Master Thesis

UNIVERSITY OF TWENTE.

The key e-service factors that influence customer satisfaction during online grocery shopping

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Juli, 2024
University: University of Twente, Enschede
Word count: 18.678 words

Abstract

Online shopping is integrated into consumers' lives today, so providing e-services have become essential. However, previous literature has focused on e-service factors within the general e-commerce setting. Therefore, this study aims to fill this gap by investigating the impact of e-service factors on customer satisfaction, focusing on the Dutch online grocery industry. This research focused on nine different constructs: website design, fulfilment, customer service, security & privacy, convenience, order fill rate, incentives, overall e-service quality, and customer satisfaction. Each of these constructs consisted of underlying variables. A quantitative research method was employed, using an online survey to gather data, resulting in a valid sample of 181 respondents. Multiple linear regression analysis identified purchase process, order accuracy, evaluation convenience, order fill rate, and incentives as significant factors influencing customer satisfaction. The study's limitations include the specific focus on Dutch customers and the exclusion of other potential e-service factors. Future research should consider larger, more diverse samples and explore additional e-services variables. The findings contribute to academic knowledge by clarifying the key drivers of customer satisfaction in the online grocery sector and offering practical recommendations for online grocery stores to improve their service quality and customer satisfaction.

Keywords: Customer Satisfaction, E-service Factors, Online Grocery Industry, Online grocery shopping, Netherlands, E-commerce

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1. Introduction

The economy is going through a transition, with every business being turned into information-based operations by the use of technologies. In the modern world, rapid technological advancement has become increasingly important in electronic commerce (e-commerce), leading to significant shifts in the economic landscape and impacting all areas of the industry (Jain et al., 2021). Within this economic environment, the emergence of various developments in information technology, connectivity, and smartphones, makes it able to change the way customers meet the needs of a product or service (Ivastya and Fanani, 2020). The rise of these e-commerce channels has changed the shopping and consumption experience of customers. These channels are rapidly replacing the traditional stores, enabling people to browse, order, and pay online (Blut et al., 2015).

According to the Centraal Bureau voor de Statistiek (2023), 78% of individuals aged 12 years or older made online purchases in the first half of 2023, an increase compared to 74% in 2022. This percentage is close to the 77% reported in 2021, indicating a persistent trend toward increased online shopping. Compared to traditional shopping methods, online businesses provide convenience to customers, allowing them to effortlessly place orders, pay for the products, and wait for delivery (Rita et al., 2019). Over a period of five years, the amount of individual customers purchasing their groceries online has nearly quadrupled. In the first half of 2023, sales generated from online grocery shopping and delivery showed a fourfold increase compared to the corresponding period in 2018 (Sirtioglu and Schreijen, 2023).

Kayabaşı et al. (2013) state that customer satisfaction is influenced by the quality of products, service, and company image. Literature about service quality shows that customers' perception of high-quality service and their satisfaction significantly increase their buying intention (Kayabaşı et al., 2013). Additionally, the literature shows that service quality is a key factor influencing customer satisfaction and plays a crucial role in customer retention amid fierce competition in the online marketplace (Wu and Ding, 2007). Rust (2001) states, that the rise of the information economy and electronic networks, has emerged the idea of e-service quality, referring to the delivery of services through for example the Internet. Given the importance of e-service quality, companies should focus on a well-functioning website to retain customers. This is crucial, because acquiring and retaining new customers, in both the virtual market and the traditional market, is challenging and costly (Kayabaşı et al., 2013).

The use of the internet and smartphones between companies and customers has been growing rapidly around the world (De Magalhães, 2021). This growth can be attributed to the convenience it offers customers, the integration of mobile devices and e-commerce into individuals' daily lives (Wang et al., 2015). The online grocery industry is no expectation, as grocery shopping is a daily activity for many customers (Shroff et al., 2023). Studies show there has been a significant rise in the popularity of online grocery shopping, with a substantial rise in demand for food products in online marketplaces in previous years (Ali and Naushad, 2021; Hanus, 2016). Customers can save money and time with e-grocery shopping, which could be used to carry out other more interesting activities, instead of going to the physical grocery store, picking the products, standing in the checkout queue, and carrying heavy bags (De Magalhães, 2021). The low rates, favourable government policy, timely distribution, and internet penetration, are factors that it makes easier to develop an e-grocery store within the industry (Ali and Naushad, 2021).

