inferred from the surveys and the interviews have been summed up, integrated and explained jointly.

## 9.1 Analysis of valid hypotheses

Starting from the quantitative results, a complementary qualitative reading is given in order to provide a clearer vision on the topic analyzed and the data interpretation.

The independent variable with the strongest effect on the intention to use VR along the purchasing journey is *enjoyment*. VR is strongly associated to an amusement tool and that in this case could pump and foster the shopping experience, using 3D immersion technology. As a matter of fact, during the in-depth interviews, the interviewed stated that for them the strength of the VR is the simulated experience, the fact that one can have the same environment of the shop but with the data enrichment and the customization generated by IoT and data analytics. Thanks to the strong storytelling power of VR and its main characteristic of immersion, people think it can be an interesting tool for shopping because it provides the context of shopping and not just the product. Customer experience is thus enhanced and so is the value for the client.

The interviews revealed that with VR it is much easier and faster to compare products prices and characteristics, rather than with online shopping (*Convenience*). Consumers acknowledge the data analytics role in VR: as one of them affirmed “I like the fact that I can have all the information about a product and that I can have a customized offer which follows my needs and makes everything faster”. Thanks to IoT technologies, VR can process immediately a huge quantity of data and customize the service given.

The spatial idea itself is key. When the interviewed were asked *how would you describe VR?*, the majority of consumers mentioned the fact that VR can take you to a different place even though it is far, and it can happen at any time.

Concerning the constructs of *Effort*, the main features that has been considered is the one linked with immersion and evaluation of the product. Due to the strong capacity of representing the object in the spatial dimension, consumers can evaluate sizes, details and colors immediately, much more than in the online shopping. This is fundamental in order to make the purchase process smoother: consumers, indeed, use a digital purchase channel because it is easier to compare the prices and features (especially technical characteristics) of the items.

Nonetheless, purchase risk is strongly perceived when buying with VR, even if in Brazil it is really common to pay through electronic methods and banks have special strategies to limit this kind of risks. For example, many banks, such as *Banco Santander*, offer the service of a temporary card number which changes every few minutes and that allows to shop in digital platforms. This kind of technologies, which could be applied to VR shopping too, have changed the Brazilian way of thinking about the payment risks in purchasing through digital platforms. Consequently, even though the variable *Effort* is statistically valid, it has a lower impact on the intention to use the technology.

## 9.2 Analysis of rejected hypotheses

Looking at the results of the statistical analysis, the independent variable *Easiness to use the technology* seems to have no statistical evidence. Therefore, the forthcoming section of the research is to explain this unexpected phenomenon through deeper quality examinations.

First of all, it is fundamental to stress out that the proportion of people that do not buy online is just the 0,04% of the sample. Although the sample is made up of people of different age and genre, it can be affirmed that the respondents involved in the research are mainly online shoppers.

For this reason, it is conceivable that the sample is confident with the use of e-commerce: the people involved consider the technology as something natural, they use it without making any efforts because it is part of their daily life. They do not feel uncomfortable with shopping online.

In particular, in Brazil the use of cards in everyday payment is really high: in the country, the electronic payments are projected to grow at 5% annually, against a 1% annually for transactions in cash<sup>20</sup>. Moreover, this habit is more accentuated in the São Paulo state. The large confidence with electronic payments, contributes to raise online payment frequency.

From the analysis done, the outcoming impression is that the interviewed consumers do not perceive the technology of v-commerce as something difficult to learn because they feel the way of using it is very close to the one of e-commerce. In one of the interviews, a consumer stated that he thinks the technology is easy to be acquired and it seems to be really user friendly. For this reason H1a is not relevant for the sample.

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<sup>20</sup> João Pedro Caleiro, 2018

Looking more in detail at the given answers, the evidence of this element can be clearly detected. To the question: “which kind of products would you buy with the VR?” more than 50% people mentioned the same products they had already bought online. Just to give a concrete example, a kind of common answer has been “I would buy the products I already buy online”. Another evidence of this theory is that the most cited kinds of products are “electronicos” and “electrodomesticos”, which are the online best seller categories in Brazil.

This outcome can be read as a positive implication for the research. Although consumers have not a clear idea about the factual advantages of VR, as for example the huge potential in discovering and examining the single products (and it is fundamental for first-purchases), they do not think VR is difficult to use (and this could affect their willingness to use the technology along the purchasing process) because they are already e-commerce buyers. As it has been already highlighted, VR is considered to be the next logical step of the shopping online and, consequently, e-commerce users could constitute a good starting consumers base.

What we have said so far, can be linked to the effect of the moderator, too. The moderator analysis is, indeed, statistically not valid and thus H4 has been rejected. More specifically, H4 is the hypothesis related to the role of *Need for touch* as moderator of the effect of the independent variables on the dependent ones. This is an unexpected and interesting finding: in fact, in this case, the theory for which NFT has a mediation role (Lee, Yang, Johnson, 2017) is to be discarded.

