

The Impact of Self-Service Technology (SST) on Customer Experience

Author: Dorise Leda Lima
University of Twente
P.O. Box 217, 7500AE Enschede
The Netherlands

ABSTRACT,

This research investigates the impact of self-service technology (SST) on customer experience in supermarkets. The purpose of this study is to explore the knowledge and perceived experience of customers on SST. Focusing on fulfilling the lack of academical research on how customers handle self-service technologies in supermarkets. The research contributes to customer experience field and technology-based retail services by offering understanding of how people perceive and use SST. Supporting managers and marketers in better comprehending the impact of technology, as well as creating strategies to improve customer experience in supermarkets that offer SSTs as part of their service. To accomplish this study, semi-interviews were conducted, which consisted of asking self-service users open questions, giving them the freedom to engage. The qualitative approach was held with the aim of gaining a deeper knowledge of customers' personal thoughts and feelings about their experience as SST users. Therefore, a total of eleven self-service users were interviewed via Teams and Zoom, specifically six self-scanning users and five self-checkout users. As a way of analyzing the interviews, a software named ATLAS.TI was used to code and combine similar data. Which led to a better interpretation of the user's experience. To finish, key findings suggested that customers' experience can be positively and negatively affected by SST usage. This is because it can be perceived as efficient and convenient in terms of time saving and avoiding long lines. However, SST can present deficiencies such as internal errors or lack of features that prevent users from maximizing their experience, which jeopardizes the shopping process.

Graduation Committee members:

1st Supervisor: Dr. Yasin Sahhar

2nd Supervisor: Dr. Raymond Loohuis

Keywords

Customer experience, self-service technology, SST, SST users, self-scanning, self-checkout.

1. INTRODUCTION

The purpose of this research is to examine the impact of self-services on customer experience in supermarkets.

Technology has been playing a crucial role in the retail industry, which aims to improve customer experience and efficiency. The retail industry is the largest end user self-service technology (P&S Intelligence, 2022). This smart service is also known as SST and emphasizes the usage of technologies to decrease or eliminate the need of human intervention to accomplish a task (Parasuraman et al., 2000). Along with creating and delivering service to customers (Schatsky et al, 2015). It is estimated that there will be a growth rate of 9.8% from 2021 until 2030 of self-service technologies usage in the retail industry (P&S Intelligence, 2022). Thus, SST tends to become more essential in physical shops. Moreover, *“in-store technology is a fast-growing shopping tool spreading in all retail sectors”* (Kim, Lee, Mun & Johnson, 2017; Piotrowicz & Cuthbertson, 2014; Rigby, 2011). In this research shops such as supermarkets will be the primary focus. This is because many grocers are increasingly implementing tech-enabled customer experiences and store operations (McKinsey & Company, 2022). And it is estimated that costs can be reduced by 15% to 30% (McKinsey & Company, 2022). Which shows that integration of technology in grocery stores is advantageous and a future promise.

Furthermore, usage of self-service technologies is increasing, which affects mostly customers and their experience within the store. The impact of SST use on the customers' journey in stores is still a subject that needs to be studied deeply because this phenomenon is expanding fast in the retail market. Thus, it is important to understand the concept of customer experience and factors related to it. The customer experience refers to *“encompassing customers' cognitive, emotional, social, sensory and value responses to the organization's offerings over time, including pre- and post-consumption”* (Kranzbühler et al., 2017; Lemon and Verhoef, 2016, Voorhees et al., 2017). Nowadays companies prioritize customer experience, so they try to provide customers with the best quality service. Which increases customers' satisfaction and leads to other positive outcomes, such as customer loyalty, brand visibility and profitability. In order to enhance and update the quality of customer experience, technology has been implemented in multiple companies and services. This integration in customer experience is related to *“customer usage of any form of in-store technologies while interacting with a retailer”* (Verhoef et al. 2009; Stein & Ramaseshan, 2016). Self-service technologies represent a revolutionary method for companies to deal with customers. Which brings multiple advantages such as convenience, perceived control, transaction speed and easiness to use. With SST, people don't need to wait in lines for several minutes and they can order/purchase their own products, involving less contact with employees. Those can be perceived as an advantage, while for others a challenging situation that leads to customer dissatisfaction and frustration. For this reason, it is important for marketers to comprehend the many effects of the usage of SST on customer experience. To tackle this study, a qualitative approach will be performed, which aims at *“obtaining data through open-ended conversational communication”* (Bhat, 2018). Specifically semi-interviews will be used as a qualitative method that consists of exploring complex concepts, experiences, and opinions (Stolle, 2022), providing a deeper understanding of customer experience.

1.1 Research question

In order to accomplish this study, the following research question was elaborated:

RQ: *How does self-service technology such as self-scanning and self-checkout impact customer experience in supermarkets?*

To support the study and answer the research question, different sub-questions are suggested:

SQ1: How do customers experience self-service technologies?

SQ2: How can self-service technologies be improved to maximize customer experience?

SQ3: How can firms use SST to enhance customer experience?

1.2 Contributions

This study contributes to customer experience field and retail services based on technology. The research aims to explore the knowledge and perceived experience of customers regarding self-service technologies found in supermarkets. To understand both fields, existing literature contributes to obtain a wide range of knowledge on customer experience (Kranzbühler et al., 2017; Lemon & Verhoef, 2016; Voorhees et al., 2017) and its interplay with technology (Verhoef et al. 2009; Stein & Ramaseshan, 2016). Thus, the study aims to add more value to current literature on both domains, focusing on tackling SST users experience in retail industry (Fernandes & Pedroso, 2017; Kazancoglu & Yarimoglu, 2018; Lee et al., 2010, 2013; Orel & Kara, 2014; Stark, 2020). Consequently, a research question was designed to guide the study towards the main topic of the research, which is the impact of self-service technology on customer experience. To support this, sub questions were created in order to investigate deeper aspects of customer experience and its interrelation with technology, leading to other contributions. First sub question aims to explore the customer experience with self-service technologies, providing a deeper insight of user's point of view on the self-service they mostly use and the main causes of usage. This information will demonstrate the benefits and impacts of self-service usage on customer experience. Thus, it will allow managers and marketers to recognize the main advantages and disadvantages that customers give to SSTs. Then, second sub question, requires users view on self-service condition such as features, available options. This will provide hints on how organizations can maximize customer experience through deficiencies perceived by clients. For the last sub question, users' perception on self-service technology and their future expectations will allow organizations to have a deeper insight on how to use self-service technologies to enhance customer experience and what other SSTs could improve customer's experience. Altogether, those different aspects will contribute to managers and marketers to better comprehend the impact of the technology and find strategies to adjust it so customer experience can be enhanced worldwide in supermarkets that incorporate SSTs as part of their service. This enhancement is extremely important for the retail industry, especially because 90% of executives believe that improving customer experience is a managerial priority and critical to a firm's success (Oracle, 2013).

2. LITERATURE REVIEW

This research is primarily focused on understanding the impact of self-service technologies usage on customer experience in the retail industry, more specifically in grocery stores.

2.1 Customer experience in-store

The integration of self-services has an impact on customer experience which can be perceived as an important factor for organizations. Thus, retailers benefit from the adoption of SST to enhance customer shopping.

To understand the impact of SST usage on customer experience and its value, it is important to firstly strengthen knowledge on this concept. Customer experience refers to “*encompassing customers’ cognitive, emotional, social, sensory and value responses to the organization’s offerings over time, including pre- and post-consumption*” (Kranzbühler et al., 2017; Lemon & Verhoef, 2016; Voorhees et al., 2017). Moreover, the term originates from a wide range of interactions between a customer and a service provider (Gentile et al., 2007).

Marketers nowadays benefit from technology to improve customer experience. Combine leads to a technological customer experience, which is related to “*customer usage of any form of in-store technologies while interacting with a retailer*” (Verhoef et al. 2009; Stein & Ramaseshan, 2016). The integration of innovative digital technologies such as mobile, location-based, virtual reality, digital twins, blockchains, AI, wearable technologies, business process automation have become more popular. Many businesses employ these digital technologies as a competitive advantage since they must stay updated to respond to market dynamics and because technology is constantly developing (Kumar & Reinartz, 2016; Leeftang et al., 2014).

Furthermore, according to Poncin & Ben Mimoun (2014), technology “*positively affects the perception of store atmosphere, brings positive emotions and adds shopping value for the customer*”. Moreover, “*the experience with technology affects customers’ purchase decisions, satisfaction and loyalty*” (Fernandes & Pedroso, 2017; Demirci Orel & Kara, 2014; Djelassi, Diallo & Zielke, 2018). However, there are multiple tangible and intangible aspects to consider in in-store environments such as design, music, temperature, and scents (Baker et al., 2002; Puccinelli et al., 2009; Verhoef et al. 2009; Bäckström & Johansson, 2006). Those elements are extremely important because they can influence the amount of money spent on spontaneous purchases (Spies et al., 1997). For this reason, retailers are focusing on innovative technology to improve the customer experience, by adopting smarter in-store technology.

2.1.1 Customer-centric perspective

Customer-centric approach is used by several organizations, which suggests that firms look at what job’s customers need to do (Christensen et al., 2005), how offerings are integrated into customers’ processes (Heinonen et al., 2010; Grönroos & Gummeros, 2014), and how customers integrate resources to co-create value (Vargo & Lusch 2004; 2008; 2016). This will allow organizations to gain a better understanding of customer experience. It is suggested that the lack of a strong customer orientation is why many businesses fail Levitt (1960). Moreover, a customer-centric perspective also suggests that one understands the customer experience instead of only focusing on responses and reactions to interactions with a single firm (Vargo & Lusch 2004; 2008; 2016).