For this reason, it is key that customers are satisfied with the company, otherwise, they can easily switch to other online grocery stores, that can fulfil their needs. Despite the growing popularity of online grocery shopping and the recognized benefits for customers, there remains a gap in understanding the factors of e-service quality that influence customer satisfaction within the context of e-grocery shopping. Previous studies have primarily examined e-service quality as a general concept within the e-commerce industry. For example, Rita et al. (2019) identified four primary dimensions of e-service quality, yet their analysis focused on online shops in general, rather than specific product segments or industries. Santos (2003) also proposed dimensions of e-service quality, namely the

incubative and active, but this study did not consider a specific industry or product segment. Additionally, the research did not employ a statistical analysis of these variables. While customers experience convenience when making online purchases, as earlier discussed by Wang et al. (2015), there is limited research on whether this convenience extends to customers shopping for groceries online. Hanus (2016) utilized secondary data to identify various forms of convenience but did not employ a specific measurement scale to statistically examine if convenience influences customer satisfaction. The order fill rate is seen as a critical variable influencing the demand for online grocery shopping (De Magalhães, 2021). De Magalhães (2021), emphasised in their limitation the need to include pre and post-transaction variables (for example Website Design and Fulfilment) and the study did not investigate the influence of this variable on customer satisfaction. Consequently, there is limited insight into which of the specific e-service qualities are most critical in the online grocery industry. This highlights the need for more targeted research to identify the factors of e-service quality which are the most important for customer satisfaction when purchasing groceries online.

Therefore, this research aims to investigate which e-service factors influence customer satisfaction within the market segment of online grocery stores. These factors are selected based on their identification in previous studies, where these factors were recognized as crucial elements impacting customer satisfaction. The following factors will be tested in de context of the online grocery industry: website design, fulfilment, customer service, security/privacy, convenience, order fill rate, and incentives. These factors together will be seen as the overall dimension of e-service quality, which then influences the customer satisfaction of online grocery customers. The research will take place in the Netherlands, serving as the study and data collection area. This choice is based on the fact that the Netherlands has a very high rate of internet usage. Referring back to the beginning of the introduction, the latest figures from Centraal Bureau voor de Statistiek (2023) show that 78% of individuals aged 12 years or older made online purchases in the first half of 2023. As a researcher based in the Netherlands, it is easier to obtain data from respondents, which increases the reliability of the data collection. Lastly, in existing literature, the Dutch market is frequently overlooked, when speaking about online purchasing behavior. By conducting this study in the Netherlands, it can gain valuable insights and contribute to the understanding of the e-commerce market in the Netherlands. Based on these features and the existing literature the following research question was formulated:

"Which of the e-service factors influence the customer satisfaction, within the online grocery market in the Netherlands?"

Looking at the theoretical and practical contributions of this research, this study will theoretically contribute to the existing knowledge about e-service factors affecting customer satisfaction, especially within the context of online grocery stores. By conducting a survey among online grocery shoppers, the research aims to fill the gap. For practical implication, a comprehensive analysis and identification of key factors influencing customer satisfaction can help online grocery stores improve their service offerings. In turn, these improvements can increase customer satisfaction, give the online grocery store a competitive advantage, and better meet customers' needs.

This master thesis is structured as follows: Chapter 2 presents the literature review, focusing on various determinants of e-service quality, and customer satisfaction. Chapter 3 will discuss the methodology that applied in this study. Chapter 4 will present the data analysis and results of the study. Chapter 5 will provide a discussion of the findings. Finally, Chapter 6 will conclude the study, by summarizing the key findings, discussing the limitations of this study, and offering recommendations for future research, to end with the academic and practical implications.

2. Literature review

This chapter includes the literature review, a central part of the research. It undertakes a comprehensive examination of existing literature about customer satisfaction and e-service quality within the online grocery industry. By critically analyzing previous scholarly work, this review aims to justify the current research and provide a foundation for further investigation, with a specific focus on answering the research question.

2.1 Customer satisfaction

The rise of e-commerce channels changed the way of shopping and consumption, e-channels are fast replacing traditional channels, where people now can look, order, and pay online (Blut et al., 2015). Online shops face the challenge of offering valuable and unique terms to meet customer needs and maintain satisfaction among these customers (Biesok and Wyród-Wróbel, 2011; Rita et al., 2019).

Customer satisfaction has been discussed and defined in several studies. Kotler and Armstrong (2010) defined customer satisfaction as the degree to which the perceived performance of a product or service meets the customers' expectations. These expectations are based on previous purchases, opinions of their friends and associates, and information and promises of marketers and competitors (Kotler and Armstrong, 2010). In contrast to the previous perspective, Kayabaşı, et al. (2013) argue that customer satisfaction can be considered as the perception of customers that the benefits they receive are higher than the costs. Looking at the research by Wolfinbarger and Gilly (2003), they argue that product and service quality are both related to customer satisfaction of shoppers, indicating that quality is expected to play a crucial role in determining the success of an online retailer. Empirical studies consistently demonstrate the numerous benefits, for example, the securing of lifetime revenues from individual customers (Bolton, 1998), decrease in price elasticity (Anderson, 1996), and minimization of customer defection risk in the event of quality fluctuations (Anderson and Sullivan, 1993), which are associated with customer satisfaction (Hu et al, 2011; Kayabaşı et al., 2013).