Analyzing the qualitative research, a possible answer could be found in the category of the products which consumers would presumably buy. Even though consumers stated to appreciate the VR characteristics of immersion and enhanced experience, they are still skeptical about using it with different categories of products they already buy online or that they already know. It follows the consumers’ statement that “they do not need to touch items but they still do not feel comfortable to use VR for new



products or brands”. The products that consumers would buy more frequently with VR are “Eletrônicos e Eletrodomésticos” (electric and home appliances) which are the online the best-seller category.

Consequently, NFT is not affecting the consumers’ choices because the respondents have in mind to buy products they already know and can evaluate from the available information and from sight. However, it is interesting to notice how in this field VR could bring a competitive advantage for retail companies: for home appliances, for example, it is very important to evaluate dimensions and material and these features can be well represented in VR. In addition, VR could use data analytics in order to provide a customization service, showing the favorite/personal setting chosen directly by the consumer. Another product category which can exploit the same advantages is the one of furniture, which was indeed mentioned by respondents. As a matter of fact, Ikea has already implemented an augmented reality tool usable from the smartphone, and it could be developed with the application of VR technology, enhancing real-setting characteristics and immersion.

## **10. Implications**

The scope of the research is to give an insight on VR for companies operating in the retail sector and to provide a spark to increase literature on technology acceptance and, mainly, on the use of Virtual Reality.

### **10.1 Implications for the research**

This study has generally confirmed the appropriateness of UTAUT2 in analyzing new technologies acceptance and given an updated version of the model. It has also enhanced the understanding about how consumers’ perceptions on the use of technology applied on retail, influence their intentions. Furthermore, it must be stressed the research result concerning the effort in using the technology: in the

modern era, the use of some evolved and advanced technologies is given for granted and so, the variable of technology effort is not that relevant as it used to be.

Finally, the work has proved that under specific conditions, NFT does not influence consumers' intentions and this can be an interesting starting point for other researches on digital purchasing channels.

## 10.2 Managerial implications

As the application of new technologies in retail is growing up and companies have begun experimenting new ways of interacting with consumers, offering different services to differentiate themselves from competitors, it is important to understand future consumers' behaviors starting from their intentions. This study presents potential implications for retailers interested in using new technologies and, more precisely, virtual reality. Practitioners could, indeed, use the study findings to manage the VR peculiarities and plan marketing programs addressing the most appropriate consumers segmentation so as to generate positive attitudes towards the use of the technology.

In particular, major brands within various industries and sectors, already present in e-commerce, could implement VR as next step. The study has proved, indeed, that Brazilian consumers are willing to use the technology. Furthermore, they particularly appreciate the entertaining aspect of the technology and its enhanced interactivity. Raising immersion and interaction is linked to a better product evaluation, and this aspect can be key for companies operating in the digital commerce. Specifically, this could be a successful strategy for players working in industries in which the consumer's evaluation of dimensions and material is an important asset (i.e. Furniture, home appliances).

However, a surprising result of the research was that the sample widely agreed on the fact that they are still not confident in buying apparel through VR. Even though VR has

an enormous potential use for the fashion industry, considering its immersion features and its customization power, consumers are still skeptical in using it.

To conclude, this study wants to be a practical and empirical tool for all retail companies, specifically Brazilian firms, which are oriented to apply an omnichannel strategy based on VR.

## **11. Final considerations**

In conclusion, the present research furnishes first-hand empirical evidence for the potentiality of VR applied to retail and outlines the factors that affect consumers' acceptance in Brazil. Since our daily activities are at present more and more embedded in technologies, it is important for companies to foresee the evolving consumer behavior and to apply new strategies in order to generate competitive advantage. So, this study could be a starting point to explore the VR applications and it may help businesses detect the right targets.

However, the work presents some limitations. In order to have a complete and critical vision on the topic, it is fundamental to make some considerations on the research limitations and share some reflections on future possible enquiries on the subject.

### **11.1 Limitations and future researches**

The current research has been made using two widely recognized and tested techniques: the one of the survey and the one of the interview. They have been adopted in order to provide a complete understanding of the topic and fulfill investigative aims, matching quantitative and qualitative approaches. However, the study is not without limitations.

First of all, having collected the answers through internet in a limited time, it has not been possible to create a larger sample. Consequently, a relatively small sample of

individuals has been recruited and, therefore, caution is warranted in interpreting the generalizability of results.

Secondly, even though it has been tried to keep the sample as heterogeneous as possible, more than a half of its components are from São Paulo metropolitan area. Considering the internal differences in culture and development across the country, it is possible that observed effects and results do not occur to the same extent in other regions of Brazil. Consequently, it would be interesting to test the study on different areas of Brazil and, even more, in other countries. Culture and, above all, the degree of the use of the technology in everyday life, in particular the usage of e-commerce, may affect the effect of the variable and lead to a different result.

Thirdly, this study only tested the intention to use VR during the purchase process. However, knowing that the consumer shopping journey starts with the research of the product, a further model could be built in order to test this phase, too.

The rapidly increase of digital shopping channels and the consequent overload of information, has caused that consumers spend a lot of their time in searching information and comparing products. That is why, in the online environment, the role of online product recommendation agents has become central.

