



Self-service technologies potential in the Portuguese retail sector

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ABSTRACT

Title: Self-service technologies potential in the Portuguese retail sector

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The use of self-service technologies has the potential to disrupt the Portuguese retail industry. The aim of this research is to assess how can SSTs transform the retail space in Portugal. This assessment was done by studying the relationship between consumer problems with attributes of self-service technologies and by the relationship between Technology readiness of consumers and self-service technologies adoption and lastly by the relationship between self-service technologies satisfaction and the consumers' trustworthiness and willingness to purchase. The data supported that self-service technologies could solve specific consumers problems related with their retail experience. Furthermore, the hypothesized framework indicated that the higher the technology readiness of a consumer the higher the self-service technology adoption will be. Besides, the Technology readiness of consumers is a crucial variable to evaluate the willingness to use innovative self-service stores. Lastly, results also show that the higher self-service technologies satisfaction, the higher will be the consumers' trustworthiness and loyalty with the respective retailers and the higher will be the willingness to purchase. Besides, more results are shown in order to support the conclusions. This research finishes with limitations and recommendations for future studies about this topic.

Keywords: self-service technologies; technology readiness; Portuguese retail industry; consumer satisfaction; consumer loyalty; consumer willingness to purchase; Amazon Go;

SUMÁRIO

Título: Potencial das tecnologias de self-service no setor do retalho Português

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O uso de tecnologias de self-service tem o potencial para revolucionar o retalho em Portugal. O objetivo deste estudo é avaliar como podem estas tecnologias criar disrupção na indústria do retalho em Portugal. Esta avaliação foi feita ao estudar a relação entre os problemas do consumidor e os atributos das tecnologias de self-service, pela relação entre prontidão tecnológica e a satisfação ao usar as tecnologias self-service, e por último pela relação entre a satisfação ao usar as tecnologias self-service e a lealdade dos consumidores e a sua vontade de comprar. Os dados suportam que as tecnologias self-service podem resolver problemas específicos dos consumidores relacionados com a sua experiência de retalho. Adicionalmente, o modelo criado foi suportado por um resultado estatisticamente significativo, o que indica que quanto maior o nível de prontidão tecnológica do consumidor, maior será a adoção de tecnologias self-service. Para além disso, a prontidão tecnológica dos consumidores é uma variável essencial para avaliar a vontade de usar conceitos inovadores de lojas self-service. Por último, os resultados mostram que quanto maior a satisfação com as tecnologias self-service, maior será a lealdade dos consumidores com os respetivos retalhistas e maior será a vontade de comprar. Outros resultados foram apresentados de forma suportar as conclusões. O estudo acaba com limitações e recomendações para futuras investigações.

Palavras-chave: tecnologias de self-service; prontidão tecnológica; indústria do retalho em Portugal; satisfação do consumidor; lealdade do consumidor; vontade de comprar do consumidor; Amazon Go;

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TABLE OF CONTENTS

ABSTRACT	II
SUMÁRIO	III
ACKNOWLEDGEMENTS	IV
TABLE OF FIGURES	VII
TABLE OF TABLES	VIII
GLOSSARY	IX
1. INTRODUCTION	1
1.1 Aim and Scope	2
1.2 Relevance	2
1.3 Research Method.....	3
1.4 Dissertation Outline	3
2. LITERATURE REVIEW	4
2.1 Retail characterization in Portugal and challenges	4
2.2 Self-Service Technologies Potential in Retail	5
2.3 Relationship between Technology Readiness with SSTs and consumer satisfaction.....	9
2.4 Self-service concept of Amazon Go	11
3. METHODOLOGY	14
3.1 Conceptual Framework and Hypotheses.....	14
3.2 Survey procedure and Data Collection	16
3.3 Measurements	17
3.3.1 SSTs satisfaction	17
3.3.2 SSTs adoption	18
3.3.3 Consumers' Problems in the Portuguese Retail.....	18
3.3.4 Consumers' Technology Readiness	19
3.3.5 Consumers' Loyalty	20
3.3.6 Willingness to Purchase	20
3.3.7 Consumers' willingness to use futuristic retail stores.....	20
3.4 Participants demographics	21
4. RESULTS	22
4.1 Reliability Analysis.....	22
4.2 Results from Hypothesis Testing	23
4.2.1 Attributes of SSTs that Solve Consumers' Problems	23

4.2.2 The relation between TR and SSTs adoption.....	24
4.2.3 The relation between Consumers' Satisfaction and Consumers' Loyalty	25
4.2.4 The relation between Consumers' Satisfaction and Willingness to Purchase	25
4.2.5 The relation between TR and the Disposition to use a futuristic self-service shop concept.	25
5. CONCLUSIONS	27
5.1 Main findings	27
5.1.1 SSTs and Consumers' Problems in Portuguese Retail.....	27
5.1.2 TR and SSTs Adoption	28
5.1.3 SSTs Satisfaction and Consumers' Loyalty.....	28
5.1.4 SSTs Satisfaction and Willingness to Purchase.....	28
5.1.5 TR and Consumers' willingness to use a Futuristic Self-Service Store	29
5.2 Limitations and Suggestions for Future Research	29
APPENDICES	VI
Appendix I: Amazon Go.....	VI
Appendix II: Online Survey	VIII
Appendix III: SPSS Analysis Output – Linear Regression Analysis	XII

TABLE OF FIGURES

Figure 1: SSTs being used in Portuguese retail space 6

Figure 2: Self-service technologies evaluation and respective customer and financial outcome 7

Figure 3: Internet Users worldwide who would prefer to shop by having an Amazon Go experience if offered by other retailers, by Age 13

Figure 4: Conceptual Framework 14

Figure 5: Value of the attributes according to the respondents. The higher, the more valuable it is for the respondents 23

Figure 6: Expected benefits of an Innovative Self-Service Store 24

TABLE OF TABLES

Table 1: Consumers’ Satisfaction Measurement model 17

Table 2: SSTs Adoption Measurement model 18

Table 3: Consumers Problems Measurement model..... 19

Table 4: Technology Readiness Measurement model 19

Table 5: Consumers’ Loyalty Measurement model 20

Table 6: Willingness to purchase Measurement model 20

Table 7: Willingness to use an innovative Self-Service Store Measurement model 21

Table 8: Respondents descriptives..... 21

Table 9: Cronbach’s Alpha for Constructs used. 22

Table 10: Descriptive Analysis of SSTs attributes 23

GLOSSARY

CA	Cronbach's Alpha
e-CRM	Electronic Customer Relationship Management
e.g.	Exempli Gratia (for example)
H	Hypothesis
RQ	Research Question
SST	Self-Service Technology
TAM	Technology Acceptance Model
TR	Technology Readiness

1. INTRODUCTION

In the rapidly evolving retail industry, consumers needs still drive purchase decisions, yet new technologies suggest that the shopping process is going to change, where technology increases performance, business operations and offers more benefits to customers (Grewal, Roggeveen, & Nordfält, 2017). From all channels, both online and offline, many retailers started to adopt technologies that allow consumers to use their services without contact with the employees of the company. Such interfaces were named Self-Service Technologies (SSTs) which experts anticipate becoming a primary variable for business disruption in the retail sector (Lin & Hsieh, 2007). The huge spectrum of SSTs solutions for retailers, for instance online marketplaces, chatbots and self-checkouts, can be used to improve service quality and consequently consumer satisfaction and loyalty. Consequently, have also introduced significant improvements in customer service for retailers and also consumers (Lin & Hsieh, 2007).

Due to the retail industry and its weight on the Portuguese economy, the Portuguese retail seems to be very attractive to assess the potential of SSTs. Even though having a higher growing value and accessibility to SSTs, it is scarce the available research about SSTs evaluation and there is no academic knowledge about psychological variables that impact consumers adoption of SSTs in Portugal.

With the majority of SST options, consumers opt between an employee service and a technological based encounter (e.g. getting support at the physical store vs customer support from a chatbot) (M.L. Meuter, Ostrom, Bitner, & Roundtree, 2003). For Meuter, Ostrom, Bitner and Roundtree (2003) even when there are many options available, customers will only choose the SST alternative if they are familiar with the technology and see an incentive to use it.

However, Parasuraman (2000) noticed that there was a rise of customer dissatisfaction when experiencing new technologies, which show that the adoption of new technology depends on individual intrinsic factors.

Clearly, it is crucial to analyze how these individual intrinsic factors can impact the shopping journey with SSTs in order to assess the potential of these technologies in retail.

It is clear that specific emotional reactions can occur according to the individual feelings towards the experience with the technology (Lin & Hsieh, 2007). When evaluating the usage of SSTs, Parasuraman (2000) indicates that Technology Readiness (TR) is the attribute that should be evaluated to reliably predict customer behavior.

Within the Portuguese retail industry, the research available related to the evaluation of the potential of SSTs is very scarce and thus there is limited knowledge about the variables that influence consumers perception of SSTs.

Consequently, this study aims to enrich the research related with the topic and help the retailers and costumers to understand the value of SSTs in this industry.

This research will be conducted by studying which problems can SSTs solve in the retail space, then studying consumers' TR, consumers satisfaction with SSTs, consumers' loyalty with the retailers and consumers' willingness to purchase. Therefore, with this study, Portuguese retailers will be in a better position to understand the potential of SSTs with their customers.