According to Brady and Robertson (2001), to improve and achieve customer satisfaction, companies need to provide good services as a means for this. To thrive in a highly competitive e-commerce environment, focusing on service quality is a key and essential success strategy (Rita et al, 2019; Santos, 2003). E-service quality directly and positively influences customer satisfaction in the e-commerce industry, so when e-service quality meets a high standard, customer satisfaction tends to increase (Ribbink et al., 2004). It is important to understand which different factors e-service quality have, or could influence customer satisfaction.

2.2 E-service quality, dimensions, and attributes

The literature has demonstrated that e-service quality is a crucial determinant of customer satisfaction. Therefore, it is necessary to delineate the different factors of e-service quality based on the literature. E-service quality can be defined as "interactive service provided through the internet" (Kayabaşı et al., 2013) or "a website facilitates efficient and effective shopping, buying and delivery (Zeithaml et al., 2000). Table 1 and 2 provides an overview of the selected studies that examine e-service quality, along with their dimensions and attributes. Tables 1 and 2 summarize each paper's theoretical foundation, research aim, context, key variables, findings, and limitations.

Research by Rita et al. (2019), investigated the primary dimensions of e-service quality that exerted influence on the customer satisfaction. Specifically, their analysis encompassed four different dimensions, namely website design, fulfilment, customer service, and security/privacy. These four dimensions were further disaggregated into multiple underlying attributes that represented the dimensions. They chose fifteen different attributes. Where website design, security/privacy, and fulfilment were seen as essential for building superior service quality, but customer service was not an important dimension (Rita et al, 2019).

Another study (Blut et al., 2015) delved also into the dimensions of e-service quality, adopting the same four dimensions of website-design, fulfilment, customer service, and security/privacy. Nevertheless, this study incorporated sixteen attributes, one more than the prior work. However, the

differences extend beyond mere numerical disparity (Blut et al., 2015). Notably, among these sixteen attributes, there exists a discrepancy of four attributes in comparison to the fifteen identified by Rita et al. (2019). Where the study by Blut et al. (2015) uses website organization/design/navigation, merchandise stock availability, billing accuracy, and merchandise quality, the other study did not address this in their study.

In contrast to the other two studies, Santos (2003) takes a different approach to the dimensions of e-service quality. The study investigated two dimensions, namely the incubative dimension and the active dimension. The incubative dimension refers to the effective design of a website and the use of technology to ensure customers can easily access, understand, and be attracted to the website (Santos, 2003). The incubative dimension shares the most similarity with website design when compared to the previous two studies. The active dimension refers to the effective support, quick responsiveness, and attentive maintenance that a website offers to its customers (Santos, 2003). The active dimensions exhibit a certain degree of overlap with the four dimensions from the other studies, it encompasses attributes from each of these dimensions. However, there are still differences in the specific attributes identified. This study also uses attributes such as linkage, efficiency, and incentives, which are not addressed in the other two studies (Santos, 2003).

For the purpose of this study, several variables from the literature were chosen based on various reasons. The e-service factors of website design, fulfilment, customer service, and security & privacy, as identified in the studies by Blut et al. (2015) and Rita et al. (2019), will be utilized. Additionally, the incentives variable from Santos (2003) will also be included. These variables were chosen because they can potentially be important in the online grocery industry, but the variables need to be empirically tested to determine their importance within this industry. The studies by Blut et al. (2015) and Rita et al. (2019) emphasised the need to test the variables of website design, fulfilment, customer service, and security & privacy in a specific industry and with other relevant variables. Similarly, the study by Santos (2003) emphasised the importance of testing and evaluating the variables using a specific measurement scale. In this way, this approach ensures that the selected dimensions of e-service quality are both comprehensive and relevant to the context of online grocery shopping.

Table 1: Studies that examine the dimensions of e-service quality

Authors, Theoretical foundation, and research aim	Context and key variables	Findings	Limitations
In the research by Santos (2003), the researcher wants to develop a detailed conceptual framework of e-service quality determinants. There was a need to gain a better understanding of consumer evaluations of e-services to identify suitable determinants of the e-commerce operating environment	- E-service quality/Consumer Evaluations/E-commerce context - Incubative and Active dimension -Incentives (as different from studies 2 & 3)	- E-service quality has an incubative and an active dimension - Each of the two dimensions involves of five or six determinants - The model can help to understand e-service quality, and achieve high customer retention, customer satisfaction, and profitability.	- The study did not provide any specific measurement scale. A large-scale quantitative study would be desirable to conduct a measurement research into the e-service quality. - Also test the ranking of importance of the determinants. It would be interesting to asses this statistically.