Online product recommendation agents are web engines that give users useful suggestions and shopping assistance, trying to give a highly customized service (Benbasat, Wang, 2005). Some examples of websites that have used this kind of web applications are Amazon and Netflix, which use innovative multi-agent systems to enhance collaboration and adaptability of users and devices and improve recommendation effectiveness (Rosaci, Sarné, 2006; Rosaci et al, 2009; Rosaci, Sarné, 2012). Considering the strong potential power of data analytics for customization and recommendation effectiveness in VR, it could be very interesting to

test the convincing capability and the effect of recommendation agents while the user is browsing to find and value products using VR.

In order to use the technology and have the possibility to shop through its use, consumers need to have a head-setter at home or they have to go to a specific place. Thus, the spreading of VR technology implies the availability and easy accessibility of head-setters. Even though the technology and the head-setter tools have been produced for several years, the technology is still not considered mainstream. This is mainly due to its cost and availability. Consequently, further studies should consider this obstacle in the research model, being it particularly relevant for the feasibility and spreading of VR as a channel of purchasing.

Future researches could also deepen the results of this dissertation, analyzing the influence of different product categories and industries, even adding further consumer characteristics like price sensitiveness and demographics as valid moderators. Another idea would be testing the model with different kinds of technologies applied to retail, such as the *chatbox*<sup>21</sup>. This would enlarge our comprehension of the use of VR, from the consumer's point of view.

Furthermore, it could be interesting to repeat the analysis after making people try a VR experience. This could be particularly useful to test the differences between VR and e-commerce and to get a better insight on the consumers' journey and their difficulties in using the technology and assessing the available products.

To sum up, considering that VR is an emerging technology and its application to retailing is at its early stages of experimentation and development, further researches will be crucial in order to understand its best utilization and do identify the most

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<sup>21</sup> Artificial Intelligence software able to simulate a conversation to complete different kind of services, among which shopping

appropriate industries and geographical areas where to spread the usage of VR in commerce.

## 11.2 Conclusions

VR is considered to be one of the most powerful new technologies and its potential to enhance retailing services and develop e-commerce experience is particularly significant. In order to develop effective VR applications and strategies, companies need to understand and assess how consumers develop their attitude toward the use of VR in the purchase context and what the variables affecting their intentions are.

This study has examined the effects of the perceived technology features on the intention to use the technology within the Brazilian market. In particular, it has tested the impact of perceived effort in purchasing and using the technology, perceived convenience in using VR to shop and perceived enjoyment in using VR. Finally, the moderator effect of NFT has been analyzed, too.

It is important to keep in mind that the market assessed is the Brazilian one (with a main focus on the Sao Paulo metropolitan area) and we primarily had to recognize its peculiarities. Despite it is classified as an emerging market, Brazil is technologically advanced, especially as far as e-commerce is concerned, and it is quite open to accept and use technology innovations.

The study results have demonstrated that the customers' perceptions of VR drive their intention to use it: first and foremost, the enjoyment followed by the convenience and the effort in purchasing. This study thus, confirms and deepens what UTAUT2 model and Wang, Lin, Tai and Fan model have stated. Furthermore, other important information have been derived from the analysis done.

Some interesting and unexpected findings have come out from the analysis of the non-statistically significant variables, such as the easiness to use the technology and the

role of the need for touch as moderator between independent and dependent variables. Concerning the former (i.e. easiness to use the VR technology along the purchasing process), the study has found that Brazilian consumers' perception of the difficulty of learning how to use the technology does not affect the intention to use it, at all. This is due to the fact that consumers think its use is relatively simple and it is not different from the usage of e-commerce platforms. People, indeed, consider VR a user-friendly technology and so learning how to shop through it does not represent a relevant element in order to direct consumers' intentions. This could be a stimulus for firms which want to start operating with VR, knowing that technical and operational aspects of the technology are not a discriminant factor for the acceptance by the Brazilian consumers.

Concerning the role of the NFT, the variable has resulted non-statistically significant and, consequently, deprived of a mediating role on the effects of the independent variables on the dependent ones. It is very interesting, considering that the literature has always stressed the importance of the sense of touch during the acquisition of information on a product with the final aim of purchasing. However, such an interpretation of this finding may be connected to the kind of product which the respondents affirmed to be willing to buy through VR.

In fact, the majority of the sample would buy those product categories that they already know and usually buy online, namely home and electric appliances. For this reason, they do not need to assess products by touching them; on the contrary, they find VR useful because it allows them to easily value dimensions and materials in an involving and immersive way.

The immersion topic is, indeed, key when we talk about VR. The most important independent variable has resulted to be the one of enjoyment. Enjoyment during shopping is particularly important because it is able to enhance and boost the purchase experience.

The strong immersive power of the technology is able to enhance the shopping experience, it moves the digital shopping closer to the physical one. Moreover, enjoyment is fostered by IoT intelligence and data analytics which have the capability of personalizing the experience and customizing the product offer.