1.1 Aim and Scope

This research aims to assess self-service technology market prospects, specifically for the Portuguese retail space. Consequently, this research will be conducted by studying which problems can SSTs solve in the retail space, then studying consumers' TR, consumers satisfaction with SSTs, consumers' loyalty with the retailers and consumers' willingness to purchase. This description of the issue can be articulated through the following research questions:

RQ1: Which retail consumer problems does SSTs solve?

RQ2: Are retail consumers' receptive to the use of SSTs?

RQ3: Does SSTs satisfaction influence the loyalty towards a retail store?

RQ4: Does SSTs satisfaction affects the willingness to purchase?

1.2 Relevance

This research makes many contributions to established knowledge of the literature and industry, especially in the Portuguese context. Further, it offers retailers with advice about how to successfully introduce SSTs in order to tackle the emerging problems customers face in the Portuguese retail. In addition, it provides the first phase to determine the business potential in Portugal by studying which problems can SSTs solve in the retail space, then studying consumers' TR, consumers satisfaction with SSTs, consumers' loyalty with the retailers and consumers' willingness to purchase. As a result, the current research follows a conceptual model based on the consumers' view in the Portuguese context, which can provide guidance to the retailers.

1.3 Research Method

Primary and secondary data was used to address the research questions. An online survey was developed with the goal of testing empirically the conceptual model developed. The collected answers were used as primary data. Moreover, was used secondary data collected from academic articles, industry reports, newspaper articles and websites, where the data was studied and organized to be used for this research.

1.4 Dissertation Outline

The next chapter it is presented the literature review, which starts by the Portuguese industry and its current challenges, followed by potential of SSTs, following by technology readiness and consumers satisfaction with SSTs and ending with the application case of Amazon Go in order to better understand how will be the future in retailing and what could influence consumers to use a futuristic self-service store concept. Next, is the third chapter with the methodology which includes the conceptual framework, survey procedure and data collection, measurements for each construct and lastly the demographics related with the participants. Then, it is presented the fourth chapter with the results and findings. Lastly, this research ends with the discussion of the findings for each hypotheses and research question. This research ends with the limitations associated to the study and recommendations and insights to be used in future academic studies.

2. LITERATURE REVIEW

This chapter provides a summary of the existing knowledge related with the research topic. It is subdivided in four parts. In the first part it is analyzed the Portuguese retail industry and its current challenges. The second part it is presented business potential of SSTs. The third part, it is presented how can technology readiness impact consumer satisfaction. Lastly, an application case of Amazon Go is studied. Several academic articles, industry reports, newspaper articles and websites were considered and compiled.

2.1 Retail characterization in Portugal and challenges

Portugal is characterized by a strong retail industry. This space is the sixth largest economic sector in Portugal (PORDATA & INE, 2020). In 2014, there were 136.800 retailers who made a total of 16 billion euros, which represents 7% of the whole Portuguese GDP (INE, 2014). The six biggest retailers in Portugal are Sonae, Jerónimo Martins, Auchan, Lidl, Dia and Intermarche with a combined turnover of 11.291 billion euros in 2014 (Rito & Messa, 2014).

Retailing in Portugal is a fast pacing industry characterized by quick changes with new projects and experiments, which results in the adoption of new practices and some other practices are just abandoned (Monteiro, 2017). Consequently, is very important to study the areas where new technologies are disrupting consumers habits, in order to Portuguese retailers take decisions to attract and retain consumers' having into consideration the future of the retailing. A report from Accenture related with the Portuguese retail industry in the future, identified three key problems for the consumer.

Firstly, in Portugal there is a high penetration rate of smartphones, nearly 70% in 2018, which resulted in consumers increasing their preference for the digital channel. Offline channel is crucial for consumers, but mobile and online channels are becoming more popular and the lack of these channels could mean losses in revenue for retailers, loses in the number of consumers and consequently losses in their loyalty and satisfaction (Accenture, 2015; Almeida, 2018). Besides, having both online and offline channels is not enough, regardless of the point of contact, efficiency is everything. This demands a high integration of all channels, for instance websites, marketplaces, social networks and physical stores, in order to reduce the complexity of the journey and time spent for the consumer and improve comfort and convenience (Jorge, 2019; PWC, 2017)

Secondly, an exceptional customer experience across channels is paramount for brand loyalty and ensure that the consumers' are sharing positives stories (PWC, 2017). The tendency is a truly customer-centric experience, where the consumer is the heart of the retail business model,

in the planning and execution (PWC, 2017). Thus, it's necessary to deliver personalized customer offerings with engagement and interaction based, making the offer relevant by synthesizing consumer interests, needs, and transactions across channels (Accenture, 2015). Besides, higher personalization and customization means for the consumer higher power of choice, higher access to information about a product and service, higher support through the buying process and higher control in the decision process (Accenture, 2015). This is not just online but also in store, using digital technology to enable staff to offer the same experience regardless of the channel (Accenture, 2015). Clearly, now technology is now available to provide that enabling platform for growth, differentiation and innovation by integrating the front office seamlessly with the back office, and to power personalization and decision making with sophisticated analytics (Jorge, 2019; PWC, 2017)

Lastly, the consumer looks for simple and quick retail experiences, where time, comfort and convenience are everything (Accenture, 2015). Consumers' look for a simple experience where they enter in stores, purchase goods and exit without having a pause at a counter to pay, saving time and reducing problems through the whole process (Patel, Cordero, & Hung, 2020). Consumers' don't like confusion and problems, and when it happens it results in a bad buying experience, which results in the withdrawal of purchase, creating losses of revenue for retailers (Portugal Textil, 2018). Consumers' want to have full control of the transaction with much more autonomy, convenience and privacy, managing their time and not depending on third parties (Gonçalves, 2006).

Challenges and difficulties have been identified but it is necessary to study and analyze if SSTs can solve these issues and if this can be a business opportunity within this space. As a result, the next section is related with the relation between the SSTs and their influence on the market and then making the connection with the issues identified on the Portuguese retail industry.

2.2 Self-Service Technologies Potential in Retail

In our days, technology is disrupting every sector of society. Retail is no exception, with an increasing number of solutions that are becoming more sophisticated and consequently with a higher cost. Besides, innovation and development of new technologies are crucial in helping retailers creating a sustainable competitive advantage, specifically playing a role in increasing revenues and decreasing costs (Inman & Nikolova, 2017).

In order to understand better SSTs, it is relevant to define them. Self-Service Technologies (SSTs) are technological based interfaces that allow customers to use services independently from employees (Matthew L Meuter, Ostrom, Roundtree, & Bitner, 2000). In terms of

classification, SSTs may either be presenter from a company or from a customer viewpoint (P. A. Dabholkar & Bagozzi, 2002). Specifically, for this research, was used a model developed by Meuter, Ostrom, Roundtree and Bitner (2000), which consists in an empirical classification system.

Through the years, managers have been substituting services provided by employees, for self-service technologies (SSTs) for two main reasons, which are the reduction of costs and the superior service quality provided (White, Breazeale, & Collier, 2012). Firstly, rising expenses by getting less workers and growing efficiency (Weijters, Rangarajan, Falk, & Schillewaert, 2007). Secondly, SSTs boost the level of operation by more effectively handling transactions and allowing managers to adjust demand variations to offer a more consistent service delivery (Oh, Jeong, Lee, & Warnick, 2016). Finally, SSTs also helps managers to extend service offers, for example by delivering valuable customer data insights, retailers may reach specific customers with particular items of their interest, or even produce new goods that match the desires of consumers (Taillon & Huhmann, 2019).

Currently, several SSTs options are present in the Portuguese retail space. Therefore, based on industry reports, newspaper articles, websites and observations, in Figure 1 are represented the different options of SSTs in Portuguese retail in the present day. Columns show the different technologies that are being used by companies to establish a connection with their customers. The rows represent the areas where SSTs can have an impact and showing the goal of these technologies from a client point of view and what can the client achieve with them.

<i>Interface Purpose</i>	Interactive Voice Response	Online/Internet	Interactive Kiosks	Video
Customer Service	• Automated Service Hotlines	• Websites • Chat Bots • Mobile Apps	• Digital Service Stations • Store Tablets • Barcode Scanners	
Transactions	• Automated Order Hotlines	• Web Shops • E-commerce Marketplaces (Facebook)	• Self-checkout Stations • Barcode Scanners • ATMs	
Self-Help	• Automated Information Hotlines	• Mobile apps • Blogs • Ebooks • Websites • Chat Bots	• Store Tablets • Information Screens	• Social Networks • Twitch • Youtube

Figure 1: SSTs being used in Portuguese retail space (Matthew L Meuter et al., 2000).

Furthermore, SSTs also benefit the consumer, allowing them to use services providing a more versatile option in terms of time and space, which offers them greater flexibility and satisfaction

(Wal, Pampallis, & Bond, 2002). Several studies have shown that SSTs may offer many advantages to consumers' during a shopping experience using SSTs, for instance capital savings, reduced risk, easier buying experience and happiness (Walker, Craig-Lees, Hecker, & Francis, 2002), which can affect positively the perceived service (Kallweit, Spreer, & Toporowski, 2014). Thus, this positive impact caused by SSTs can result on a higher customer acquisition and retention rate by the retailers, which consequently improve the relationship between consumers' and retailers (Khadem & Mousavi, 2013).