2.2 Smart technology

The incorporation of technology in stores is associated with new opportunities in the retail market and improvement of customer

experience, however it can also lead to possible disadvantages. Both contrasts will be provided and discussed below. But firstly, it is important to gain a deeper insight on smart technologies such as self-service technologies to understand its impact on the customer experience. Thus, a study of the interplay between technology and customer experience was the first step to understanding the topic of the research.

Nowadays technology can be found everywhere, and it can be considered the primary source of innovation. According to Rust and Huang (2014), technology has three important impacts on service: the ability to communicate with customers, the ability to store customer data and the ability to analyze customer data are all improved. This creates new opportunities for organizations to customize service and build customer relationships. Thus, marketers are increasingly benefiting from technology to deliver customers with efficient and high-quality services. For that reason, the concept of “smart technologies” is gaining popularity in the business sector and others. Smart technology is attributed to “*those that can learn from interactions between employees (or firms) and customers, and over time begin to adapt and offer customized, desirable service to customers*” (Marinova et al. 2017). *Smart technologies arise from cognitive computing, which describes a form of self and deep learning that involves high-level data abstraction and nonlinear processes based on input data, adaption, and learning* (Fingar, 2014).”

Smart home devices, smart cities, smart cars, wearable technology, smart healthcare devices and automatized services are a few examples of smart technology that can be easily found. However, in this research, the type of smart service approached is automated services, in particular self-service technology.

2.3 Self-service technology (also known as SST)

The use of self-service technologies is constantly increasing in retail industries, it is estimated a growth rate of 9.8% from 2021 until 2030 (P&S Intelligence, 2022).

SST is an automated technology, that aims to improve service quality, customer satisfaction and increase efficiency and productivity (Fernandes & Pedroso, 2017; Kazancoglu & Yarimoglu, 2018; Lee et al., 2010, 2013; Orel & Kara, 2014; Stark, 2020). This sort of smart service serves as a replacement for personal contact, which means there is low employee involvement at the counter during the customer purchase (Schatsky et al., 2015).

Furthermore, self-service technology includes self-checkout kiosks, self-scanning machines, digital interactive screen store, digital ordering screen (Bulmer et al., 2018). Which can be found in retail industry, such as grocery stores and fast food, the largest end user of self-service technology (P&S Intelligence, 2022).

Standardization technologies such as SST are mainly used for efficiency, which means they are used to achieve greater output with less input (Huang et al., 2017). Standardized technology is applied for routine and repetitive tasks. Moreover, this type of technology is mostly used when demand is homogenous, which means demand is inelastic, so if prices and income increase or decrease, the optimal demand is the same (Huang et al., 2017). When service is a commodity, switching cost is low, however there is a wide range of similar services within the business sector which increases competition (Huang et al., 2017). Moreover, in commodity services, the potential of customer lifetime value is low, this means that low value is attributed to customers relationship with the company. This kind of service can be found in mass production industries such as fast-food chains. Also, it includes self-services such as ATMs, kiosks, self-checkouts. The key characteristics for standardized technologies such as SST are

maximized efficiency, lower costs and add consistency to service delivery (Berry, 1999; Dabholkar, 1996).

2.4 Advantage and disadvantage of SST on customer experience in-store

To understand the pros and cons that arise from self-service technology, it is important to gain insight into how customers experience those technologies. Past studies highlighted several positive factors associated with the use of SST and its impact on customer experience, which can be found below.

2.4.1 Customer loyalty

Studies have shown that enhancing customer experience increases customer satisfaction (Sivadas & Baker-Prewitt, 2000). Which leads to higher satisfaction (Klaus & Maklan, 2013; Chheda et al., 2017).

2.4.2 Transaction speed

The transaction speed in a self-service experience refers to the time it takes to actively complete a transaction via a self-service technology (Dabholkar, 1996). The faster the transaction speed, more value is added to the customer experience. This is because time waste is reduced, which is highly appreciated by clients (Lovelock & Young, 1979). According to Meuter et al. (2000), *“saved time” was a prominent reason given by respondents for a satisfying self-service experience*. Moreover, waiting time is also an important aspect of customer experience, which influences customer satisfaction (Weijters et al., 2007; Djelassi et al., 2018).

2.4.3 Perceived Control

Perceived control from a self-service technology refers to the *“belief in one’s ability to command and exert power over the process and outcome of a self-service encounter”* (Collier & Sherrell, 2009). When customers obtain more control over self-service technologies, the customers’ confidence to explore the SST will increase, which means they are more familiar with the technology and less afraid try different functions in it. This ability to control the SST will allow the customer to learn more about new information and options within the technology (Collier & Sherrell, 2009) that feel in control of self-service process tend to quickly move through menu options and handle easily the entire transaction process (Collier et al., 2009)

Customers who feel in control of the self-service process can quickly move through menu options and more efficiently direct the transaction compared to those who lack control, which can even slow down the process.

2.4.4 Easiness-to-use

Easiness to use refers to *“the degree to which a person believes that using a particular system would be free of effort”* (Davis, Bagozzi & Warshaw, 1989). This is another fundamental factor that affects customers’ experience (Dabholkar et al., 2003; Anitsal & Flint, 2006; Elliott et al., 2012). Thus, the technology is perceived as easy when it doesn’t require much instruction or human interaction to finalize the navigation/purchase process. Moreover, according to Turner and Shockley (2014) customers perceive self-service technologies as having greater value when they are comfortable utilizing them and when close service support is available.

2.4.5 Convenience

In a self-service experience, convenience is perceived as *“the ability to reduce the physical and sometimes cognitive effort to initiate a transaction independent of employee involvement”* (Collier & Sherrell, 2009). According to Dabholkar, Bobbitt and

Lee’s (2003) research in supermarkets on *“willingness to choose self-scanning”*, they highlighted speed and convenience as the main reasons for customers to choose self-service technologies in the first place. The convenience with self-service transactions is that customers can decide when and where the transaction will happen.

However, there are still some cons related to the impacts of SST usage on customer experience. Regardless of the positive impacts of SST mentioned above, customers still prefer to have an employee around in case of needing help. According to Dabholkar et al. (2003) and Anitsal & Flint (2006), despite self-service technologies within stores, employee assistance with the technology and advice are still highly valued by customers. Moreover, employees are expected to be well informed about the products and mindful with customer their needs (Terblanche & Boshoff, 2004).

2.4.6 Frustration and dissatisfaction

Customers can experience a negative reaction towards self-service technology usage, which leads to a dismissive customer experience. Most of the time, self-service technologies are implemented in stores by retailers with no customer guidelines or instructions that teach the customer how to properly benefit from the technology (Collier & Sherrell, 2009). However, retailers expect customers to know how to search through the SST. This lack of instruction can prevent the customer from exploring different options and information within the technology, which limits the customer experience in the store (Collier & Sherrell, 2009). Not to mention that there is little employee assistance for SSTs. Most times, retailers don’t prepare employees in case of self-service failure, this is because organizations are too focused on implementing new SSTs (Collier & Sherrell, 2009). Thus, according to Collier & Sherrell (2009), marketers should first educate themselves before adopting self-service technologies and they should provide employees with essential knowledge on how to use SSTs and help customers.

Those two aspects, lack of instructions and little employee support, affect the customer experience negatively because the customer feels powerless, with no control over the self-service technology, which leads to frustration, and it discourages the customer to proceed and finalize the transaction (Dabholkar et al. 2003). This situation increases customer dissatisfaction.

2.5 Opportunity/Gap

Past studies focus on studying the impact of SST on customer satisfaction and loyalty in stores (Marzocchi & Zammit, 2006; Fernando & Pedroso, 2017; Elliott et al., 2012). Which seems to be one of the drivers for retailers to implement self-service technologies in physical stores such as self-kiosks, handheld scanning. Other investigators focus on how clients expect customers’ experience to be (Bäckström & Johansson, 2006; Bäckström & Johansson, 2017). However, there is a lack of academical research on how customers handle SST usage to improve customer experience. This aspect should be considered critical for organizations because SST are often implemented in stores without any help support to customers or employees (Collier & Sherrell, 2009). Which impacts customer experience positively or negatively according to the degree of the customer’s comprehension on how to use the SST. Thus, it is relevant to study this phenomenon, this will provide retailers with more insight into possible opportunities and challenges related with SST and customer experience. Moreover, the customer-centric perspective will be taken into consideration, to assess SST impacts on customer experience. This study will allow firms to

enhance customer experience based on SST users among supermarkets.

2.6 Theoretical framework

A framework was constructed to better understand customer experience and the factors related to it in this research.

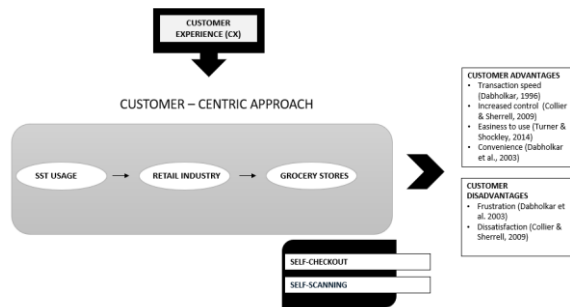


Figure 1. Framework customer experience

The framework above summarizes the different aspects that will be addressed in this research. Customer experience will be the main topic of this study, and other elements will be approached in order to better understand the concept and provide greater insight on how to improve customer experience. Thus, smart technologies are one of the main components of this research, because the study will focus on self-service technologies to enhance customer experience, and their impact. Then, a customer-centric approach will be used to better comprehend customers perspective in their shopping process while using self-service technologies in physical food shops such as grocery stores.