To conclude, it can be said that this study confirms and proves the potentiality of VR and its applicability in retail, at least in the Brazilian context. The use of VR could enhance the e-commerce service and it might also provide several benefits for the users, thus assuring a competitive advantage to first-mover companies. Moreover, it could be used for different product categories and in many different contexts. However, considering that it is still at its first steps of development, companies have to assess consumers' perceptions and impressions and they should individuate the right target of consumers. This study meant just to be a starting point for further investigation and more extended consideration and a resourceful hint to begin dealing with a cutting-edge technology which seems to be the future development of e-commerce.



## **Appendix**

The survey has been translated in Portuguese and it has been developed using Qualtrics. It has been shown to the respondents a video explaining the functioning of VR.

### **Items used to measure the constructs in the study**

#### **NEED FOR TOUCH**

NFT1 When walking through stores, I can't help touching all kinds of products.

NFT2 Touching products can be fun.

NFT3 I place more trust in products that can be touched before purchase.

NFT4 I feel more comfortable purchasing a product after physically examining it.

NFT5 When browsing in stores, it is important for me to handle all kinds of products.

NFT6 If I can't touch a product in the store, I am reluctant to purchase the product.

NFT7 I like to touch products even if I have no intention of buying them.

NFT8 I feel more confident making a purchase after touching a product.

NFT9 When browsing in stores, I like to touch lots of products.

NFT10 The only way to make sure a product is worth buying is to actually touch it.

NFT11 There are many products that I would only buy if I could handle them before purchase.

NFT12 I find myself touching all kinds of products in stores.

## PERCEIVED PURCHASE EFFORT

PPE1 It costs a lot of time to buy product X with VR

PPE2 It costs a lot of efforts to buy product X with VR

PPE3 It is difficult to buy product X with VR

PR1 I think there are potential risks of getting the incorrect product X when buying with VR

PR2 I think there are potential risks of incompletely examining the product quality when buying product X with VR

PR3 I think there are potential risks of wrong payments when buying product X with VR

## PERCEIVED EASINESS TO USE THE TECHNOLOGY

PTE1 I find VR easy to use

PTE2 Learning how to use VR is easy for me

## PERCEIVED CONVENIENCE

PC1 I can buy product X at my convenient time with VR

PC2 I can speedily possess product X when buying with VR

PC3 I live a more convenient life by buying product X with VR

PE1 Being able to use VR throughout the purchase journey allows me to purchase quickly

PE2 Being able to use VR throughout the purchase journey is useful to me

PE3 Being able to use VR throughout the purchase journey makes my life easier

#### PERCEIVED ENJOYMENT

E1 Being able to use VR throughout the purchase journey is enjoyable

E2 Being able to use VR throughout the purchase journey is pleasurable

E3 Being able to use VR throughout the purchase journey is interesting

#### INTENTION TO USE VR

PA1 Overall, purchasing with VR is satisfactory

PA2 Overall, purchasing with VR is a clever decision

PA3 Overall, purchasing with VR is pleasant

PI1 I would purchase with VR

PI2 I would tell my friends to purchase with VR

PI3 I would like to repeat my experience with VR

## **Original Survey (in Portuguese)**

Bem-vindo!

Esse questionário foi desenvolvido por uma estudante da Universidade Bocconi e da Fundação Getulio Vargas para uma pesquisa acadêmica. Por favor leia as perguntas com atenção e responda sinceramente. O questionário é anônimo e demora 5 minutos.

Agradeço desde já sua preciosa ajuda.

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Q1 Para responder as perguntas que apresentaremos, imagine-se dentro de uma loja.

	Discordo totalment e (1)	Discord o (2)	Discordo parcialment e (3)	Não concord o nem discordo (4)	Concordo parcialment e (5)	Concord o (6)	Concordo totalment e (7)
Quando vou a uma loja, não posso deixar de tocar nos produtos. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tocar nos produtos pode ser divertido. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eu tenho mais confiança nos produtos quando eu posso tocar neles antes da compra. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eu me sinto mais confortável comprando produtos depois de examiná-los fisicamente. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quando estou nas lojas é importante para mim tocar todos os tipos de produtos. (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Caso eu não possa tocar num produto na loja, eu resisto em comprá-lo. (6)

☐☐☐☐☐☐☐☐

Gosto de tocar nos produtos mesmo sem intenção de comprá-los. (7)

☐☐☐☐☐☐☐☐

Eu me sinto mais confiante em fazer uma compra depois de tocar no produto. (8)

☐☐☐☐☐☐☐☐

Quando eu estou na loja, eu gosto de tocar em muitos produtos. (9)

☐☐☐☐☐☐☐☐

A única maneira de estar certo sobre um produto é tocando ele. (10)

☐☐☐☐☐☐☐☐

Existem muitos produtos que eu poderia comprar ou ter comprado se eu pudesse tocar ou ter tocado neles. (11)

☐☐☐☐☐☐☐

Eu me identifico tocando nos produtos nas lojas. (12)

☐☐☐☐☐☐☐

Q2 Você verá um filme e responderá algumas perguntas na sequência.