Nevertheless, SSTs may also contribute to some drawbacks for all stakeholders involved. Since SSTs replace several employees, the client loses interaction with the staff, which can result in lack of help to effectively use these interfaces and solve any kind of errors that occur (Gelbrich, 2009). This issue can be critical in specific industries, like high end retail industries (Kucukusta, Heung, & Hui, 2014), where the reduced interaction and personalized experience provided by SSTs are not aligned with luxury clients who expect a very high tailored experience. This issue can negatively impact the customer journey and relation between clients and brands (Kucukusta et al., 2014). Taillon and Huhmann (2017) developed a model that relates SSTs evaluation with customer and financial outcomes. Figure 2 illustrates the consequences that arises from clients after using a service like engagement, confidence, word-to-mouth contact, and consequently the financial consequences for company performance like profitability and business value.

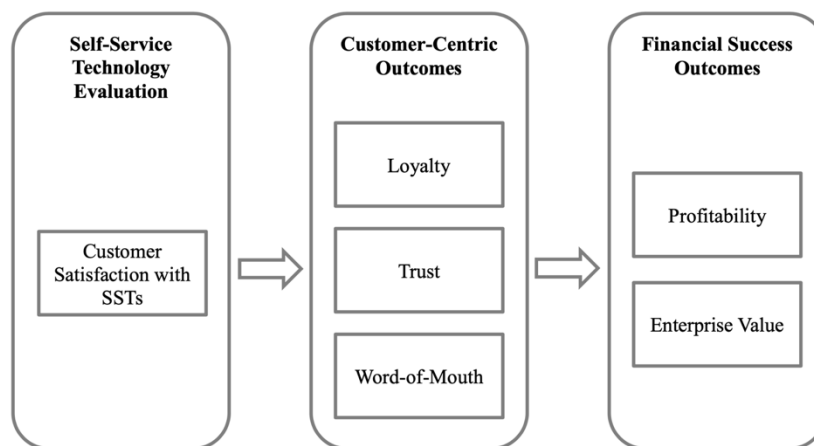


Figure 2: Self-service technologies evaluation and respective customer and financial outcome (Taillon & Huhmann, 2019).

Taillon and Huhmann (2019) indicated that to assess the value that SSTs create for businesses, it is necessary to first measure customer satisfaction. Therefore, it is proposed that each after use SST assessment should have an influence on the customer and consequently on the financial

outcome (Taillon & Huhmann, 2019). Even if customer satisfaction is just a part of customer outcomes, it will affect anyway several outcomes like loyalty, trustworthiness and confidence (Taillon & Huhmann, 2019). Studies have demonstrated that psychological factors affect the financial outcome of companies. Besides, customer satisfaction has a strong positive effect on loyalty which will result on bigger profits for companies and growth (Ennew, 2015).

Prior research has demonstrated that customer satisfaction is influenced by the value of services provided to customers and profitability increases after SST implementation (Taillon & Huhmann, 2019). For instance, many retailers implemented policies that encourage the customer adoption of SST offerings, such as self-checkouts lanes, in order to enhance profitability (White et al., 2012). Several different Industries also implemented these kind of policies, like banks that incentivized their clients to start using ATMs, in which for the bank was a way to automate processes and increase profit margins (Hung, Yen, & Ou, 2012).

The second factor to measure the financial impact of SST adoption was enterprise value, which is the market capitalization of a firm plus total debt minus cash and cash equivalents (Taillon & Huhmann, 2019; Murphy, 2020). Enterprise value can be used as a measure of financial outcome and there are studies that show that a higher satisfaction from customers is positively correlated with stock market returns and can result in higher returns comparing with benchmarks like S&P 500 index (Fornell, Mithas, Morgeson, & Krishnan, 2006; Fornell et al., 2006). To conclude, higher SSTs evaluations from customers will positively impact the customer side such as confidence and loyalty, which will positively affect the company side such as profits and enterprise value.

It was shown in section 2.1 that the Portuguese retail industry have several issues that can be solved by SSTs, which ultimately will benefit the consumers and firms involved. Consumers demand services in an online and digital format, which for example in the issue of client support can be solved by the use of chat bots, which can be an approach to solve first line problems that customers have.

In addition, issue of offering an exceptional customer experience can be solved by using SSTs. Is possible to see phenomena when totally automated and interactive interfaces were implemented in the retail industry which benefited the consumer by improving the service quality with more convenient and faster shopping experience and reducing transaction problems (Renko & Druzijanic, 2014). All SSTs advantages, helped to offer an exceptional shopping experience to their customers and consequently increasing the industry overall performance (Radomir & Nistor, 2012). These advantages helped retailers improving several aspects of their business, namely improving service quality, revenues, shopping experience and client

satisfaction. Besides, SSTs also help improving employee performance, business efficiency and reducing costs (Rust & Espinoza, 2006). Moreover, SSTs can offer more benefits that contribute for an excellent customer experience, for instance Self-service checkouts are faster, empowers customers to take charge in how they use a service and creates a more personal experience with different service options according to the customer background or history (Marzocchi & Zammit, 2006; P. Dabholkar, Bobbitt, & Lee, 2003)

Lastly, SSTs can also benefit the simplicity of the customer journey. SSTs represent a quicker service delivery, reducing complexity and problems, with increased convenience, reliability and privacy, being efficiency and speed the core of SSTs (Curran & Meuter, 2005). Ultimately, this will positively affect all customer expectations and increase customer satisfaction (Collier & Kimes, 2013).

Is very important that companies implement these technologies for customers to use them, in order to use SSTs benefits for their advantage. Nevertheless, another important aspect should be taken into account when studying the psychology of the consumer when dealing with new technologies. As a result, to have a complete analysis of the potential of SSTs in the Portuguese retail sector, the next section will examine how Portuguese consumers are when dealing with new technology. This concept is called technology readiness and it will be studied what is it and if it impacts SSTs adoption and willingness to use futuristic self-service stores.

2.3 Relationship between Technology Readiness with SSTs and consumer satisfaction

Several research show that consumers very frequently choose to use new technologies like SSTs, and is also very frequent to stop using them (Matthew L. Meuter, Bitner, Ostrom, & Brown, 2005), which will depend mainly of the psychological profile towards new technologies (Technology readiness) of each consumer (Lin & Hsieh, 2007). Clearly, this psychological profile needs to be understood by the retail industry in order to effectively implement SSTs in their business (Lin & Hsieh, 2007).

Technology Readiness is defined by the people's predisposition to use and accept new technologies. The main goal of these new technologies is to help people at professional and personal level. According to previous studies, there are three main topics that affect TR and the adoption of new technologies from consumers.

Firstly, the Technology Acceptance Model (TAM) refers to aspects that could drive or inhibit the adoption of new technology. From this model point of view, individuals willingness to adopt

new technology is influenced by how easy is to use and how the individual perceives how useful the technology is (Davis, Bagozzi, & Warshaw, 1989).

Secondly, for Mick and Fournier (1998), there are technology paradoxes, which are:

1. Assimilation/isolation
2. Control/chaos
3. Competence/incompetence
4. Efficiency/inefficiency
5. Freedom/enslavement
6. New/obsolete
7. Fulfils/creates needs
8. Engaging/disengaging

According to the researchers, after doing a qualitative study on the reactions from individuals towards technology, they concluded that this technology paradoxes can cause good or bad feelings (Lin & Hsieh, 2007).

Lastly, the technology and computer anxiety which affects individuals in different ways. Technology anxiety happens when a individual demonstrate a bad feeling towards technology applications (M.L. Meuter et al., 2003) and computer anxiety happens when individuals demonstrate fear for using a computer (Igbaria & Parasuraman, 1989). Other research proved that consumers values, beliefs and motivations can increase (e.g. curiosity) or decrease (e.g. fear) the adoption of new technologies (Davis et al., 1989).

Parasuraman (2000) also defines TR as the psychological state of the sum of inhibitors and enablers that result in a predisposition to adopt and use a new technology. Besides, this author developed a scale with 36 items and four dimensions to classify either if it is a enabler of TR or if it is a inhibitor. As a result, from the four dimensions, two are optimism and innovativeness which are enablers, and the other two are discomfort and insecurity which are inhibitors.

Consequently, for the assessment of customers adoption of SSTs, TR should be seen as a crucial variable to be analyzed, since it impacts the psychological state of mind of individuals which affects the behaviors towards SSTs technologies and retailers. In Portugal, there's no academic research about this topic, specifically about how TR can affect consumers satisfaction with SSTs.

It is paramount to define satisfaction with SSTs or with a service, which is a cognitive evaluation based on emotions, which measures the level in which the customer perceives the

use of the service to cause positive feelings. (Cronin, Brady, & Hult, 2000; Tjiptono & Chandra, 2004).

There are several evidences from Lin and Hsieh (2007) that indicates that TR is a variable that positively affects consumers satisfaction with SSTs, but it requires more studies in different contexts and scenarios to confirm these results.