3. METHODOLOGY

3.1 Research design

The aim of the research is to study how self-service technologies (SSTs) impact customer experience in physical stores such as grocery stores. For this, information was acquired about the current SSTs implemented in supermarkets and their impact on customer experience. Moreover, detailed information was obtained on concepts such as SSTs and customer experience. Along with its advantages and disadvantages to customers. To acquire the previously information mentioned, reading through literature was necessary to gain a strong knowledge on customer experience, smart technologies and their advantages and disadvantages for customers. Engines such as Google, Google scholar and Springer were used to find general information and scientific articles.

Furthermore, search terms such as “customer experience”, “smart technology”, “self-service technology”, “SST advantages vs disadvantages”, “impact of SST”, “SST obstacles” were used to find more information needed. Most of the articles related to the topic of customer experience and technology were read. Thus, desk research led to a better insight into the topic of the study and enabled to find a gap and a research question. After the desk search, exploratory data was conducted. A personal observation of self-checkout users in three different supermarkets Auchan in Luxembourg was performed, to better understand customers dynamics while shopping in supermarkets. Along with a personal survey on ten self-scanning users while they were shopping. Those were informed of the study’s nature and consent was given to use their insight in the research. That information contributed to getting familiarized with self-services. Which helped me to write indicated open questions to be asked during the interviews. Desk search, observation and a survey have provided knowledge on customers and most common SSTs used in supermarkets.

To accomplish this research a qualitative approach was chosen, which consists in empirical work that focuses on “obtaining data through open-ended conversational communication” (Bhat, 2018) and it “is used to understand complex concepts, experiences and opinions” (Stolle, 2022). Thus, this approach was considered the most appropriate to undertake because it allows gaining a deeper knowledge of customers’ personal thoughts and feelings when using self-scanning and self-checkouts in supermarkets. So, the qualitative method used in this study is semi-interviews which consists on asking open questions to participants rather than sticking to a strict list of questions, besides it encourages two-way communication (What Is a Semi-Structured Interview?, 2022). Which is relevant to ensure that participants can engage in the conversation and share personal experiences regarding the topic addressed.

3.2 Research setting/case

The research setting comprehended remote interviews that took place via the platform Teams and Zoom. Which allowed data collection even though participants were not physically present. Moreover, remote interviews ensured that participants could participate regardless of their location. This online method was chosen because participants did not always have the availability to meet in person. Additionally, this method also allowed participants and the researcher to have a conversation as if they were face to face, which allowed to obtain a better understanding of participants reaction, feelings, and beliefs. Thus, a semi-interview was conducted to give the candidates the freedom to answer open questions sharing their opinions and views on their personal experience while using self-services.

Furthermore, a sample of eleven self-service users were chosen for this research. The main selection criteria for this research were being a self-service user while doing groceries in supermarkets. Thus, 6 self-scanning users were interviewed individually, with the aim to obtain a better understanding of their experience as customers while using the self-device. Then, other 5 random self-checkout users were also interviewed so insight could be collected about their experience with SSTs in supermarkets as well.

3.3 Data collection

As mentioned above a total of eleven participants were interviewed, which led to a better understanding of their personal experiences with self-services in supermarkets. Before interviewing people, they were contacted through the platform WhatsApp so participation agreement could be settled, and meetings could be arranged via Teams and Zoom. Those interviews were recorded and transcribed at the same time with participants consent. However only the transcripts were used for the study maintaining their names anonymously, to ensure the candidates privacy. Then, recordings were erased at the end of the study to preserve participant’s image.

Furthermore, interviewees were acquaintances of acquaintances of the researcher, and they were all self-service users, which strengthened the reliability of the research because they were able to provide the insight that was needed for the study by sharing their personal experiences as self-service users. Interview questions followed open questions aimed to give candidates the opportunity to express their voices. The open questions ensured consistency within questions; however, sub questions were varied according to candidates answer so more information in depth could be obtained.

After data collection through semi-interviews, transcriptions were written, then coded on account of the software ATLAS.TI. Which is known as a qualitative research tool and it is mainly used “for coding and analyzing transcripts & field notes,

building literature reviews, creating network diagrams, and data visualization” (Research Guides: Qualitative Data Analysis: ATLAS.Ti, 2023). Thus, this software allowed us to label the data collected and to combine similar data. This can be found in the appendix section. Then, the coded data was analyzed, and similarities were found, which led to a better interpretation of the user’s experience. After this, a verification was performed, which means that an overall check of the different aspects mentioned by users was analyzed by the researcher, strengthening the reliability of data results.

4. RESULTS

4.1 Analysis of interviews with self-scanning users

Deeper understanding of the customer’s experience was gained through individual interviews with self-scanning users in grocery shops. Consequently, the impact of self-scanning on customer experience will be analyzed.

Table 4. Positive aspects of self-scanning users on customer experience (found in appendix)

After interviewing six distinct self-scanning users, it was observed some common points on their shopping journey while making use of the self-scanning. Most of the candidates have pointed out as the primary quality of the device, efficiency in terms of timesaving and avoiding long lines. According to them, self-scanning saves their time, and they don’t need to wait in long lines to pay for the articles bought. Which makes the “*whole shopping experience faster*” mentioned candidate 2. This can be perceived as an advantage “*especially when supermarkets are busy*”, stated candidate 4, and as a customer he only needs to checkout by himself and leave the store. This device usage has been perceived as easier and quick for all candidates. Some candidates such as number 1 and 4, have mentioned that efficiency is the main driver for them to use the self-scanning, otherwise the experience would be similar to regular checkouts. Moreover, candidate 4 says that being able to take its own time during the shopping process and at the checkout leads to less stress and a smoother experience. Thus, it is observed that the device provides users with a high level of autonomy, which leads to a better experience.

In addition, candidates have mentioned that self-scanning is easy to use and understandable besides the first time. Some have learnt it by themselves, candidate 4 has described the device as “*pretty intuitive, so it wasn't too big of a deal to use it*”. While others have requested help from an employee, like candidate 5 that had some questions regarding the device, “*How do I connect the self-scanning to the checkout*”, cited. However, after having learnt how it functions, it wasn’t difficult for users to understand the device and use it afterwards. Consequently, it was observed that the self-scanning ease of use tends to facilitate the shopping process of its users.

Another important aspect identified by candidates was the convenience related to self-scanning usage. Candidates 1 and 5 highlighted that the self-scanning allows them to pack their goods in bags while shopping, with no need to pack every single item or scan them once again at the checkout. Moreover, candidate 5 said that the main advantage of packing while shopping is that she can see if the products fit in her bag, because she doesn’t have a car, thus, it is important to estimate the number of products that she is buying. Otherwise, it will be too heavy to walk or cycle with groceries. Thus, in this case self-scanning usage is crucial when purchasing goods in supermarkets.

Furthermore, self-scanning has been labelled as convenient because it allows the customer to manage his finances. Candidate

1 pointed out that with “*the self-scanning’s scan what article you have, and they show you the price of course, but it also adds up in total. So, you already know at the end how much you are going to be spending, and you can of course remove it if you want*”. According to this candidate, this feature allows the customer to not feel embarrassed in case deciding to remove products, because there is nobody to see it. Unlike in regular checkouts or self-checkouts where there are people standing behind waiting. Moreover, candidate 1 as an anxious person, the self-scanning represents a more relaxed shopping process, stating “*especially at the checkout when things can happen either if you didn't want this or if you realize you can't afford it or whatever reason*”. In this case, candidate 3 shared a similar opinion with the previous candidate, mentioning that “*at least you don't have the shame of standing there in front of everybody and not being able to pay by card. You're there alone at the checkout, so nobody sees you. That happens sometimes to me*”. Both insights demonstrate that certain customers prefer to use self-scanning so they can manage their own shopping in case something goes wrong they are less likely to face other people’s judgement and they can handle the situation by themselves. Besides that, the feature of showing the article prices, not only facilitates the customer in terms of keeping track of their expenses, but also it helps the customer because according to candidate 5, “*instead of doing mental calculations you just see everything on the screen*”. On top of that, candidate 3 highlights another convenient “*there are products that do not show the price and with the self-scanning I can immediately know the price*”, so there is no need to ask for any assistance.

4.1.1 Frustration/dissatisfaction

Table 5. Cause of frustration and dissatisfaction among users’ self-service users (found in appendix)

Although the self-scanning has been providing many benefits to its users, there are some aspects of the device that still cause a certain level of frustration or dissatisfaction among its users. It was observed that some of the candidates have experienced bugs regarding the device, such as the machine not responding. Which jeopardizes the entire shopping process. Candidate 2 has mentioned that the self-scanning stopped working while shopping, so he had to look for an employee to help him. Another candidate, 1, has complained about the same issue, stating that “*the system sometimes locks up and I can't scan anything else in the middle of my shopping. This often happens to me. I must get another scan and queue up at customer service. Which takes time*”. Besides, there are other problems identified such as not being able to see the total price of articles before checkout. According to candidate 4, “*I couldn't see like a total amount of the entire price for my entire list that I scanned while shopping. I could only see the total price at the very end I when I was checking out*”. This can be disturbing for customers that are using the self-scanning with the purpose of managing their spendings.

On the other hand, some users have been struggling with removing articles from their shopping list. Candidate 1 mentioned that sometimes it can be complicated because the machine simply doesn’t work. Thus, an employee must be found to solve the problem. She also pointed out that sometimes in order to save time, she tries to remember the product so that at the checkout she can just ask an employee to remove the article from the shopping list. This same issue has also been brought up by candidates 2 and 3 that had to walk in the supermarket to find an employee to help them. Those issues lead to a waste of time and prevent the customer from obtaining a quicker and easier shopping process.