**Clip of 32 seconds without sound**

Q3 Imagine-se nessa situação de compras com Realidade Virtual apresentada no filme ao responder as perguntas a seguir

	Discordo totalment e	Discord o	Discordo parcialment e	Não concord o nem discordo	Concordo parcialment e	Concord o	Concord o totalment e (7)
	(1)	(2)	(3)	(4)	(5)	(6)	
Vai demorar muito tempo fazer compras com essa tecnologia de Realidade Virtual (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vou precisar me esforçar muito para usar essa tecnologia de Realidade Virtual (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
É difícil comprar usando Realidade Virtual (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Há o risco de comprar o produto errado ao fazer compras com Realidade Virtual (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Corro o  
risco de não  
conseguir  
analisar  
corretament  
e a  
qualidade  
do produto  
ao comprar  
com  
Realidade  
Virtual (6)

☐☐☐☐☐☐☐☐

Há o risco  
de errar na  
hora do  
pagamento  
ao comprar  
com a  
tecnologia  
de  
Realidade  
Virtual (7)

☐☐☐☐☐☐☐☐

Acho que a  
Realidade  
Virtual é  
fácil de  
usar (8)

☐☐☐☐☐☐☐☐

Aprender a  
usar  
Realidade  
Virtual vai  
ser fácil  
para mim  
(9)

☐☐☐☐☐☐☐☐

Posso fazer  
compras a  
hora que eu  
quiser  
usando  
Realidade  
Virtual (10)

☐☐☐☐☐☐☐☐

Poderei ter  
acesso  
rapidament  
e a  
produtos se  
comprar  
pela  
Realidade  
Virtual (11)

☐☐☐☐☐☐☐☐

Comprar com Realidade Virtual vai ser conveniente (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A Realidade Virtual me permitirá comprar mais rapidamente (13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Poder comprar com a Realidade Virtual será útil (14)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Comprar com Realidade Virtual vai deixar minha vida mais fácil (15)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Poder comprar com a Realidade Virtual será divertido (16)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Poder comprar com a Realidade Virtual será agradável (17)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Poder comprar com a Realidade Virtual é interessante (18)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

No geral, a compra com Realidade Virtual é satisfatória (19)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
No geral, comprar com Realidade Virtual é uma decisão inteligente (20)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
No geral, a compra com Realidade Virtual é agradável (21)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eu compraria com Realidade Virtual (22)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eu diria aos meus amigos para comprar com Realidade Virtual (23)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eu compraria diversas vezes com Realidade Virtual (26)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q33 Qual a sua IDADE (número), por favor?

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Q34 E o seu GÊNERO?

☐ Homem (1)

☐ Mulher (2)

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Q35 Clique nos itens que você possui ou usa.

☐

Spotify (1)

☐

Amazon Prime (2)

☐

Plano de dados (3)

☐

Facebook (4)

☐

Instagram (5)

☐

Twitter (6)

☐

Snapchat (7)

☐

Conta de Youtube (8)

☐

Dropbox/ Onedrive/ Google Drive/ Amazon Drive (9)

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Q41 Com que frequência você compra online?

- ☐ Toda semana (1)
  - ☐ Uma vez por mês (2)
  - ☐ Duas ou mais vezes por ano (3)
  - ☐ Anualmente (4)
  - ☐ Nunca compro online (5)
- 

Q36 Qual foi a última vez que você comprou online?

- ☐ Essa semana (1)
  - ☐ Esse mês (2)
  - ☐ Nos últimos 6 meses (3)
  - ☐ Faz mais de um ano (4)
  - ☐ Nunca comprei online (5)
-

Q37 Dos itens abaixo, quais você já comprou online?

- ☐ Ingressos (1)
- ☐ Eletrodomésticos (2)
- ☐ Roupas (3)
- ☐ Passagem aérea (4)
- ☐ Vinhos (5)
- ☐ Maquiagem/ Cosméticos (6)
- ☐ Calçados (7)
- ☐ Comida (Restaurantes) (8)
- ☐ Livros (9)
- ☐ Móveis (10)
- ☐ Alimentos (Supermercado) (11)
- ☐ Nunca comprei online (12)

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Q38 Qual tipo de produto você COMPRARIA usando Realidade Virtual?

\_\_\_\_\_

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Q39 Qual tipo de produto você NÃO COMPRARIA usando Realidade Virtual?

\_\_\_\_\_

## References

- Addis, M. and Holbrook, M.B. (2001) 'On the Conceptual Link Between Mass Customization and Experiential Consumption: An Explosion of Subjectivity', *Journal of Consumer Behavior* 1(1): 50–66
- Arnould, E., Price, L. and Zinkhan, G. (2002) 'Consumers'. New York: *McGraw-Hill*
- Babin B. J., Darden W. R., Griffen M., (1994). 'Work and/or Fun: Measuring Hedonic and Utilitarian Shopping Value', *Journal of Consumer Research*, 20 (4): 644-656
- Balaji M. S., Roy S. K., (2017), 'Value co-creation with Internet of things technology in the retail industry', *Journal of Marketing Management*, 33(1-2): 7-31
- Bandura A., (1986), 'Social Foundations of Thought and Action; A Social Cognitive Theory', Englewood Cliff: *Prentice Hall*
- Bellenger D., Steinberg E., Stanton W., (1976), ' The Congruence of Store Image and Self Image', *Journal of Retailing*, 52: 17-32
- Benbasat I., Wang W., (2005), ' Trust in the Adoption of Online Recommendation Agents', *Journal of the Association for Information Systems*, 6 (3): 72-101
- Best R. (2012), 'Market-based Management ', 6th edition, London: *Pearson*
- Bhatnagar A., Ratchford B. (2004), "A Model of Retail Format Competition for Non-Durable Goods," *International Journal of Research in Marketing*, 21: 39–5