In the next section, a case study of Amazon Go is presented, aiming to study a futuristic SST model, which will affect the entire retail industry in the next years. As a result, the Amazon Go technology is presented and analyzed.

2.4 Self-service concept of Amazon Go

SSTs have been around from many years, but Amazon is pushing this innovation even further, using a new technologies to implement in their retail business and drastically changing how customer journey and shopping experience occurs (Grewal et al., 2017). For the Portuguese retailers, this way of operating can represent an opportunity to understand how this technology is being received from the general public and providing useful insights if this could be implemented in Portugal, which could enhance their service quality.

Amazon describes Amazon Go as a new kind of store with no checkout required, making use of new technologies to achieve this and that's why this concept is so futurist. Besides, Amazon Go is a chain of convenience stores all across the united states in different states (Amazon, 2020). Amazon opened its first cashier-free convenience store to the public in 2018 (Palmer, 2020). Since then, Amazon Go stores have expanded far beyond the first location at the company's Seattle headquarters (Palmer, 2020). Currently, there are 25 Amazon Go stores across the United States, with locations in Chicago, New York, San Francisco and Seattle.

Shoppers can purchase meat, seafood, bakery items, household essentials, easy-to-make dinner and Amazon Go also offer a mix of organic and conventional items (Palmer, 2020).

This concept works by using several hardware and software specifically for this. Starting by the hardware, there cameras across the store and the shelves have weight sensors, to detect if an item was taken by the customer (Reuters, 2018). In terms of software, according to Amazon (2020), Amazon Go concept deploys several technologies used in self-driving cars, specifically computer vision, sensor fusion and deep learning algorithms. Amazon called it just walk out technology (Amazon, 2020).

Then the journey starts with clients enter the store by showing the smartphone in the scanner. Then they choose and take the intended products and they may leave the store (Grewal et al., 2017). The just walk out technology automatically detects when products are taken from or

return to shelves and keep track of items in a virtual cart (Grewal et al., 2017). After customers leave the store, they are charged from their Amazon account and sent an automatic receipt (Grewal et al., 2017). All customers need is a smartphone, an Amazon account and the Amazon Go app (Amazon, 2020).

Amazon Go model has several economic benefits, specifically eliminates the need for cashiers and out of stock scanners/inventory counters, which implies direct labor savings of around \$412.300 per year and per store. Then, this model also creates enormous amounts of data that indirectly permits additional optimization of the workforce and supply chain, which indirectly allows labor savings of around 50.000\$ per year and per store (Chaubard, 2019).

Besides, for customers there are several benefits, specifically the short period of time needed to complete the shopping experience, the futuristic environment of the store and how it works and the convenience. All of these aspects consequently reflect the feedback given by the customers and the high rating Amazon Go app in the Apple app store, which from a scale 1 to 5, it has 4.5 star (Cheng, 2019).

On the other hand, Amazon Go has limitations. Several complaints in reviews are related with items that were out of stock or the store didn't have the things that customers wanted. Besides, the store also doesn't serve hot food or beverages even though customers are free to heat up their meals in microwaves in the sitting area (Cheng, 2019).

For the future, Amazon is planning to open 3.000 stores until 2021, which can result in an estimated annual revenue of 4.5\$ billion. Moreover, Amazon has a growth opportunity beyond just opening more stores. Selling more grocery items and other sort of products could increase the average transaction amount (Cheng, 2019).

Recently, Amazon announced that they will sell the just wall out technology to other retailers reflecting Amazon's strategy of offering lucrative services to others (Dastin, 2020).

% of respondents in each group

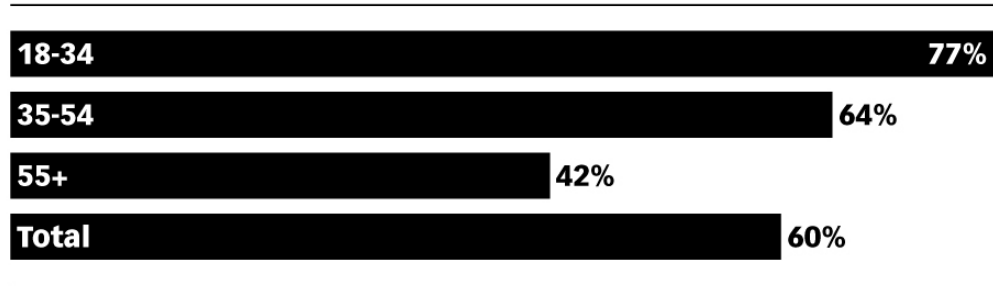


Figure 3: Internet Users worldwide who would prefer to shop by having an Amazon Go experience if offered by other retailers, by Age (Garcia, 2018).

According to MuleSoft, a majority (60%) of internet users worldwide said they would prefer a “just walk out” shopping experience if offered by other retailers, as Figure 3 shows. Besides, it also shows how willingness to purchase is negatively correlated with age(Garcia, 2018).

With Amazon Go, artificial intelligence and computer vision, created the ultimate self-service technology experience by disrupting shopping habits and creating new ways to do it in the future (Grewal et al., 2017).

Appendix I has pictures of different parts of Amazon Go store.

3. METHODOLOGY

3.1 Conceptual Framework and Hypotheses

The goal of this research is to analyze how SSTs can solve consumer’s problems and how consumers’ TR, loyalty and willingness to purchase is related with SSTs. Besides, it was decided to include one more relationship that enriches the overall analysis, which is how TR is related with the willingness to use new self-service store concepts (Amazon Go). The initial conceptual framework is shown on Figure 4, with the hypotheses and the relationships between dependent and independent variables.

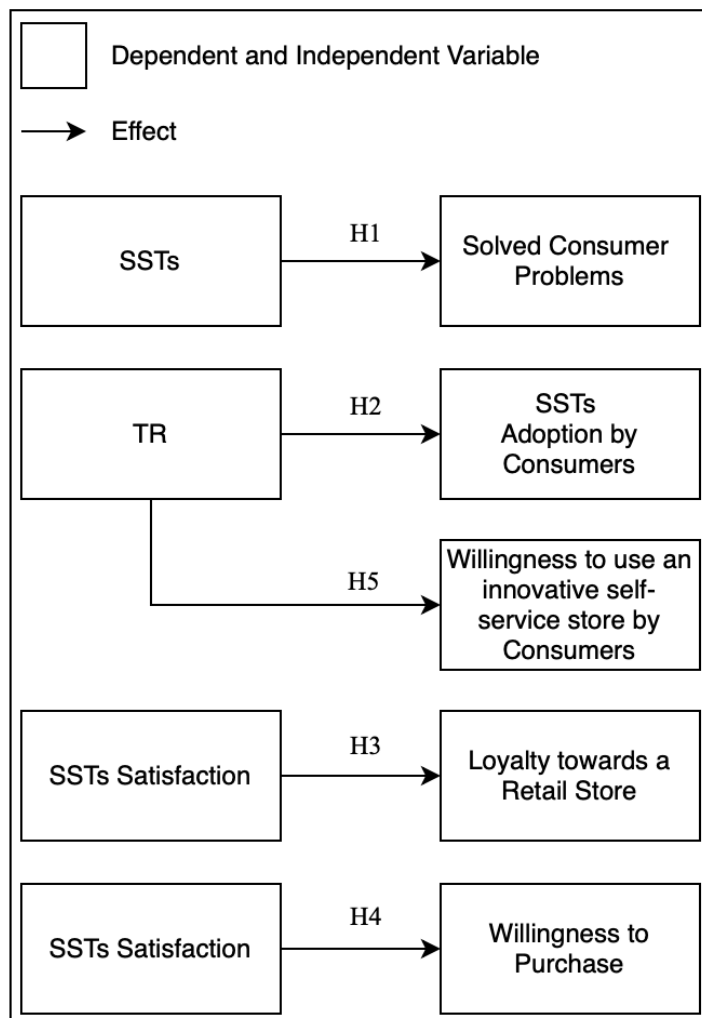


Figure 4: Conceptual Framework

Several assumptions were used for the conceptual framework, with the first one being that SSTs can solve several problems for the consumer in the retail space. Wal, Pampallis & Bond (2002) suggest that SSTs give consumers the flexibility of time giving the opportunity to choose when and how long a service will take, and flexibility of space offering the possibility to the consumer

decide the where, which later translates in higher freedom and satisfaction. Literature shows that SSTs can offer several additional benefits to the consumers such as money saving, easier to control, lower risk, time saving and enjoyment (Walker et al., 2002). Consequently, it was created an hypothesis that SSTs can help solving consumer's problem across the retail industry.

Therefore, it is hypothesized that SSTs solve consumers' problems in the retail industry.

***H1:** SSTs can help solve consumers' problems in the retail space*

Furthermore, for the second hypotheses it was assumed that TR impact the adoption of SSTs from consumers. This phenomenon is described by Meuter, Ostrom, Bitner and Roundtree (2003), where is indicated that there is a relationship between consumer's anxiety with technology and their satisfaction with SSTs, which will impact the adoption of SSTs. Besides, Parasuraman (2000) also says that personality is a crucial factor when evaluating consumers' satisfaction. In Taiwan, Lin and Hsiedh (2007) shown that TR has an impact on consumers' satisfaction with SSTs, which can increase the adoption of SSTs. Clearly, it is necessary more studies to validate these results, mainly in other geographies and with different scenarios. As a result, was created the hypotheses that TR has an effect on consumers' adoption of SSTs.