Despite those problems mentioned above, other problems related to promotions have been highlighted. In this case, promotions tend to not appear sometimes in the self-scanning according to candidate 1. Which creates a level of dissatisfaction for the client. Candidate 1 said that *“this is annoying because even if I don't want to go to the cashier, I have to wait in the line and sometimes the employee is busy with another customer. It's so inconvenient”*. This seems to be a problem to customers especially because the purpose of using the self-scanning is to faster the shopping process, rather than complicating it even more. Because of many issues, even though users are comfortable with using the self-scanning, they still appreciate employees standing next to self-checkouts. According to candidate 5, *“no matter you have self-scanning or not, there are still procedures where you might need someone”*. This shows that customers still prefer workers nearby in case of any doubt or struggle. Candidate 6, highlights that the employee at the cash-registers is helpful, *“because if you have any question or something doesn't work, you can ask”*. However, candidate 4 perceived employees in different ways, stating that *“you could see it as someone is there to help you, which is the way I see it”*. But *“I also feel sometimes that they are there to check on you because they don't trust you”*. In this case, candidate 4 shares a similar opinion to candidate 2, that highlights that *“sometimes I do get annoyed but personally if I'm certain that I have scanned everything because I've had both the experience”*. Thus, it is observed that users can perceive employees in two different ways, either as there to help them or as someone to check on them as they are not truthful.

4.2 Analysis of interviews with self-checkout users

Individual interviews were conducted with 5 people to better understand their customer experience as self-checkout users in supermarkets.

Table 6. Positive aspects of self-checkout users on customer experience (found in appendix)

After the interviews, it was observed that the key driver for customers to use self-checkout is efficiency. The candidates perceive the self-machine as an opportunity to save time, avoid long queues and to speed the transaction in an easy way. Candidate 7 quoted *“I prefer self-checkouts because I don't have to wait”*, while for candidate 10 *“it's simply easier and quicker”*. Not to mention that the machine is described as *“quite intuitive”* by candidate 8. Which highlights the easiness of the machine, especially because *“it is clearly explained on the screen”* cited candidate 8, so it is not difficult to navigate through the machine in order to checkout. Those different aspects cited by candidates showed that the self-checkout facilitates their shopping checkout. Moreover, for some such as candidate 7, the self-checkout is also convenient because it allows him to checkout at his own pace, which means there is no need for a rush when it comes to pack or pay its products.

Besides, the efficiency that the self-checkout brings to its users, it was clearly noticed that most users only have a preference to use it when they are buying few products. This is because the self-checkout is not seen as convenient for all types of purchases, which was cited by several candidates. Candidate 8 mentioned that the self-checkout usage depends on the number of items. If she is buying a lot of products, then paying at the cashier would be preferred. She highlights *“if I'm shopping for my whole family, I will rather go to a place where there is a cashier. I don't want to do it myself because there will be too many items to scan”*. Other candidates also shared the same opinion as candidate 8, for example candidate 9 states that *“it would take me a long time to*

scan everything”. Then candidate 11 pointed out that *“there is immediately someone there to scan all products and that's it. Also, if there is a problem, they can directly fix it”*. Those insights demonstrate that users are more willing to use the self-checkout based on the convenience it brings to them. In the case of purchases of high volume, users do not perceive self-checkout as the best option, while for a few products it is the most indicated. Moreover, some candidates also pointed out that self-checkouts are not flexible for bigger purchases because they have limited space to place the articles. Candidate 11 justifies its preference for regular checkouts because *“there is not enough space in the self-checkout for lots of items”*. Sharing the same perspective with all other candidates also brought up to the issue limited space within self-checkouts.

4.2.1 Frustration/dissatisfaction

Table 7. Cause of frustration and dissatisfaction among users' self-service users (found in appendix)

Although the benefits that self-checkout brings to customers, self-checkout users have identified some difficulties that cause them to some degree frustration or dissatisfaction while using the self-checkout. Articles without barcodes have been indicated as one of the main sources of dissatisfaction cited by 3 of the candidates. Candidate 10 mentioned that there are a lot of articles that don't have barcodes to scan them such as muffins, croissants. She highlights *“sometimes I can't find it and then it takes long time. I think they need to have a better system for that because I never know what the name of the product is”*. Then candidate 8 complained about the same issue, but this time about fruits, *“I didn't know which one it was and then I made a mistake, and I couldn't go back so I had to call someone. Also, sometimes the barcode isn't written, or it falls off or something like that and so I'm stuck”*. Along with candidate 11, that also perceived this same problem while buying fruits as well. Stating *“Sometimes I don't even find my article, or I end up choosing the wrong one, so I must call a worker to help me. This whole process takes even more time than expected”*. Those experiences demonstrate that products that don't have barcodes only delay the customer checkout and waste their time, which is the opposite intention of the users, that expect a quick and easy checkout.

Besides, another issue that is pointed out quite often is that fact that users cannot remove the products once they scanned it twice. This shows that there are still supermarkets that are not upgraded enough to make available some features to the customers such as the option to withdraw an article. Candidate 11, 8 and 10 have pointed this same issue. Candidate 11 said that *“I scan the same product twice by mistake and then I have to wait for one of the workers to come help me because I cannot do that in the local supermarkets where I live”*. The absence of this option limits the customer's autonomy to checkout, which is the purpose of the self-checkout, an independent checkout with no intervention of employees.

To conclude it was observed that the absence of barcodes on products and no option to remove products in the screen constitutes one of the main complaints of customers and jeopardizes the checkout.

5. DISCUSSION

5.1 Key Findings

This study investigated the concept of customer experience and how this can be impacted by self-service technologies in the retail industry. Therefore, a research question was posed *“How does self-service technology impact customer experience?”*. To answer this question a qualitative approach was undertaken, with semi-interviews as a method. Which resulted in key findings. The

aim was to explore the impact of two distinct self-services on customer experience, both self-scanning and self-checkout, which are present in supermarkets, and can be used by any customer. Both self-services have demonstrated similarities in customer experience, therefore, they will be interpreted and reflected as a whole.

The findings indicate that most customers perceive self-service technology as efficient in terms of timesaving and avoiding long lines. Which is one of the main reasons for them to use the self-checkouts and self-scanning. This result aligns with Lovelock and Young (1979) that have suggested that customers highly appreciate when time waste is reduced.

Besides self-scanning being perceived as an efficient self-service, it was also pointed out as an easy device to use, considered a *"pretty intuitive, so it wasn't too big of a deal to use it"*, cited candidate 4. The easiness to use of a self-service refers to *"the degree to which a person believes that using a particular system would be free of effort"* (Davis, Bagozzi & Warshaw, 1989), which was mentioned by customers. However, some customers still need help from an employee at the beginning, as candidate 1 and 3. Thus, not all customers share the same response when introduced to new technologies. Which can be an important factor to consider when implementing SSTs in stores. Yet, when customers become familiarized with the technology, they seem to handle it easily afterwards, as candidate 6 mentioned *"for me, the only thing was at beginning that I couldn't take it out. I was struggling a bit, but after it that was fine"*. This finding highlights Turner and Shockley (2014) theory that suggests customers view self-service technologies as having greater value when they are comfortable utilizing them and when close service support is available. Thus, customers still perceive human presence as useful in the shopping process because they can ask for help whenever there is an issue, cited most self-service users in this study. As an example, candidate 3 quotes *"employees can come directly to us and solve it, which is good because there is always someone to fix the problem"*. Which shows that complete automatization in stores could potentially impact customers in an obstructive way.

Another relevant key finding was the convenience customers perceived while using SST. Convenience refers to *"the ability to reduce the physical and sometimes cognitive effort to initiate a transaction independent of employee involvement"* (Collier & Sherrell, 2009). Customers have mentioned the conveniences of self-scanning and self-checkout. Therefore, the study shows that customers can choose convenience over SST. This is because when customers purchase high volumes, they prefer to pay at the regular checkout rather than self-checkouts. According to SST users, it is more convenient when the employee scans all the products for them, leaving less room for mistakes and confusion. This demonstrates that a customer's decision about whether to use the SST depends critically on the level of convenience it offers. Thus, customers aim at convenience while purchasing, which shows that SST is a tool of convenience that can be rejected when there is another more convenient option. This finding was not found in previous literature. It is important to keep in mind when implementing SST, if the SST is not perceived as convenient enough it could be refuted by customers.

Furthermore, the SST quality is not the only concern when making it available but also external aspects related to the SST usage. The self-scanning was perceived as customer unfriendly; this is because it can be uncomfortable and unpractical for users that carry a basket throughout the shopping process. Unlike carts, there is no support for self-scanning which forces customers to hold the self-scanning with one hand and the basket with another one, making difficult the shopping experience. Moreover, the

lack of bags next to self-scanning is another external aspect to consider because according to customers, bags and self-scanning should be closer so they can immediately get a bag to pack their articles while shopping. Both external aspects show that the self-service system is not the only aspect of the SST that impacts the customer's experience. Which was not found in previous literature. It is relevant to review potential external factors that affect users experience and improve it because those can be impacted by aspects that indirectly affect their experience. Another important component is employees, they have demonstrated to be useful during the user's process, supporting them with handling the SSTs. This aligns with existing literature that suggests that despite self-service technologies, customers still highly value employee assistance (Dabholkar et al., 2003; Anitsal & Flint, 2006). Moreover, employees' help is requested by SST users that need assistance with handling SST for the first time, or during the shopping process when issues arise. Along with checking out. Those have illustrated that employees need to be trained on how to handle SST because customers expect them to handle issues that might occur when using SST. This finding supports Terblanche & Boshoff (2004) theory that suggests that employees are expected to be well informed about the products and mindful with customer needs.