Bloch P. H., Bruce G. D., (1984), 'Product involvement as leisure behavior', *Advances in consumer Research*, 11: 197-202

Bloch, P. H., Richins M. L., (1983), 'Shopping without Purchase: An Investigation of Consumer Browsing Behavior', *Advances in Consumer Research*, 10: 389-393

Brown, S. A., and Venkatesh, V. (2005). 'Model of Adoption of Technology in the Household: A Baseline Model Test and Extension Incorporating Household Life Cycle', *MIS Quarterly*, 29(4): 399-426

Burdea C., Coiffet P. (2003), 'Virtual Reality Technology- Volume I', Xiii, Hoboken: *IEEE*

Carù A., Cova B., (2003), 'Revisiting consumption experience. A more humble but complete view of the concept', *Marketing Theory Articles*, 3(2): 267-286

Chesney T, Chuan S., Dobele A., Hoffmann (2017), 'Information richness and trust in v-commerce: implications for services marketing', *Journal of Services Marketing* 31(3): 295-307

Ching-Jui K., Tze-Hsien L., Yu-I Y (2012), 'The effects of sequential combinations of virtual experience, direct experience, and indirect experience: the moderating roles of need for touch and product involvement', *Springer Science+ Business Media*, 12:177–199



Compeau, D. R., & Higgins, C. A. (1995). Computer self-efficacy: Development of a measure and initial test. *MIS Quarterly* 19(2): 189-211

Davis, F.D. (1986), 'A technology acceptance model for empirically testing new end-user information systems: Theory and result', *PD.D. dissertation, Sloan School of Management, Massachusetts Institute of Technology*

Davis, F.D., Bagozzi, R.P., & Warshaw, P.R. (1992), 'Extrinsic and intrinsic motivation to use computers in the workplace', *Journal of Applied Social Psychology*, 22(14): 1111-1132

De Vries R., Jager G.,Tijssen I, Zandstra E., (2018), 'Shopping for products in a virtual world: Why haptics and visuals are equally important in shaping consumer perceptions and attitudes', *Food Quality and Preference*, 66: 64- 75

Dodds, W. B., Monroe, K. B., and Grewal, D. (1991). 'Effects of Price, Brand, and Store Information on Buyers', *Journal of Marketing Research* 28(3):307-319.

Firat, A.F. and Dholakia, N. (1998) 'Consuming People: From Political Economy to Theaters of Consumption'. London: Sage

Forsythe S, Liu C, Shannon D, Gardner LC (2006), 'Development of a scale to measure the perceived benefits and risks of online shopping'. *J Interact Mark*, 20:55–75

Gentile C., Spiller N., Noci G., (2007), 'How to Sustain the Customer Experience: An Overview of Experience Components that Cocreate Value with the Customer', *European Management Journal*, 25 (5), 395–410

Goodhue D., Thompson L., (1995) 'Task-technology fit and individual performance' *MIS Quarterly*, 19(2): 213

Gwown S., (2011), 'Clarifying the role of mean centering in multicollinearity of interaction effects', *British Journal of Mathematical and Statistical Psychology*, 64: 462–477

Hair JF, Black B, Babin B, Anderson RE, Tatham RL (2006), 'Multivariate data analysis', New Jersey: *Prentice-Hall*

Hair F., Hult G., Ringle C., Sarstedt M. (2013), ' A primer on partial least squares structural equation on Modeling (PLS-SEM)', Los Angeles: *Sage*

Hardy AP. (1982), 'The selection of channels with seeking information: cost/benefit vs. least-effort', *Info Process Management* 18(6):289–293

Harrison D. A., Mykytyn P. P., Riemen-schneider C. K., (1997), 'Executive Decisions about Adoption in Information Technology in Small Business: Theory and Empirical Tests', *Information System Reach*, 8(2):171-195

Hasan A., Lukasz M. (2017), 'Advances in Neuroergonomics and Cognitive Engineering', Los Angeles: *Baldwin, Carryl*

Hoffman, D. L., & Novak, T. P. (2015). 'Emergent experience and the connected consumer in the smart home assemblage and the Internet of things.' *The Center for the Connected Consumer; The George Washington University School of Business*.