***H2:** TR has an effect on consumers' adoption of SSTs*

Moreover, for the third hypotheses was used as assumption that consumers' satisfaction positively impacts loyalty with retailers. Firstly, there are evidences from previous studies that shows that consumers satisfaction positively impacts trustworthiness and confidence with retailers (Cronin, Brady & Hult, 2000). Besides, Yang and Peterson (2004) shown that satisfaction in online commerce was a crucial driver of loyalty. Another important driver was described by Taylor and Hunter (2002) where they indicated that customer satisfaction positively affects loyalty and trustworthiness, specifically in a e-CRM context. With the evidences found, it was created the hypotheses that satisfaction with SSTs positively impacts loyalty with retailers.

***H3:** Consumers' satisfaction with SSTs positively impact consumers' loyalty with retail stores.*

Moreover, for the purpose of this research it is presumed that consumers' satisfaction positively affects willingness to purchase. Consequently, it was created the hypotheses that consumers' satisfaction with SSTs positively affects consumers' willingness to purchase.

H4: Consumers' satisfaction with SSTs positively impact the willingness to purchase.

Finally, to enrich this study, it was included the assumption that TR will affect the willingness to use new self-service store concepts. Research shows that the profiles that have higher disposition to try and use services that are technology based are the ones with the higher measurements of TR (Parasuraman, 2000). Clearly, new self-service store concepts are highly dependent on technology to disrupt and innovate. Therefore, it was created the hypotheses for the Portuguese market, consumers with higher measurements of TR have higher predisposition to use new and innovative self-service stores.

H5: TR positively impact consumers' disposition to use futuristic self-service stores.

3.2 Survey procedure and Data Collection

To gather data to this study, an online survey was developed and created in English and designed using the software Qualtrics. Choosing an online survey, can lead to biased results, specifically measuring technology readiness, since the population that answered to the survey will be more willing to use technology, which can influence the results. Furthermore, the majority of the respondents are students and highly educated millennials, which can also impact results.

On the other hand, there are several advantages in using a survey published online. Firstly, a survey can be created for free in this case, but even more complex surveys are very cheap to create. Secondly, is relatively easy and fast to design, create and share a survey, with powerful survey software like Qualtrics, it's possible to create a survey in a reduced period of time. Thirdly, with social networks it makes very easy to share a survey and to collect huge amounts of data, which creates a lot of value for the researchers. Lastly, with the survey being done by online channels, it contributes for their level of honesty in their responses, since they are not being watched while they are doing the survey, which offers them the privacy and trust that they need.

The Survey was published and shared in social media (Facebook, Instagram, WhatsApp and Messenger) and by e-mail, between 25 of April 2020 and 11 of May 2020.

The survey started with a brief description of the researcher, with the survey rules and goals. Then, there was a question to check if the participants were living in Portugal, otherwise they would not be considered valid. Following this, the first group of questions started by asking if the respondents use any kind of SST in a retail context in the previous six months. Then, it was questioned about their experience with the SST in order to evaluate their satisfaction. Besides, it was asked to rate the retailer where they had the experience and then was asked about their willingness to purchase and their willingness to keep using SSTs in the future. To end the first group, was asked what attributes they think SSTs should have.

The second group of questions had the goal to assess the TR profile of the respondents. The third group of questions started by showing a new self-service store concept which was identical to Amazon Go. Following this, it was questioned to rate their willingness to use such store and which advantages they expected to collect from using it. To finish this group, was asked if they respondents already knew Amazon go or not. The fourth group was related to demographics in order to assess it in the respondents. Specifically, gender, age, education and occupation. The survey required five minutes to complete and the complete version is shown in Appendix II.

3.3 Measurements

For this research, several scales from previous studies were used as a reference to measure the phenomena. The first part aimed to measure consumer satisfaction, consumer loyalty, SSTs adoption and attributes of SSTs. The second part aimed to measure technology readiness. The third part aimed to measure willingness to purchase and again SSTs adoption and attributes of SSTs. The last part aimed to measure variables related to demographics of the respondents, specifically gender, age, education and occupation.

3.3.1 SSTs satisfaction

With the goal of assessing consumers' satisfaction, it was asked to the respondents to evaluate their last shopping experience using SSTs. It was used five items that were assessed on a 7-point Likert scale. Four items were adapted from Dabholkar and Bagozzi (2002) and the last

Construct	Question	Scale	Literature
Consumer Satisfaction with SSTs	The experience was good?	Strongly disagree (1) - Strongly agree (7)	Adapted from Dabholkar and Bagozzi (2002)
	The experience was pleasant?		
	The experience was beneficial?		
	The experience was favorable?		
	Overall, how satisfied are you with the Self-Service Technology after usage?	Not at all satisfied (1) - Completely satisfied (7)	Adapted from Westbrook (1987)

Table 1: Consumers' Satisfaction Measurement model

item was adapted from Westbrook (1987). Table 1 shows the items, scales and literature used to assess consumer satisfaction.

3.3.2 SSTs adoption

For the measurement of the SSTs adoption in the Portuguese retail context, it was created a measurement for the purpose of this research, where participants were asked if the experience increases the willingness to use SSTs and their willingness to use a retail store with such a futuristic self-store concept. In both items was used a 7-point Likert scale. Table 2 shows the items and scales used to assess SSTs adoption from consumers.

Construct	Question	Scale
SSTs Adoption from Consumers	Your Self-Service Technology experience increases your willingness to use more Self-Service Technologies.	Strongly disagree (1) - Strongly agree (7)
	Willingness to use such self-service retail store.	Very unlikely (1) - Very likely (7)

Table 2: SSTs Adoption Measurement model

3.3.3 Consumers' Problems in the Portuguese Retail

To understand which problems consumers' face in the retail industry in Portugal and how can SSTs help solving those problems, it was created a measurement for the purpose of this research, where participants were asked to rate the attributes that SSTs should have and what are the advantages that they perceive for using a futuristic retail store. The first item used a 7-point Likert scale, where was independently measured several attributes of the SST: how is the difficult to use, how much time it saves, gives the option to decide when to use it, gives the option to decide where to use it, how much money it saves, how easy is to control the technology, how enjoyable is the technology, how convenient is the technology, perceived risk, how good is comparing to the alternative. The second item was an open question, where the participant was free to write what he thinks. Both questions were adapted from Heinemann

(2019). Table 3 shows the items and scales used to assess how can SSTs help solving consumers' problems in retail.

Construct	Question	Scale	Literature
Consumers Problems in the Portuguese Retail	Rate the following attributes that self-service technologies have: easy to use, saves time, when I want, where I want, saves money, easy to control, enjoyable, convenient, low risk, better than the alternative	Strongly disagree (1) - Strongly agree (7)	Adapted from Heinemann (2019)
	What are your expected benefits of using such a self-service store?	Open Question	

Table 3: Consumers Problems Measurement model

3.3.4 Consumers' Technology Readiness

To measure consumers' TR, Parasuraman (2000) developed a 36-item scale version of Technology readiness index (TRI). For the purpose of this research was used a reduced version developed by Heinemann (2000) which is based on the original one. This reduced version has 12 points that fill the purpose of this study. It was divided in four groups each one with three questions. It was used a 7-point Likert scale to measure the twelve points. Table 4 shows the items, scales and literature used to assess TR on consumers.

Construct	Question	Scale	Literature
Consumers Technology Readiness	Technology gives people more control over their daily lives	Strongly disagree (1) - Strongly agree (7)	Adapted from Heinemann (2019)
	Products and services that use the newest technologies are much more convenient to use		
	You prefer to use the most advanced technology available		
	Other people come to you for advice on new technologies.		
	In general, you are among the first in your circle of friends to acquire new technology when it appears.		
	You keep up with the latest technological developments in your areas of interest.		
	Technical services are not helpful because they don't explain things in terms you understand.		
	There should be caution in replacing important people/tasks with technology because new technology can breakdown or get disconnected.		
	Technology always seems to fail at the worst possible time.		
	You don't feel confident doing business with a place that can only be reached online.		
	When you call a business, you prefer to talk a person rather than to a machine.		
	If you provide information to a machine or over the internet, you can never be sure it really gets to the right place.		

Table 4: Technology Readiness Measurement model

3.3.5 Consumers' Loyalty

To measure consumer loyalty towards the respective retailer, participants were asked about five items using a 7-point Likert scale. Four items were adapted from Oliver (1980), and the last item was created for the purpose of this research. Table 5 shows the items, scales and literature used to assess consumers' loyalty.

Construct	Question	Scale	Literature
Consumers Loyalty with Retailers	I am satisfied with my decision to go to this store.	Strongly disagree (1) - Strongly agree (7)	Adapted from Oliver (1980)
	If i had to do it all over again, I would go to this store.		
	My choice to go to this store was a wise one.		
	I think that I did the right thing when I decided to go to this store.		
	Your Self-Service Technology experience increases the willingness to go to the same store.		