In addition, to better explore the main question and respond to it, three sub-questions were also posed so the overall research question could be answered.

SQ1: How do customers experience self-service technologies?

-SST is seen as a way of avoiding long lines, especially self-checkouts in which people scan few products. This is perceived as a time saving.

-Some customers use self-scanning to manage their finances because they can check overall price of items during the shopping process. Additionally, users can pack their own items in bags in their own pace, which makes them feel less stressed. Both aspects are highly convenient.

-Checking out with self-scanning is much faster because all products were already scanned, which is the reason most of self-scanning users like this product.

-Self-scanning and self-checkout usage make customers feel more independent and in control of their entire shopping process.

-Self-checkouts are targeted by most of users when they buy few articles. Which facilitates checkouts according to them. However, when buying lots of products, they prefer regular checkouts to avoid confusion while scanning. Thus, they feel that self-checkouts are not adaptable to high volume purchases.

-Self-checkout users feel that using the SST avoids them of embarrassment when paying in case their cards do not work.

-Some have faced problems with scanning items without barcodes such as fruits and bread. Which made them waste time calling an employee.

-Others have experienced machine errors with the self-scanning, experiencing bugs during the shopping process.

-Without any knowledge of how to use the self-scanning, some requested help from an employee at the beginning.

-There are few instructions about self-scanning, thus it is difficult for some to have a deeper understanding of all features. Thus, some are not able to remove the products from the screen.

-Employees are perceived as useful and have helped some during the shopping process, but sometimes they can be inconvenient while checking if people have scanned all articles.

-Self-checkouts have been labelled as having small space to place articles, so for users it can become confusing while scanning

products because they mix products at the checkout due to limited space.

-Customers have to call an employee to remove an article that was scanned twice by mistake in self-checkouts, which was described as inconvenient.

To conclude, the impact of SSTs on customer experience varies according to several factors, such as level of efficiency, convenience, and technology ease that it provides to customers. Those can be perceived as an advantage, as well as a source of dissatisfaction and frustration when mishandled.

SQ2: How can self-service technologies be improved to maximize customer experience?

-According to users, self-scanning should have less bugs such as inability to read promotions because once there is a problem in the system, they must look for assistance, which makes them waste time.

-Self-scanning could have more instructions because users struggle to find important features such as removing a product they do not want anymore.

-Self-checkouts do not scan articles without barcodes, so people must search it through the menu and sometimes do not find the article. Which difficult the whole self-checkout process. Thus, a better system should fix this issue. -Self-checkouts have limited space, which is not flexible enough for high volume purchases, one of the main complaints of users. Thus, bigger self-checkouts could be implemented.

-Users were not able to remove articles that were scanned twice by mistake from the self-checkout, so they must call employees to fix it, which makes the process less independent and time consuming.

To conclude, there are several factors that can be improved, ranging from internal to external aspects. Both are important to be considered and improved in order to maximize customer experience.

SQ3: How can firms use SST to enhance customer experience?

-Self-checkouts that are able to scan all products by themselves and that are made for high volume purchases, with no limited space. Along with new features within the search menu, increasing customers autonomy during the process.

To conclude, customers expect updated self-service machines that allow them to have a fast and innovative shopping experience.

5.2 Contributions

Considering the key findings from the previous section, several theoretical contributions were made. Following the lead of its title, this study contributes to understanding the impact of self-service usage on customer experience in supermarkets.

First, this research focused on deep understanding of customer experience when dealing with self-service technology. According to scholars, customer experience and technology can be defined as “customer usage of any form of in-store technologies while interacting with a retailer” (Verhoef et al. 2009; Stein & Ramaseshan, 2016). The interlink is often seen in the retail industry, which is used as a competitive advantage to many businesses to leverage their service and customer satisfaction (Kumar & Reinartz, 2016; Leeflang et al., 2014). This research offers a deeper understanding of how self-service affects customers’ experience in supermarkets. The findings imply that the main reason for customers to use self-service is the efficiency and convenience that it brings to them, such as time saving. As Meuter et al. (2000) suggested, “saved time” was a

prominent reason given by respondents for a satisfying self-service experience. Self-service can be a source of efficiency and convenience, which are aspects of high value for customers. However, this research concurs that customers only use self-service because of the benefits they see in it, but if the SST proves to be unsatisfactory in terms of efficiency and convenience compared to traditional methods of purchasing, customers are willing to shift from technology to conventional ways of shopping.

Second, customer experience has shown that it must be understood in order to be improved. Scholars have suggested that one understands the customer experience instead of only focusing on responses and reactions to interactions with a single firm (Vargo & Lusch 2004; 2008; 2016). Thus, in this study, customer experience was thoroughly explored, and the results suggest that customers are impacted not just by the internal self-service deficiencies such as errors, bugs, lack of features but also external aspects. Moreover, little is known about external aspects of SST that impact customers’ experience. Yet, in this research, it was found that external factors of SST play a significant role in how the customer experience is impacted. Two aspects were detected, the lack of shopping bags at the entrance of supermarkets next to self-scanning. Along with, baskets not being adaptable for self-scanning users. Both are considered external factors, because they are not related to SST system or deficiencies, but still are crucial to SST usage.

Finally, customers’ views were prioritized in this research, supporting a customer-centric approach. Which places customer as the primary source of any business decisions (Vargo & Lusch 2004; 2008; 2016). This research contributes to acknowledge customer’s expectations regarding SST, so user needs can be fit with their expectations. Previous literature demonstrated a lack of academical research on how customers handle SST usage to improve customer experience. This paper suggests that in order to match user demands with consumer expectations, it is important first to recognize what customers expect from SST. Thus, SST can be improved.

5.3 Managerial implications

5.3.1 Managerial implications for self-scanning

After interviewing the self-scanning users, it was possible to obtain a deeper understanding of their experience as customers and what aspects could be improved in the self-scanning to enhance the customer experience. This insight will allow managers to improve their service quality and provide customers with a better experience when using the self-scanning. Firstly, the supermarkets should improve the self-scanning system in order to decrease bugs within the self-scanning, this problem solved it will incrementally save customers time, because they usually need to walk all over the supermarket to find assistance whenever there is a problem in the system. Then, another internal issue related to the device in some supermarkets is the inability to automatically scan promotions, which forces the users to go through regular checkouts, which was mentioned by candidate 1. Other than that, users should also be able to delete the articles they do not want any more from their shopping list while using the self-scanning, asked candidate 3. It is believed that this option is already possible for some self-scanning, however this is an important feature to keep in mind while making self-scanning available to customers within supermarkets. Otherwise, it jeopardizes the autonomy of users during the shopping process. Furthermore, there are other improvements related to self-scanning that were pointed out by candidates. Those improvements are external, which means they are not directly related to the self-scanning system but with its overall usage. More instructions on how to use the device could be provided

stated candidate 6. This can prevent the customer from looking for an employee only to ask small questions. Then, candidate 4 has suggested an adaptable basket within the stores in which self-scanning's could be placed. As is known, the self-scanning's are already adjustable to the supermarket carts. But there is no adjustment for baskets. Thus, focusing on making the product more customer friendly would improve the customer experience.

Apart from that, bags are required at the entrance next to self-scanning because it facilitates users that didn't bring or forgot their own bags. This way they can directly pack their articles while shopping. This has been pointed out by candidate 5, that constantly forgets own bags, especially because packing everything while buying saves her time. Otherwise, self-scanning is not as efficient without a bag.

5.3.2 Managerial implications for self-checkout

After interviewing distinct self-checkout users, it was possible to determinate with users help which aspects could be improved within the self-checkout. This will allow managers to enhance customer experience in supermarkets. The first issue to address is products without barcodes. Those seem to represent a disturbance for most self-checkout users, making the checkout confusing and unpleasant. To solve this problem and even facilitate the entire checkout process, candidate 7 and 11, have suggested a self-checkout like the ones that can be found in Decathlon, *"you just put your product and it scans itself, you don't have to scan it, you just put it there. And for example, if you have three articles, you would just put them there and you would scan automatically"* cited candidate 7. While candidate 11 reassures that *"it would improve my experience especially when it comes to products without a bar code like fruits, where I have a bit more difficulty to find them in the machine"*. This type of machine could be the new revolutionary machine that will also allow companies to increase control within the supermarkets in order to avoid robberies, and at the same time facilitate the customer experience.

Besides, the limited space of self-checkout prevents people that are buying high volume purchases from using the machine, which seems to be one of the main reasons customers do not always opt for self-checkouts. Candidate 10 highlights that *"when there are a lot of things it's confusing to me. Sometimes I don't even know what I scanned"*. Thus, it would be wise to focus on improving this aspect of checkouts. This could be easily solved by a self-machine that automatically all products as mentioned above.

To finish, candidates suggest *"an option to maybe go back, or you delete the articles"*, cited candidate 8. This shows that managers should focus on making available updated self-checkouts, because customers are more demanding these days, and expect to be as independent as possible while checking out.

5.4 Limitations and Future Research Avenues

Data collection for this research was not difficult to obtain because people usually use self-service technologies, especially self-checkouts. However, finding self-scanning users was a bit more demanding because most of acquaintances were not familiar with the device. Furthermore, a limited number of users was interviewed, which can have an impact on findings. Only eleven users were interrogated, which can result in limited findings. With a larger sample, more results could have been found and concluded. But due to the nature of this research, it wasn't possible to study very large samples. Future research should focus on studying a larger sample of self-service users, to obtain a wide and diverse perspective of customers. Which leads to more insight and input for the research and allows to draw more conclusions on customers experience. Not to mention that

a large sample of users would increase the validity of the study, because users experience could be analyzed from different angles and views. Strengthening the reliability of the research.