Holbrook, M.B. and Hirschman, E.C. (1982), 'The Experiential Aspects of Consumption: Consumer Fantasy, Feelings and Fun', *Journal of Consumer Research* 9(2): 132–40

Hornik J., (1992), 'Tactile Stimulation and Consumer Response', *Journal of Consumer Research*, 19 (12):449-58

Iansiti, M., & Lakhani, K. R. (2014). 'Digital ubiquity: How connections, sensors, and data are revolutionizing business (digest summary)'. *Harvard Business Review*, 92(11), 91–99

Iglewicz B., Hoaglin D., (1987), 'Fine tuning some resistant rules for outliers labeling', *Journal of American Statistical Association*, 82:1147-1149

Meyer C., Schwager A., (2007), 'Understanding Customer Experience', *Harvard Business Review*, February: 117–26

Moore G. C., Benbasat I., (1991), 'Development of an instrument to Measure the Perceptions of Adopting an Information Technology Innovation', *Information Systems Reach*, 2(3):192-222

Kaczorowska-Spychalska D. , (2017), ' Consumer Perspective on Omnichannel Commerce', *De Gruyter Management*, 21(2): 95-110

Kim,J., Fiore, A. M., & Lee, H. H. (2007), 'Influences of online store perception, shopping enjoyment, and shopping involvement on consumer patronage behavior towards an online retailer', *Journal of Retailing and Consumer Services*, 14(2), 95–107.

Lederman S., Klatzky R., (1987), 'Hand Movements: A Window into Haptic Object Recognition', *Cognitive Psychology*, 19 (7), 342-68

Lee ES (1966), 'A theory of migration'. *Demography* 3(1):47–57

Lee Y., Yang S., Johnson Z., (2017) "Need for touch and two-way communication in e-commerce", *Journal of Research in Interactive Marketing*, 11(4):341-360

Limayem, M., Hirt, S. G., and Cheung, C. M. K. 2007. "How Habit Limits the Predictive Power of Intentions: The Case of IS Continuance," *MIS Quarterly* 31(4),705-737

McClelland D., Richard K., Joel W., (1989), *Psychological Review*, 96 (4): 690-702

MacInnis D. J., Price L. L., (1987), ' The Role of Imagery in Information Processing: Review and Extensions', *Journal of Consumer Research*, 13 (4): 473-491

Neuhofer, B., Buhalis, D., & Ladkin, A. (2015), 'Smart technologies for personalized experiences: A case study in the hospitality domain', *Electronic Markets*, 25(3), 243–254

Pantano, E., & Timmermans, H. (2014). 'What is smart for retailing?', *Procedia Environmental Sciences*, 22: 101–107

Peck J., Childers T. L., (2003), ' To have and to hold: the influence of haptic information on product judgments', *Journal of Marketing*, 67(2), 35–48

Peck J., Childers T. L., (2003), 'Individual Differences in Haptic Information Processing: The "Need for Touch" Scale', *Journal of Consumer Research*, 30 (12): 430-442

Peck J, Johnson Wiggins J. (2011), 'Autotelic need for touch, haptics, and persuasion: The role of involvement', *Psychology and Marketing* 28(3): 222–239

Peck J, Shu SB. (2009), 'The effect of mere touch on perceived ownership', *Journal of Consumer Research* 36(3): 434–447

Plouffe, C.R., Hulland, J.S., & Vandenbosch, M. (2001), ' Research report: Richness versus parsimony in modeling technology adoption decisions – Understanding merchant adoption of a smart card-based payment system' *Information System Research*, 12(2): 208-222

Rogers, E. (1995), 'Diffusion of Innovations', New York, NY: *Free Press*

Rosaci D, Sarne´ GML (2006) 'MASHA: a multi-agent system handling user and device adaptivity of Web sites', *User Model User-Adapted Interact* 16(5):435-462

Rosaci D, Sarne´ GML (2012), 'A multi-agent recommender system for supporting device adaptivity in e-commerce', *Journal of Intelligent Information Systems*, 38(2):393–418

Rosaci D, Sarne´ GML, Garruzzo S (2009) 'MUADDIB: A distributed recommender system supporting device adaptivity', *ACM Transactions on Informatic Systems*, 27(4)

Schroöder H, Zaharia S. (2008), 'Linking multi-channel customer behavior with shopping motives: an empirical investigation of a German retailer', *Journal of Retailing and Customer Services*, 15:452–468

Sherry J. F. (1990), ' A sociocultural analysis of a Midwestern flea market', *Journal of Consumer Research*, 17(1): 13-30

Sherry J. F., McGrath M. A, Levy S. L. (1993), 'The dark side of the gift', *Journal of Business Research*, 28: 225-245

Shim S., Eastlick M.A., Lotz S. (2004), 'Search-Purchase (S-P) strategies of multi-channel consumers: a segmentation scheme', *Journal of Marketing Channels*, 11( $\frac{2}{3}$ )

Taylor S., Todd P.A., (1995), 'Understanding Information Technology Usage: A Test of Competiting Models', *Information Systems Research*, 6(4): 144-176

Thompson, R.L., Higgins, C.A., & Howell, J.M. (1991), 'Personal computing: Toward a conceptual model of utilization' *MIS Quarterly*, 15(1): 125-143

Venkatesh V., Morris M., Davis G., Davis F. (2003), 'User Acceptance of Information Technology: Toward a Unified View', *MIS Quarterly* 27 (3): 425-478