Table 5: Consumers' Loyalty Measurement model

3.3.6 Willingness to Purchase

To measure the willingness to purchase, it was created a measurement for the purpose of this research, where it was created a hypothetical scenario of a futuristic self-store concept and then was asked the likelihood of completing a purchase. This item used a 7-point Likert scale. Table 6 shows the item and scale used to assess willingness to purchase of consumers.

Construct	Question	Scale
Willingness to Purchase	Higher likelihood to complete a purchase	Very unlikely (1) - Very likely (7)

Table 6: Willingness to purchase Measurement model

3.3.7 Consumers' willingness to use futuristic retail stores

To assess how the Portuguese population would react to new retail store concepts that depends relies mainly in technology, it was created a hypothetical scenario of an innovative self-service store concept and then their willingness to use such stores.

This item used a 7-point Likert scale and was adapted from Heinmann (2019). Table 7 shows the items and scale used to assess willingness to use an innovative self-service store.

Construct	Question	Scale	Literature
Willingness to use an innovative self-service	Willingness to use such self-service retail store	Very unlikely (1) - Very likely (7)	Adapted from Heinemann (2019)

Table 7: Willingness to use an innovative Self-Service Store Measurement model

3.4 Participants demographics

Overall, the survey had 188 responses. Some responses were deleted because they did not fulfil the requirements for participating in the survey, because they did not finish the survey, or they did not have an SST shopping experience in the previous six months, or they were not living in Portugal. As a result, only 104 were considered valid to be analyzed. The population studied was 60% women and 40% men. In terms of age, the respondents had between 19 and 79 years with an average of 26 years. The majority of the sample (61%) is student, with the rest being 35% employed, 2% unemployed and another 2% is considered Other. Moreover, related with education, 44% have completed a Bachelor degree, 39% have completed a Master degree, 15% have completed high-school, 1% a PhD and 1% have lower than high-school education. The descriptive analysis is represented in Figure 5.

Descriptives Analysis		
Gender	Men	60%
	Women	40%
Age		19 - 79 years
Occupation	Student	61%
	Employed	35%
	Unemployed	2%
	Other	2%
Education	Less than highschool	1%
	Highschool	15%
	Bachelor	44%
	Master	39%
	Phd	1%
Total	Number of Respondents	104

Table 8: Respondents descriptives.

4. RESULTS

In this section is presented the techniques used to study the potential of SSTs in Portugal. The statistical tests were done in the SPSS software (values are in the Appendix III). A reliability analysis is carried out and then the results are shown and described together with the statistical tests done to verify the hypotheses, resulting in their acceptance or rejection.

4.1 Reliability Analysis

Several points on this survey came from existing research and some others were created for the purpose of this research. Consequently, a Cronbach's Alpha analysis was used to check if the constructs were reliable, by measuring the internal consistency. Firstly, in the technology readiness construct, the negative items (six) needed to be transformed into positive values to make them possible to compare with the other items, and only after this the CA test could be done properly. The reliability coefficients obtained were bigger than 0.7 in all cases, being bigger than 0.9 in the majority of them, which means that these items are extremely reliable, which make them very good in predicting the variable (Hair, Black, Babin, & Anderson, 2010). Table 8 summarizes the Cronbach's alphas for the constructs used.

Construct	Number of items	Cronbach's alpha
SSTs Satisfaction	5	0.922
SSTs Adoption	2	0.735
Consumers Problems in Retail	2	-
Technology Readiness	12	0.902
Loyalty to Retailers	5	0.933
Willingness to Purchase	1	-
Willingness to use na innovative self-service store	1	-

Table 9: Cronbach's Alpha for Constructs used.

Since the Cronbach's Alpha was bigger than 0.7, which is considered reliable, then was created four composite items that represents the four constructs. Now with the composite variables, the focus of this analysis was to do a descriptive analysis and linear regressions between the dependent variables and the independent variables.

4.2 Results from Hypothesis Testing

4.2.1 Attributes of SSTs that Solve Consumers' Problems

A descriptive analysis was performed in order to validate H1. The hypotheses suggest the existence of a positive effect of self-service technologies in solving consumers' problems in the retail space in Portugal. Table 9 shows the descriptive analysis of the attributes that self-service technologies should have, and Figure 5 shows a chart from the most valuable attributes to the respondents to the less valuable attributes.

	Mean	Minimum	Maximum	Standard Deviation	N
Easy to use	6.22	2	7	1.106	104
Saves time	6.36	3	7	1.051	
When I want	5.87	1	7	1.247	
Where I want	5.71	1	7	1.356	
Saves money	4.59	1	7	2.041	
Easy to Control	5.69	1	7	1.380	
Enjoyable	5.54	2	7	1.386	
Convenient	6.25	1	7	1.138	
Low Risk	5.68	2	7	1.416	
Better than the Alternative	5.55	1	7	1.500	

Table 10: Descriptive Analysis of SSTs attributes

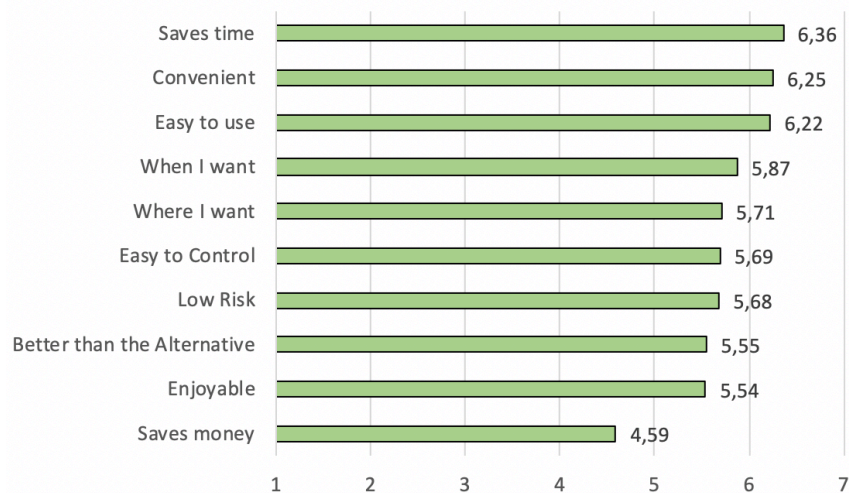


Figure 5: Value of the attributes according to the respondents. The higher, the more valuable it is for the respondents.

According to the results of the survey, the most important attributes, in a scale from 1 to 7, are “Saves time” with the highest mean of 6.36, then “Convenient” with a mean of 6.25 and “easy to use” with a mean of 6.22.

These attributes can bring several benefits to consumers’ by solving several problems that they face in the retail space in Portugal. To better understand these phenomena, it was created a scenario of an innovative self-service store concept that uses SSTs to operate, and then respondents were asked to indicate the expected benefits of such store. Figure 6 shows the expected benefits of such store according to the respondents.

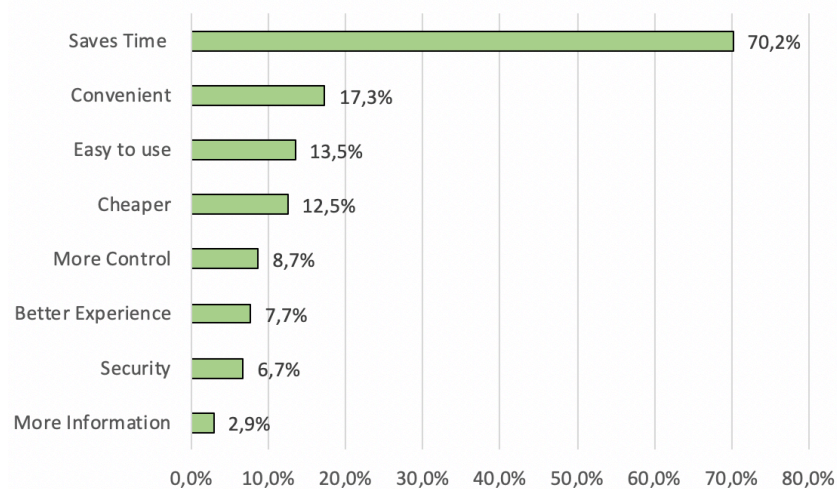


Figure 6: Expected benefits of an Innovative Self-Service Store

According to the results of the survey, 70% of the respondents attributed “saves time”, 17% attributed “convenient”, 14% attributed “easy to use” and 13% attributed “cheaper”.

4.2.2 The relation between TR and SSTs adoption

To study the relationship between TR and the adoption of SSTs was used a correlation analysis in order to test and validate H2. The hypotheses suggest that Technology Readiness influences consumers’ adoption of SSTs. To study the strength and direction of this relationship it was used the Pearson correlation technique. In terms of Technology readiness, the results indicate a moderate and positive correlation with SSTs adoption by the consumers. Besides, it represents a statistically significant effect and shows that Technology Readiness is a strong predictor of SSTs adoption by consumers’ (R Square change = 0.291; P-value = 0.000; $\beta = 0.539$). Thus, H2 is supported by data and it suggests that the higher the technology readiness the higher the SSTs adoption by consumers.