Moreover, exploring the customers experience in supermarkets has provided new ideas to improve the self-services so it can fit customers' expectations, however due to the limited number of samples, it is believed that more ideas could have been arise if samples were bigger. Thus, future research should focus on larger samples once again, with the aim to explore in depth users experience and knowledge about self-services.

To finish, not all users were from the same country in this study, which lead to different results, which could have been a limitation for the research. But it became a new insight. It was noticed that self-service update varies across countries in Europe which impacts users differently. Future research should aim to study the impact of technology advancement on customer experience, because the lack of modernization has proven in this research to be one of the key drivers of dissatisfaction among users. Also, a study comparing the level of modernization of self-services could be conducted in multiple sectors, including retail. This will allow marketers to have a better understanding of what should be modified within the self-services, so customers experience is improved.

6. CONCLUSION

In general, it can be concluded that self-service technology impacts customers positively and negatively in diverse ways during the shopping process. The self-service technology, more specifically the self-scanning and self-checkout, impact positively its customers by facilitation the shopping process due to its easiness and rapidity. Which leads to avoiding long queues and time waste. Moreover, it also provides users with a prominent level of autonomy, which is appreciated by the majority. However, it was concluded that the entire concept is rapidly jeopardized when self-technology presents any system error, delaying the complete process.

When it comes to self-scanning it was concluded major inconveniences are related to system error such as machine not responding and absence of certain features. While for the self-checkout it was concluded that the machine is not flexible to all kinds of products such as bar codeless articles. Moreover, there are still self-checkouts that do not give customers full autonomy to manage checkout such as the ability to delete articles. Those aspects negatively impact customer experience, because the SSTs do not meet customers' expectations in terms of efficiency and convenience, which leads to frustration and dissatisfaction during the shopping process.

On the other hand, it is possible to assume now that SST usage is related to the degree of efficiency and convenience that it brings to customers. This is because customers choose whether to use the self-technology according to their situation. For example, customers choose not to use self-checkouts while purchasing high volume, because it is inconvenient and inefficient for them to scan all products. Opting for regular checkouts. From those aspects, it is feasible to conclude that SSTs usage has its benefits, and that improving the SSTs system could enhance the customer experience even more.

Overall, the implementation of technology in supermarkets has demonstrated to be an advantage for customers and supermarkets because it facilitates the whole shopping process, however it is extremely important that marketers and managers keep monitoring those technologies and updating them so they can fit customers expectations. Thus, it is necessary to seek innovative ways to keep the process smooth and uncomplicated. Otherwise,

installing technologies in supermarkets can become ineffective, leading to complaints and frustrations.

7. ACKNOWLEDGEMENTS

I take this opportunity to express my gratitude to all people that made a significant contribution to the development and accomplishment of this research.

I want to start by thanking my supervisor Dr. Yasin Sahhar for assisting me and helping me during this research.

Subsequently, my sincere appreciation to all interviewees that offered a little of their time to take part in this study. It made a significant impact.

Last but not least, I want to express my appreciation to my mom for always being there for me and devoting my constant effort to you, to us.

8. REFERENCES

- Anitsal, I. & Flint, D. J. (2006). Exploring Customers' Perceptions in Creating and Delivering Value: Technology-Based Self-Service as an Illustration, *Services Marketing Quarterly*, vol. 27, no. 1, pp. 57–72.
- Auchan. (2023). Auchan. Retrieved May 30, 2023, from <https://www.auchan.lu/en/content/service/easy-scan>
- Bäckström, K. & Johansson, U. (2006). Creating and Consuming Experiences in Retail Store Environments: Comparing Retailer and Consumer Perspectives, *Journal of Retailing and Consumer Services*, vol. 13, no. 6, pp. 417–430.
- Bäckström, K. & Johansson, U. (2006). Creating and Consuming Experiences in Retail Store Environments: Comparing Retailer and Consumer Perspectives, *Journal of Retailing and Consumer Services*, vol. 13, no. 6, pp. 417–430.
- Bäckström, K. & Johansson, U. (2017). An Exploration of Consumers' Experiences in Physical Stores: Comparing Consumers' and Retailers' Perspectives in Past and Present Time, *The International Review of Retail, Distribution and Consumer Research*, vol. 27, no. 3, pp. 241–259.
- Baker, J., Parasuraman, A., Grewal, D. & Voss, G. B. (2002). The Influence of Multiple Store Environment Cues on Perceived Merchandise Value and Patronage Intentions, *Journal of Marketing*, vol. 66, no. 2, pp. 120–141.
- Berry, L. L. (1999). *Discovering the soul of service*. New York: Free.
- Bhat, A. (2018, March 27). Qualitative Research: Definition, Types, Methods and Examples. QuestionPro. <https://www.questionpro.com/blog/qualitative-research-methods/>
- Business Process: Self Checkout. (2019). World's #1 POS for Magento. Retrieved May 30, 2023, from <https://www.magestore.com/self-checkout-systems-in-retail/>
- Chheda, S., Duncan, E. & Roggenhofer, S. (2017). Putting customer experience at the heart of next-generation operating models, McKinsey, 17 March, Available online: <https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/putting-customerexperience-at-the-heart-of-next-generation-operating-models>.
- Christensen, C. M., Cook, S., & Hall, T. (2005). Marketing malpractice: The cause and the cure. *Harvard Business Review*, 1-9.
- Collier, J. E. & Sherrell, D. L. (2009, November 10). Examining the influence of control and convenience in a self-service setting - *Journal of the Academy of Marketing Science*. SpringerLink. <https://doi.org/10.1007/s11747-009-0179-4>
- Dabholkar, P. A. (1996). Consumer evaluations of new technologybased self-service options: an investigation of alternative models of service quality. *International Journal of Research in Marketing*, 13(1), 29–51.
- Dabholkar, P. A., Michelle Bobbitt, L. & Lee, E. (2003). Understanding Consumer Motivation and Behavior Related to Self-scanning in Retailing: Implications for Strategy and Research on Technology-based Self-service, *International Journal of Service Industry Management*, vol. 14, no. 1, pp. 59–95.
- Dabholkar, P. A., Michelle Bobbitt, L. & Lee, E. (2003). Understanding Consumer Motivation and Behavior Related to Self-scanning in Retailing: Implications for Strategy and Research on Technology-based Self-service, *International Journal of Service Industry Management*, vol. 14, no. 1, pp. 59–95.
- Davis, F.D., Bagozzi, R.P. & Warshaw, P.R. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Management Science*, vol. 35, no. 8, pp. 982–1003.
- Demirci Orel, F. & Kara, A. (2014). Supermarket Self-Checkout Service Quality, Customer Satisfaction, and Loyalty: Empirical Evidence from an Emerging Market, *Journal of Retailing and Consumer Services*, vol. 21, no. 2, pp. 118–129.
- Djelassi, S., Diallo, M. F. & Zielke, S. (2018). How Self-Service Technology Experience Evaluation Affects Waiting Time and Customer Satisfaction? A Moderated Mediation Model, *Decision Support Systems*, vol. 111, pp. 38–47.
- Djelassi, S., Diallo, M. F. & Zielke, S. (2018). How Self-Service Technology Experience Evaluation Affects Waiting Time and Customer Satisfaction? A Moderated Mediation Model, *Decision Support Systems*, vol. 111, pp. 38–47.
- Elliott, K., Meng, G. & Hall, M. (2012). The Influence of Technology Readiness on the Evaluation of Self-Service Technology Attributes and Resulting Attitude Toward Technology Usage, *Services Marketing Quarterly*, vol. 33, no. 4, pp. 311–329.
- Elliott, K., Meng, G. & Hall, M. (2012). The Influence of Technology Readiness on the Evaluation of Self-Service Technology Attributes and Resulting Attitude Toward Technology Usage, *Services Marketing Quarterly*, vol. 33, no. 4, pp. 311–329.
- Fernandes, T. & Pedroso, R. (2017). The Effect of Self-Checkout Quality on Customer Satisfaction and Repatronage in a Retail Context, *Service Business*, vol. 11, no. 1, pp. 69–92.
- Fernandes, T. & Pedroso, R. (2017). The Effect of Self-Checkout Quality on Customer Satisfaction and Repatronage in a Retail Context, *Service Business*, vol. 11, no. 1, pp. 69–92.
- Fingar, P. (2014). Extreme competition: The fourth industrial revolution. *BPTrends*, (December 1) <http://www.bptrends.com/extremecompetition-the-fourth-industrial-revolution/>.
- Fuentes, C., Bäckström, K. & Svingstedt, A. (2017). Smartphones and the reconfiguration of retailscapes: Stores, shopping and digitalization, *Journal of Retailing and Consumer Services*, vol. 39, pp. 270-278.
- Gentile, C., Spiller, N. and Noci, G. (2007), “How to sustain the customer experience: an overview of experience components that co-create value with the customer”, *European Management Journal*, Vol. 25 No. 5, pp. 395-410.