Venkatesh V., Thong J., Xu X. (2012), 'Consumer acceptance and use of information technology: extending the Unified Theory of Acceptance and Use of Technology'. *MIS Quarterly*, 36(1): 157-17

Verhoef P., Kannan P., Inman J. (2015), 'From Multi-Channel Retailing to Omni-Channel Retailing: Introduction to the Special Issue on Multi-Channel Retailing', *Journal of Retailing*, 91:174-181

Wang Y., Lin H., Tai W., Fan Y., (2015), 'Understanding multi-channel research shoppers: an analysis of Internet and physical channels', *Springer Science*, 14(2)

Wang Z., Wang Y., Wang J. (2016), ' Optimal distribution channel strategy for new and remanufactured products', *Springer Science* 16: 269-295

Whitmore, A., Agarwal, A., & Xu, D. L. (2015). 'The Internet of things—A survey of topics and trends', *Information Systems Frontiers*, 17(2), 261–274.

Workman J., Siwon C, (2013), 'Gender, fashion consumer group, need for touch and Korean apparel consumers' shopping channel preference', *International Journal of Consumer Studies*, 37: 522–529

Yang, L., Yang, S. H., & Plotnick, L. (2013). 'How the Internet of things technology enhances emergency response operations', *Technological Forecasting and Social Change*, 80(9), 1854-1867

Zeithaml V. A., (1988), 'Consumer Perceptions of Price, Quality, and Value: A Means–End Model and Synthesis of Evidence', *Journal of Marketing* 52(3):2-22

## Digital articles

Arthur R (2016), 'Future of retail: Artificial Intelligence And Virtual Reality Have Big Roles To Play', *Forbes*

<https://www.forbes.com/sites/rachelarthur/2016/06/15/future-of-retail-artificial-intelligence-and-virtual-reality-have-big-roles-to-play/#3c6845ad7f9d>

Baller S., Dutta S., Lanvin B (2016), 'The Global Information Technology Report 2016-Innovating in the Digital Economy', *World Economic Forum*

[http://www3.weforum.org/docs/GITR2016/WEF\\_GITR\\_Full\\_Report.pdf](http://www3.weforum.org/docs/GITR2016/WEF_GITR_Full_Report.pdf)

Bajpai P., (2018), 'The World's Top 20 Economies', *Investopedia*

<https://www.investopedia.com/insights/worlds-top-economies/>

Burkard K., (2017) 'Welcome to the future: Virtual Reality in ecommerce', *Smile.io*

<https://blog.smile.io/welcome-to-the-future-virtual-reality-in-ecommerce>

Duran R., (2013), 'Brazilian regions', *The Brazil Business*

<http://thebrazilbusiness.com/article/brazilian-regions>

Edelman D., Singer M., (2015) 'Competing on Customer Journey. You have to create new value at every step', *Harvard Business Review*

<https://hbr.org/2015/11/competing-on-customer-journeys>

Ibope Media, (2010), 'O perfil do e-commerce brasileiro', *Ibope Nielsen*

<http://www.ibope.com.br/ptbr/noticias/Paginas/IBOPE%20M%C3%ADdia%20tra%C3%A7%C3%A3o%20do%20perfil%20do%20e-commerce%20brasileiro.aspx>



João Pedro Caleiro (2018), '2017: o ano em que as transações por cartão superaram o dinheiro', Exame

<https://exame.abril.com.br/economia/2017-o-ano-em-que-transacoes-por-cartao-superaram-o-dinheiro/>

JWT Intelligence (2015), '*Virtual reality shopping*'

<https://www.jwtintelligence.com/2015/11/virtual-reality-shopping/>

Moskowitz D. (2016), 'These retailers are embracing V-commerce trend', *Investopedia*

<https://www.investopedia.com/articles/markets/041516/these-retailers-are-embracing-vcommerce-trend.asp>

Nathan Lustin (2018), '*E-Commerce in Brazil: Latin America's E-commerce Powerhouse*'

<https://www.nathanlustig.com/2018/01/20/ecommerce-in-brazil/>

Nielsen (2015), 'New product pioneers: finding early adopters in unexpected areas', *The Nielsen Global new product innovation survey*

<https://www.nielsen.com/mena/en/insights/news/2015/new-product-pioneers-finding-early-adopters-in-unexpected-areas.html>

Rigby D. (2010), 'The future of shopping', *Harvard Business Review*

<https://hbr.org/2011/12/the-future-of-shopping>

Rouge T. (2018), Exploring the unconscious way senses influence the customer experience, *My Customer- CXLab*

<https://www.mycustomer.com/experience/engagement/exploring-the-unconscious-way-senses-influence-the-customer-experience>

Tabuchi H. (2015), 'Tommy Hilfiger introduces Virtual Reality headsets for shopping',  
*The New York Times*

<https://www.nytimes.com/2015/10/21/business/tommy-hilfiger-introduces-virtual-reality-headsets-for-shoppers.html>

Virtual Reality (VR) - Statistics & Facts

<https://www.statista.com/topics/2532/virtual-reality-vr/>