4.2.3 The relation between Consumers' Satisfaction and Consumers' Loyalty

To study the relationship between consumers' satisfaction and their loyalty was used a correlation analysis in order to test and validate H3. The hypotheses suggest that Consumers' satisfaction with SSTs positively impact trustworthiness with retailers. To study the strength and direction of this relationship it was used the Pearson correlation technique. In terms of SSTs satisfaction, the results indicate a strong and positive correlation with consumers' loyalty. Besides, it represents a statistically significant effect and shows that Consumers' satisfaction with SSTs is a strong predictor of consumers' loyalty towards a retailer (R Square change = 0.515; P-value = 0.000; $\beta = 0.717$). Thus, H3 is supported by data and it suggests that the higher the consumers' satisfaction with SSTs the higher the consumers' confidence and loyalty towards the respective retailer.

4.2.4 The relation between Consumers' Satisfaction and Willingness to Purchase

To study the relationship between consumers' satisfaction and their willingness to purchase was used a correlation analysis in order to test and validate H4. The hypotheses suggest that consumers' satisfaction with SSTs has an impact on the willingness to purchase. To study the strength and direction of this relationship it was used the Pearson correlation technique. In terms of SSTs satisfaction, the results indicate a moderate and positive correlation with consumers' willingness to purchase. Besides, it represents a statistically significant effect and shows that Consumers' satisfaction with SSTs is a strong predictor of consumers' willingness to purchase (R Square change = 0.267; P-value = 0.000; $\beta = 0.517$). Thus, H4 is supported by data and it suggests that the higher the consumers' satisfaction with SSTs the higher the consumers' willingness to purchase.

4.2.5 The relation between TR and the Disposition to use a futuristic self-service shop concept

To study how TR influences the disposition from consumers to use a futuristic self-service shop concept was used a correlation analysis in order to test and validate H5. The hypotheses suggest that Technology Readiness positively impacts the disposition of consumers to use a new self-service shop. To study the strength and direction of this relationship it was used the Pearson correlation technique. In terms of Technology readiness, the results indicate a moderate and positive correlation with consumers' disposition to use a new self-service store concept. Besides, it represents a statistically significant effect and shows that Consumers' satisfaction

with SSTs is a strong predictor of consumers' disposition to use a futuristic store concept (R Square change = 0.235; P-value = 0.000; β = 0.485). Thus, H5 is supported by data and it suggests that the higher the technology readiness of consumers' the higher the consumers' disposition to use a futuristic self-service retail store.

5. CONCLUSIONS

The focus of this research was to assess the potential of SSTs for the consumers and retailers in Portugal, mainly in Retail. The First Approach of this research was to understand how the retail industry is characterized in Portugal, assessing how can Self-Service Technologies be a business opportunity and how can Technology Readiness impact consumers. Following this, it was analyzed which consumers' problems SSTs can solve. Further, to assess if consumers were receptive to the use of SSTs, it was analyzed consumers' technology readiness if it impacts SSTs adoption and willingness to use a futuristic self-service store concept. Lastly, it was studied SSTs satisfaction and if it impacts loyalty towards the respective retailers and willingness to purchase. This chapter shows the findings of this research with the respective conclusions, ending with the limitations of this research and several recommendations to be used in the future by other researchers in studies about this topic.

5.1 Main findings

5.1.1 SSTs and Consumers' Problems in Portuguese Retail

The results show that SSTs have several attributes that can help solving issues for the consumer in the Portuguese retail space. Firstly, the most important attributes that the respondents think that SSTs should have are time saving, convenience and it should be easier to use. It is clear that for consumers, SSTs can solve issues related with time spending on the retail store, can offer more convenience and then it should be easier to use. Another important aspect is the Control that SSTs offer. The attributes "When I want", "Where I Want" and "easy to control" are also attributes that respondents valued and they all measure "Control", which mean that SSTs will likely increase consumers control over their retail experience.

Secondly, to better understand the phenomena, in the scenario of a futuristic self-service store concept that uses SSTs to operate, the highest expected benefits that respondents indicated are "Saves time", "Convenient", "Easy to use" and "Cheaper", which means that in a scenario of an automated self-service store, consumers expect several improvements related with time, comfort, easiness of the experience and price. The ultimate goal of the study of these attributes was to answer the research question:

#RQ1: Which consumer problems does SSTs solve?

In summary is clear that SSTs is a crucial variable to help consumers in several aspects of their retail experience. Specifically, SSTs can mainly help in these three aspects: Time saving, Convenience and Easiness of the experience.

5.1.2 TR and SSTs Adoption

The results show that TR is a strong predictor of SSTs adoption by the consumers. There is a positive relation between both variables. Which means, the higher consumer TR, the higher the SSTs adoption, which can be explained by the fact that the population studied has high levels of education with high usage of SSTs in their lives which mean that their TR profile is high. The ultimate goal of the study of this relationship was to answer the research question:

#RQ2: Are consumers' receptive to the use of SSTs?

In summary, it is clear TR is a crucial variable to evaluate the SSTs receptiveness of consumers', which is translated in consumers with higher TR profiles are more receptive to the use of SSTs.

5.1.3 SSTs Satisfaction and Consumers' Loyalty

The results show that consumers' satisfaction with SSTs is a strong predictor of consumers' loyalty towards the respective retailer. There is a positive relation between both variables. Which reflects in higher values of consumers' satisfaction with SSTs, leads to higher values confidence and loyalty with retailers. The ultimate goal of the study of this relationship was to answer the research question:

#RQ3: Does SSTs satisfaction influence the loyalty towards a retail store?

In summary, it is clear the consumers' satisfaction with SSTs is a crucial variable to evaluate consumers' loyalty towards a retailer, which is translated in consumers with higher SSTs satisfaction will more likely have confidence and trust in the retailers.

5.1.4 SSTs Satisfaction and Willingness to Purchase

The results show that consumers' satisfaction with SSTs is a strong predictor of consumers' willingness to purchase. There is a positive relation between both variables. Which reflects in higher values of consumers' satisfaction with SSTs, leads to higher willingness to purchase. The ultimate goal of the study of this relationship was to answer the research question:

#RQ4: Does SSTs satisfaction affects the willingness to purchase?

In summary, it is clear the consumers' satisfaction with SSTs is paramount to evaluate consumers' willingness to purchase, which is translated in consumers with higher SSTs satisfaction have a higher willingness to purchase.

5.1.5 TR and Consumers' willingness to use a Futuristic Self-Service Store

The results show that TR is a strong predictor of willingness to use a futuristic self-service store. There is a positive relationship between both variables. Which means, the higher consumers' TR profile the higher the willingness to use this futuristic store concept. Once again, this result can be explained by the highly educated population studied with the high usage of SSTs in their lives meaning that this population has high levels of TR. Consequently, this explains the willingness to use new and futuristic self-service store concepts.

5.2 Limitations and Suggestions for Future Research

This research was done in a scope of a master thesis, with limited resources and timeframe, which created several limitations which should be taking into account when interpreting the results and conclusions and created space for improvements and recommendations for future studies related with the topic.

First of all, prospective studies may extend to many contexts and scenarios outside the main sense of this study. This research focuses on the Portuguese retail industry and hence takes into account only SSTs which are used in this particular sector. Including other sectors, cultures and countries which could be important in further validating and broadening the results of this report.

Secondly, the population studied was very small which cannot be considered very representative of the entire population. Therefore, resulting in the impossibility to generalize the results to the entire population. Besides, there was a sample bias, since respondents had high levels of education, they were mostly millennials. Therefore, this study was also subject to snowball sampling. Different and more population with other measurements instruments should be used in future research to gain a better understanding of this topic.

Thirdly, owing to the obvious lack of credible evidence relating to the Portuguese retail sector, the literature review provided in subchapter 2.1 was built on the basis of scholarly publications and consulting reviews but also on certain newspaper websites published by the subject-matter experts. This will ultimately influence the applicability of the observations.

Fourthly, no environmental considerations are taken into consideration in this study. Further analysis may also consider the potential influence of environmental considerations such as external pressures from other people or employees in the retail stores. Clearly, there are more psychological and external factors that could impact the variables in this research, which could impact or complete the model. For future research, this should be taken into consideration.

Lastly, in this fast pacing industry, technology will disrupt the space, which makes it paramount to do an effective implementation of SSTs in order to succeed. This should represent an opportunity for all stakeholders, including researchers, retailers and consumers.

In general, self-service technologies will disrupt several industries, but in the next years will be specifically critical in the retail space, which will can represent a great business opportunity for Portugal in this sector.