- Grönroos, C. & Gummerus, J. (2014). The service revolution and its marketing implications: Service logic versus service-dominant logic. *Managing Service Quality*, 24(3), 206-229.
- Heinonen, K., Strandvik, T., Mickelsson, K., Edvardsson, B., Sundström, E., & Andersson, P. (2010). A customer-dominant logic of service. *Journal of Service Management*, 21(4), 531-548.
- Kim, H.-Y., Lee, J. Y., Mun, J. M. & Johnson, K. K. P. (2017). Consumer Adoption of Smart InStore Technology: Assessing the Predictive Value of Attitude versus Beliefs in the Technology 75 Acceptance Model, *International Journal of Fashion Design, Technology and Education*, vol. 10, no. 1, pp. 26–36.
- Klaus, P. P. & Maklan, S. (2013). Towards a better measure of customer experience. *International Journal of Market Research*, vol. 55, no. 2, pp. 227-246.
- Kranzbühler, A.M., Kleijnen, M.H.P., Morgan, R.E. and Teerling, M. (2017), “The multilevel nature of customer experience research: an integrative review and research agenda”, *International Journal of Management Reviews*, Vol. 20 No. 2, pp. 433-456.
- Kumar, V. and Reinartz, W. (2016), “Creating enduring customer value”, *Journal of Marketing*, Vol. 80 No. 6, pp. 36-68.
- Leefflang, P.S.H., Verhoef, P.C., Dahlström, P. and Freundt, T. (2014), “Challenges and solutions for marketing in a digital era”, *European Management Journal*, Vol. 32 No. 1, pp. 1-12.
- Lemon, K.N. and Verhoef, P.C. (2016), “Understanding customer experience throughout the customer journey”, *Journal of Marketing*, Vol. 80 No. 6, pp. 69-96.
- Levitt, T. (1960). Marketing myopia. *Harvard Business Review*, 38(4), 45-56.
- Lovelock, C. H., & Young, R. F. (1979). Look to consumers to increase productivity. *Harvard Business Review*, 57(3), 168–178.
- Marinova, D., de Ruyter, K., Huang, M. H., Meuter, M., & Challagalla, G. (2017). Getting smart: Learning from technology-empowered frontline interactions. *Journal of Service Research*, 20(1), 297–42.
- Marzocchi, G. L. & Zammit, A. (2006). Self-Scanning Technologies in Retail: Determinants of Adoption, *The Service Industries Journal*, vol. 26, no. 6, pp. 651–669.
- Meuter, M. L., Ostrom, A. L., Roundtree, R. I., & Bitner, M. J. (2000). Self-service technologies: understanding customer satisfaction with technology-based service encounters. *Journal of Marketing*, 64, 50–64.
- Oracle (2013). Global insights on succeeding in the customer experience era. Retrieved from <http://www.oracle.com/us/global-cx-study-2240276.pdf>
- Orel F, Kara A (2014) Supermarket self-checkout service quality, customer satisfaction, and loyalty: empirical evidence from an emerging market. *J Retail Consum Serv* 21(4):118–129. doi:10.1016/j.jretconser.2013.07002
- Parasuraman, R., Sheridan, T. B., & Wickens, C. D. (2000). A model for types and levels of human interaction with automation. *IEEE Transactions on Systems, Man, and Cybernetics-Part A: Systems and Humans*, 30(3), 286–97.
- Piotrowicz, W. & Cuthbertson, R. (2014). Introduction to the Special Issue – Information Technology in Retail: Toward Omnichannel Retailing, *International Journal of Electronic Commerce*, vol. 18, no. 4, pp. 5-15.
- Poncin, I. & Ben Mimoun, M. S. (2014). The Impact of “e-Atmospherics” on Physical Stores, *Journal of Retailing and Consumer Services*, vol. 21, no. 5, pp. 851–859.
- Puccinelli, N. M., Goodstein, R. C., Grewal, D., Price, R., Raghubir, P. & Stewart, D. (2009). Customer Experience Management in Retailing: Understanding the Buying Process, *Journal of Retailing*, vol. 85, no. 1, pp. 15–30.
- Research Guides: Qualitative Data Analysis: ATLAS.ti. (2023, June 1). NYU Libraries. <https://guides.nyu.edu/QDA/atlasti> Collier, J. E., & Sherrell, D. L.
- Rigby, D. K. (2011). The Future of Shopping, *Harvard Business Review*, Available Online: <https://hbr.org/2011/12/the-future-of-shopping> [Accessed 18 March 2020].
- Rust, R. T., & Huang, M. H. (2014). The service revolution and the transformation of marketing science. *Marketing Science*, 33(2), 206–221.
- Schatsky, D., Muraskin, C., & Gurumurthy, R. (2015). Cognitive technologies: The real opportunities for business. *Deloitte Review*, 16, 115–129.
- Self-Service Technology Market Growth Insights, 2022-2030. (2022). P&S Intelligence. Retrieved April 2023, from <https://www.psmarketresearch.com/market-analysis/self-service-technology-market>
- Sivadas, E. & Baker-Prewitt, J. L. (2000). An examination of the relationship between service quality, customer satisfaction, and store loyalty, *International Journal of Retail & Distribution Management*, vol. 28, no. 2, pp. 73-82.
- Spies, K., Hesse, F. & Loesch, K. (1997). Store atmosphere, mood and purchasing behaviour, *International Journal of Research in Marketing*, vol. 14, pp. 1–17.
- Stein, A. & Ramaseshan, B. (2016). Towards the Identification of Customer Experience Touch Point Elements, *Journal of Retailing and Consumer Services*, vol. 30, pp. 8–19.
- Stein, A. & Ramaseshan, B. (2016). Towards the Identification of Customer Experience Touch Point Elements, *Journal of Retailing and Consumer Services*, vol. 30, pp. 8–19.
- Stolle, S. (2022, February 9). Qualitative Research ~ Advantages & Disadvantages. *Qualitative Research ~ Advantages & Disadvantages*. <https://www.bachelorprint.eu/methodology/qualitative-research/>
- Terblanche, N. S. & Boshoff, C. (2004). The in-store shopping experience: A comparative study of supermarket and clothing store customers, *South African Journal of Business Management*, vol. 35, no. 4, pp. 1-10.
- Turner, T. & Shockley, J. (2014). Creating Shopper Value: Co-Creation Roles, In-Store SelfService Technology Use, and Value Differentiation, *Journal of Promotion Management*, vol. 20, no. 3, pp. 311–327.
- Vargo, S. L & Lusch, R. F. (2004). Evolving to a new dominant logic for marketing. *Journal of Marketing*, 68, 1-17.
- Vargo, S. L. & Lusch, R. F. (2008). Service-dominant logic: continuing the evolution. *Journal of the Academy of Marketing Science*, 36, 1-10.
- Vargo, S. L. & Lusch, R. F. (2016). Institutions and axioms: An extension and update of service-dominant logic. *Journal of the Academy of Marketing Science*, 44(1), 5-23.
- Verhoef, P. C., Lemon, K. N., Parasuraman, A., Roggeveen, A., Tsiros, M. & Schlesinger, L. A. (2009). Customer Experience Creation: Determinants, Dynamics and Management Strategies, *Journal of Retailing*, vol. 85, no. 1, pp. 31–41.

Verhoef, P. C., Lemon, K. N., Parasuraman, A., Roggeveen, A., Tsiros, M. & Schlesinger, L. A. (2009). Customer Experience Creation: Determinants, Dynamics and Management Strategies, *Journal of Retailing*, vol. 85, no. 1, pp. 31–41.

Verhoef, P. C., Lemon, K. N., Parasuraman, A., Roggeveen, A., Tsiros, M. & Schlesinger, L. A. (2009). Customer Experience Creation: Determinants, Dynamics and Management Strategies, *Journal of Retailing*, vol. 85, no. 1, pp. 31–41.

Voorhees, C.M., Fombelle, P.W., Gregoire, Y., Bone, S., Gustafsson, A., Sousa, R. and Walkowiak, T. (2017), “Service encounters, experiences and the customer journey: defining the field and a call to expand our lens”, *Journal of Business Research*, Vol. 79, October, pp. 269-280.

Weijters, B., Rangarajan, D., Falk, T. & Schillewaert, N. (2007). Determinants and Outcomes of Customers’ Use of Self-Service Technology in a Retail Setting, *Journal of Service Research*, vol. 10, no. 1, pp. 3–21.

What Is a Semi-Structured Interview? (2022, May 28). The Balance. <https://www.thebalancemoney.com/what-is-a-semi-structured-interview-2061632>

Appendix

Explorative data: Self-scanning Survey: Questions asked to 10 self-scanning users in Auchan in Kichberg, Luxembourg, 19/05/2023.

Question 1: Do you often come to Auchan? Is it related to SST?

Question 2: Why do you prefer using SST?

Question 3: How did you learn how to use SST?

Question 4: When do you solicit assistance?

Explorative data: 3 Supermarket “Auchan” – Observation of customer dynamics in Luxembourg -

Table 1. Observation of customers at self-checkout in Cloche d’Or, Luxembourg, 17/05/2023

	= Number of items	Gender	Age Range	Employee Intervention	Payment type
Customer 1	10	Couple: Female and Male	50-60	No	Card
Customer 2	2	Male	40-50	No	Card
Customer 3	3	Female	40-50	Yes	Card
Customer 4	5	Male	50-60	No	Cash
Customer 5	10	Female	25-35	Yes	Card
Customer 6	6	Female	40-50	No	Card
Customer 7	3	Male	20-25	No	Card
Customer 8	5	Male	20-25	No	Card
Customer 9	4	Male	40-50	No	Cash
Customer 10	4	Male	20-30	Yes	Card
Customer 11	2	Male	45-55	Yes	Cash
Customer 12	6	Male	25-35	Yes	Cash
Customer 13	2	Female	18-25	No	Card
Customer 14	3	Female	20-25	No	Cash
Customer 15	5	Female	20-25	Yes	Cash
Customer 16	1	Female	35-45	No	Card
Customer 17	3	Male	35-45	No	Card
Customer 18	1	Male	40-50	No	Cash
Customer 19	2	Male	>18	No	Cash
Customer 20	2	Female	40-50	Yes	Cash

Table 2. Observation of customers at self-checkout in Differdange, Luxembourg, 16/05/2023