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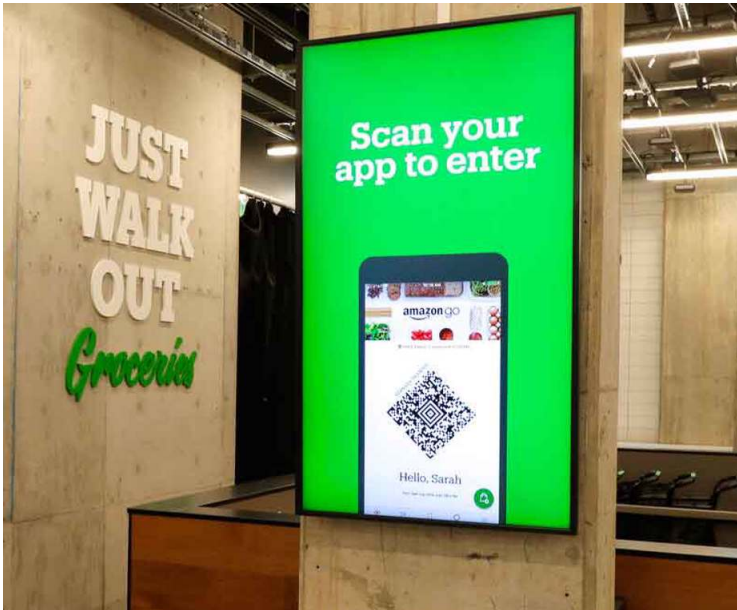
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APPENDICES


Appendix I: Amazon Go





Appendix II: Online Survey

Block 1: Introduction and Screening Question



Dear Participant,

I'm a master student at Católica Lisbon School of business and Economics. The Following survey is part of my final dissertation.

There are no right or wrong answers in this survey and your responses will be treated anonymously. Please read the questions carefully and answer truthfully.

This Survey contains 4 parts and completing it will take approximately 7 minutes.

Thank you very much for participating and collaborating in this study!

Best regards,
Marco Albuquerque


Q1. Are you currently living in Portugal?

Yes

No

[→](#)

Block 2: Self-Service Technology evaluation



The following group will be related with a self-service technology experience that you had.

Have you used a Self-Service Technology in a retail context during the last six months?
(e.g. self-checkouts)

Yes

No

On a scale 1 (strongly disagree) to 7 (strongly agree), please indicate your level of agreement with the following statements:

	1 = Strongly Disagree	2	3	4	5	6	7 = Strongly agree
The experience was good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The experience was pleasant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The experience was beneficial	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The experience was favorable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Overall, how satisfied are you with the Self-Service Technology after usage?

Not at all satisfied	Moderately dissatisfied	Slightly dissatisfied	Neither satisfied nor dissatisfied	Slightly satisfied	Moderately satisfied	completely satisfied
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On a scale 1 (strongly disagree) to 7 (strongly agree), please indicate your level of agreement with the following statements:

	1 = Strongly Disagree	2	3	4	5	6	7 = Strongly agree
I am satisfied with my decision to go to this store.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If i had to do it all over again, I would go to this store.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My choice to go to this store was a wise one.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think that I did the right thing when I decided to go to this store.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

On a scale 1 (strongly disagree) to 7 (strongly agree), please indicate your level of agreement with the following statements:

	1 = Strongly Disagree	2	3	4	5	6	7 = Strongly agree
Your Self-Service Technology experience increases the willingness to go to the same store.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your Self-Service Technology experience increases your willingness to use more Self-Service Technologies.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

On a scale 1 (very unimportant) to 7 (very important), please rate the following attributes that self-service technologies have:

	1 = Strongly Disagree	2	3	4	5	6	7 = Strongly agree
Easy to use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Saves time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I want	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Where I want	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Saves money	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Easy to control	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Enjoyable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Convenient	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Low Risk	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Better than the alternative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Block 3: Technology Readiness



On a scale of 1 (strongly disagree) to 7 (strongly agree), please indicate your level of agreement with the following statements:

	1 = Strongly disagree	2	3	4	5	6	7 = Strongly agree
Technology gives people more control over their daily lives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Products and services that use the newest technologies are much more convenient to use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
You prefer to use the most advanced technology available	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

On a scale of 1 (strongly disagree) to 7 (strongly agree), please indicate your level of agreement with the following statements:

	1 = Strongly disagree	2	3	4	5	6	7 = Strongly agree
Other people come to you for advice on new technologies.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In general, you are among the first in your circle of friends to acquire new technology when it appears.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
You keep up with the latest technological developments in your areas of interest.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>


On a scale of 1 (strongly disagree) to 7 (strongly agree), please indicate your level of agreement with the following statements:

	1 = Strongly disagree	2	3	4	5	6	7 = Strongly agree
Technical services are not helpful because they don't explain things in terms you understand.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There should be caution in replacing important people/tasks with technology because new technology can breakdown or get disconnected.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technology always seems to fail at the worst possible time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

On a scale of 1 (strongly disagree) to 7 (strongly agree), please indicate your level of agreement with the following statements:

	1 = Strongly disagree	2	3	4	5	6	7 = Strongly agree
You don't feel confident doing business with a place that can only be reached online.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When you call a business, you prefer to talk a person rather than to a machine.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If you provide information to a machine or over the internet, you can never be sure it really gets to the right place.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Block 4: Innovative Self-Service Store and Amazon Go



Imagine a retail store, which allows you to scan your smartphone as you enter the store, pick up the products you want and leave. After you have left the store, you are charged and sent an automatic receipt. All you need is a smartphone, an online account and the respective app.

	1 = Very unlikely	2	3	4	5	6	7 = Very likely
Willingness to use such self-service retail store.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Higher likelihood to complete a purchase	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>


What are your expected benefits of using such a self-service store?

Are you familiar with Amazon Go?

Yes

No

Block 5: Demographics



You are almost done!

Before you finish, please answer to the following demographic information.

Please select your gender

Male

Female

Please indicate your age

What is your level of education?

None

Lower than Highschool

Highschool or equivalent

Bachelors or equivalent

Masters

Phd

What is your current occupation?

Student

Employed

Unemployed

Retired

Other

Block 6: The End



Thank you for your participation in this research. Your contribution is crucial.

This research seeks to understand how Self-service technologies can solve consumers problems in the retail industry. The goal is to study the relationship between consumers TR (tendency to adopt new technologies), self-service technologies and consumers intentions towards retailers, specially their loyalty to specific retail stores and their willingness to purchase.

If you have any questions, suggestions or comments please use the space below.

To finish, please press the blue arrow button below.



Appendix III: SPSS Analysis Output – Linear Regression Analysis

The relation between Technology Readiness and SSTs adoption by the consumer

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	.539 ^a	.291	.284	.61282	.291	39.394	1	96	.000

a. Predictors: (Constant), TR_Composite

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.794	1	14.794	39.394	.000 ^b
	Residual	36.053	96	.376		
	Total	50.847	97			

a. Dependent Variable: SST_Adoption_Composite

b. Predictors: (Constant), TR_Composite

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.964	.240		20.690	.000
	TR_Composite	.301	.048	.539	6.276	.000

a. Dependent Variable: SST_Adoption_Composite

The relation between Consumers' Satisfaction and Consumers' Loyalty

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	.717 ^a	.515	.510	.64234	.515	108.155	1	102	.000

a. Predictors: (Constant), SST_Satisfaction_Composite

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	44.625	1	44.625	108.155	.000 ^b
	Residual	42.085	102	.413		
	Total	86.710	103			

a. Dependent Variable: SST_Loyalty_Composite

b. Predictors: (Constant), SST_Satisfaction_Composite

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.988	.401		4.956	.000
	SST_Satisfaction_Composite	.686	.066	.717	10.400	.000

a. Dependent Variable: SST_Loyalty_Composite

The relation between Consumers' Satisfaction and Willingness to Purchase

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	.517 ^a	.267	.260	1.242	.267	34.293	1	94	.000

a. Predictors: (Constant), SST_Satisfaction_Composite

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	52.882	1	52.882	34.293	.000 ^b
	Residual	144.952	94	1.542		
	Total	197.833	95			

a. Dependent Variable: Imagine a retail store, which allows you to scan your smartphone as you enter the store, pick up the products you want and leave. After you have left the store, you are charged and sent an automatic receipt. All you need is a smartphone, an online account and the respective app. – Higher likelihood to complete a purchase

b. Predictors: (Constant), SST_Satisfaction_Composite

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.095	.798		1.373	.173
	SST_Satisfaction_Composite	.763	.130	.517	5.856	.000

a. Dependent Variable: Imagine a retail store, which allows you to scan your smartphone as you enter the store, pick up the products you want and leave. After you have left the store, you are charged and sent an automatic receipt. All you need is a smartphone, an online account and the respective app. – Higher likelihood to complete a purchase

The relation between Technology Readiness and Consumers' Willingness to use an Innovative Self-Service Store

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	.485 ^a	.235	.227	.724	.235	29.510	1	96	.000

a. Predictors: (Constant), TR_Composite

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.482	1	15.482	29.510	.000 ^b
	Residual	50.365	96	.525		
	Total	65.847	97			

a. Dependent Variable: Imagine a retail store, which allows you to scan your smartphone as you enter the store, pick up the products you want and leave. After you have left the store, you are charged and sent an automatic receipt. All you need is a smartphone, an online account and the respective app. – Willingness to use such self-service retail store.

b. Predictors: (Constant), TR_Composite

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.930	.284		17.387	.000
	TR_Composite	.308	.057	.485	5.432	.000

a. Dependent Variable: Imagine a retail store, which allows you to scan your smartphone as you enter the store, pick up the products you want and leave. After you have left the store, you are charged and sent an automatic receipt. All you need is a smartphone, an online account and the respective app. – Willingness to use such self-service retail store.