	= Number of items	Gender	Age Range	Employee Intervention	Payment type
Customer 1	2	Female	30-40	Yes	Card
Customer 2	3	Female	20-30	Yes	Card
Customer 3	5	Female	25-35	Yes	Cash
Customer 4	1	Male	20-30	No	Card
Customer 5	1	Female	30-40	Yes	Card
Customer 6	10	Female	20-30	No	Card
Customer 7	4	Male	18-25	No	Card
Customer 8	5	Male	25-30	No	Card
Customer 9	2	Male	40-50	No	Card
Customer 10	2	Male	>18	No	Cash
Customer 11	2	Male	40-50	Yes	Cash
Customer 12	7	Female	25-35	Yes	Card
Customer 13	1	Male	30-40	No	Card
Customer 14	4	Male	>18	No	Cash
Customer 15	1	Female	20-30	No	Card
Customer 16	1	Female	20-30	No	Card
Customer 17	1	Male	20-30	No	Card
Customer 18	1	Male	30-40	No	Card
Customer 19	2	Male	30-35	No	Card
Customer 20	2	Male	>18	No	Cash

Table 3. Observation of customers at self-checkout in Kichberg, Luxembourg, 15/05/2023

	= Number of items	Gender	Age Range	Employee Intervention	Payment type
Customer 1	more than 10	Female	40-50	Yes	Card
Customer 2	3	Male	30-40	No	Cash
Customer 3	3	Female	20-25	Yes	Cash
Customer 4	3	Couple: Female and Male	30-40	Yes	Card
Customer 5	2	Male	40-50	No	Card
Customer 6	7	Male	35-45	No	Card
Customer 7	3	Female	40-50	No	Card
Customer 8	2	Female	15-20	No	Cash
Customer 9	10	Female	30-40	Yes	Card
Customer 10	10	Male	30-40	Yes	Card
Customer 11	5	Couple: Female and Male	30-40	No	Card
Customer 12	8	Couple: Female and Male	20-25	No	Card
Customer 13	1	Male	40-50	No	Card
Customer 14	1	Male	60-65	No	Card
Customer 15	2	Male	20-30	No	Card
Customer 16	3	Female	30-40	Yes	Card
Customer 17	7	Male	30-40	No	Card
Customer 18	9	Female	20-25	No	Card
Customer 19	3	Female	20-25	No	Card
Customer 20	7	Male	40-50	Yes	Cash

Interview questions for self-checkout users

1. How often do you use the self-checkout?
2. When did you start using self-checkout?
3. How did you learn to use the self-checkout in supermarkets?
4. How do you perceive the self-checkouts at the supermarket? How does the self-checkout improve your customer experience?
5. What challenges have perceived with checkout process or payment options while using self-checkouts?
6. How do you perceive employees next to self-checkouts? How does it improve your customer experience?
7. What changes you would like to be implemented in the self-scanning to improve your customer experience?
8. To what extent have you experienced any frustration related to the use of self-scanning?

Interview questions for self-scanning users

1. How often do you use the self-scanning?
2. When did you start using self-scanning?
3. How did you learn to use the self-scanning system?
4. How do you perceive the self-scanning at the supermarket? What advantages does it bring to you?
5. What difficulties have you experience in using the self-scanning?
6. Can you tell me more about your experience of combining self-scanning with self-checkouts? Did you have any difficulties at first or do you face any difficulties often?
7. How do you perceive employees at cash-registers?
8. What changes you would like to be implemented in the self-scanning to improve your customer experience?

9. To what extent have you experienced any frustration related to the use of self-scanning? Or anything ever caused you dissatisfaction while using self-scanning? Tell me more about it.

Coding interview with software ATLAS.IT

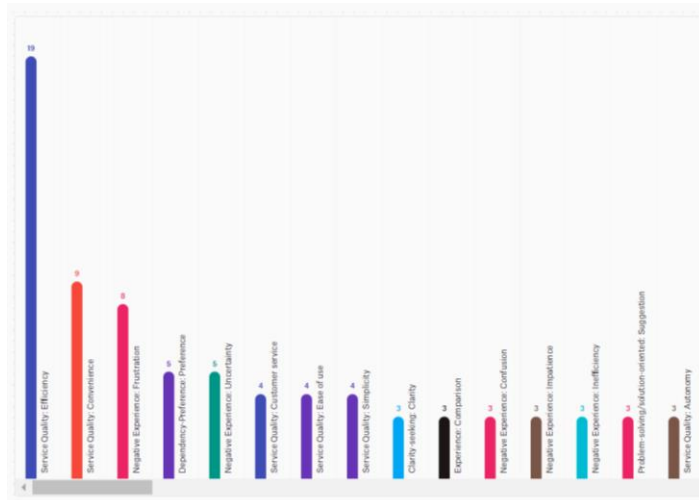


Fig.2: coding software ATLAS.IT for self-scanning interviews

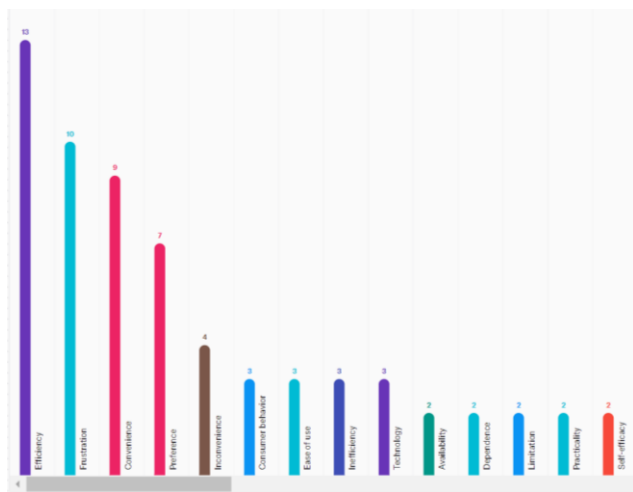


Fig.3: coding software ATLAS.IT for self-checkout interviews

Positive aspects of self-scanning usage mentioned by users	Customer experience
Efficiency: time saving and avoiding long lines	"It is an advantage especially when supermarkets are busy" - candidate 4. "Whole shopping experience faster" - candidate 2 Easier and quick for all candidates.
Autonomy and less stress	Candidate 4 says that being able to take its own time during the shopping process and at the checkout leads to less stress and a smoother experience.
Easy to use	"Pretty intuitive, so it wasn't too big of a deal to use it" - candidate 4.
Fast process	Self-scanning allows them to pack their goods in bags while shopping, with no need to pack every single item or scan them once again at the checkout - Candidates 1 and 5
Convenience	Packing while shopping is that she can see if the products fit in her bag, because she doesn't have a car, thus, it is important to estimate the number of products that she is buying - Candidate 5
Manage finance/budget	"The self-scanning's scan what article you have, and they show you the price of course, but it also adds up in total. So you already know at the end how much you are going to be spending, and you can of course remove it if you want" - Candidate 1
Discretion	"Especially at the checkout when things can happen either if you didn't want this or if you realize you can't afford it or whatever reason" Candidate 1

Table 4. Positive aspects of self-scanning users on customer experience (found in appendix)

Cause of frustration/dissatisfaction	Customer experience
Machine not responding	It happened to candidate 2. "The system sometimes locks up and I can't scan anything else in the middle of my shopping. This often happens to me I must get another scan and queue up at customer service. Which takes time" - candidate 1
Not being able to see the total price of articles before checkout	"I couldn't see like a total amount of the entire price for my entire list that I scanned while shopping. I could only see the total price at the very end I when I was checking out" Candidate 4
Struggling with removing articles from their shopping list	Mentioned by candidate 1, 2 and 3 so they had to walk in the supermarket to find an employee to help them.
Promotions tend to not appear sometimes.	"This is annoying because even if I don't want to go to the cashier, I have to wait in the line and sometimes the employee is busy with another customer. It's so inconvenient" Candidate 1

Table 5. Cause of frustration and dissatisfaction among users' self-service users (found in appendix)

Positive aspects of self-checkout usage mentioned by users	Customer experience
Efficiency: time saving and avoiding long lines	"I prefer self-checkouts because I don't have to wait" Candidate 7 "It's simply easier and quicker". Candidate 10
Autonomy and less stress	According to candidate 7, the self-checkout is also convenient because it allows him to checkout at his own pace, which means there is no need for a rush when it comes to pack or pay its products.
Easy to use	"Quite intuitive" - candidate 8. "It is clearly explained on the screen" - candidate 8
Preference	"If I'm shopping for my whole family, I will rather go to a place where there is a cashier. I don't want to do it myself because there will be too many items to scan" - Candidate 8 Other candidates also shared the same opinion as candidate 8, for example candidate 9 states that "it would take me a long time to scan everything".

Table 6. Positive aspects of self-checkout users on customer experience (found in appendix)

Cause of frustration/dissatisfaction	Customer experience
Articles without barcodes	<p>The main sources of dissatisfaction cited by 3 of the candidates.</p> <p><i>"Sometimes I can't find it and then it takes long time. I think they need to have a better system for that because I never know what the name of the product is". - Candidate 10</i></p> <p>Candidate 8 complained about the same issue, but this time about fruits.</p> <p><i>"Sometimes I don't even find my article, or I end up choosing the wrong one, so I must call a worker to help me. This whole process takes even more time than expected" – Candidate 11</i></p>
Users cannot remove the products once they scanned it twice.	<p>Candidate 11, 8 and 10 have pointed this same issue.</p> <p><i>"I scan the same product twice by mistake and then I have to wait for one of the workers to come help me because I cannot do that in the local supermarkets where I live". Candidate 11</i></p>
Limited space	<p><i>"There is not enough space in the self-checkout for lots of items". Candidate 11</i></p>

Table 7. Cause of frustration and dissatisfaction among users' self-service users (found in appendix)