Table 2: Studies that examine the dimensions of e-service quality (continued)

(Continued from Santos (2003))			- The type of online business was not a dependent variable in the study, new studies can investigate that dependent variable in combination with differences between products vs service, informative vs interactive, B2B vs B2C, and personal vs official websites.
The research by Blut et al. (2015), was to understand e-service quality dimensions, which are crucial in online shopping. They used a means-end-chain theory to create a conceptual model. The research also highlighted the impact of e-service on outcomes like customer satisfaction, repurchase intention, and word-of-mouth, and the moderating effect of three contextual factors: country culture, regulatory environment, and industry context.	- E-service quality/Customer Satisfaction/E-commerce context - Online shopping - Website Design, Fulfilment, Customer Service, and Security/Privacy - Website Organization/Design/Navigation, Availability of merchandise/products, Billing accuracy, Merchandise quality (as differences with studies 1 & 3)	- E-service has 4 underlying dimensions, Website Design, Fulfilment, Customer Service, and Security/Privacy. - 16 attributes that are associated with e-service quality	-The study was based on a limited selection of published studies, and the constructs examined restricted the exploration of other potential moderator factors in the relationship between e-service quality and overall e-service quality. - Online channels have changed over the years, and this will probably change in the next years. Future studies can look at other attributes or dimensions of e-service quality. - The results and insights from this study stimulate further research on this topic. Although the results are quantitative and retrospective, they will benefit from qualitative commentary.
Rita et al. (2019) develop new knowledge to better understand the most important dimension of e-service quality, which impacts customer satisfaction, trust, and behaviour.	- E-service quality/Customer Satisfaction/E-commerce context - Online shopping - Indonesian consumer context - Website design, Fulfilment, Customer Service, and Security/Privacy - Price offerings and Website Aesthetics (as different from studies 1 & 2)	- 15 attributes are associated with e-service quality - Website design, security/privacy, and fulfilment are essential for superior e-service quality - Customer service is not an important dimension - Each dimension and attribute can be important to ensure customer satisfaction and trust, which in the end helps to retain online customers.	- The study used a non-probability sampling, and the study used only customers who are from Indonesia and did have experience with using an online retailer website. - The study analyzed the e-service quality of online stores in general, not based on a product segment or industry. - The study only tests the direct effect of each variable, not a moderating effect among variables

2.3 Online grocery shopping

This section will discuss relevant literature related to e-service quality and customer satisfaction within the online grocery industry, aiming to understand the specific dimensions and attributes that may influence the overall customer experience within online grocery shopping. Table 3 provides an overview of the selected studies that examine the factors, attitudes, and decision-making for online grocery shopping. Table 3 summarizes each paper's theoretical foundation, research aim, context, key variables, findings, and limitations.

In the context of online shopping, the crucial role of e-service quality and customer satisfaction has become increasingly evident and it has changed the way customers store and consume products (Blut et al., 2015; Kayabaşı et al., 2013; Rita et al., 2019; Santos 2003; Zeithaml et al. 2000). Therefore, it is essential to examine these variables within a specific sector or industry of the e-commerce environment. In this research, the focus is on the online grocery industry. Customers are increasingly looking for convenience and time savings, including for their grocery shopping (Ali and Naushad, 2021; Hanus, 2016). This shift from traditional grocery shopping to online grocery shopping has important implications for how e-service quality is understood and applied. This is due to the differences between delivering services in a traditional (physical) setting and delivering services through an online platform.

According to Hanus (2016), customers behave rationally, which means that they aim to maximize their satisfaction or their utility function. The study describes five types of online shopping convenience, namely access-, search-, evaluation-, transaction-, and possession convenience. However, there are also some disadvantages of online grocery shopping, the first one is associated with the risk of incorrect assessment of the products. Other disadvantages according to the study are long delivery time, selecting and handling of perishables (impossible to know expiry date), missing out on special bargains in traditional shops, worries about the returning process ruined products and payment systems (Hanus, 2016).

In the study of De Magalhães (2021), they concluded that the order fill rate was identified as the most critical attribute influencing the demand for e-groceries. This means that e-groceries need to accommodate a large variety of products to fulfil most of the orders. Customers want to avoid the need for complementary shopping, they want to buy everything in one online grocery store. Besides order fill rate, the price of delivery service is another important attribute of online shopping. The higher the price of delivery service for online groceries, the lower the customers will choose for online grocery shopping (De Magalhães, 2021).

Finally, Ali and Naushad (2021) studied the factors influencing customers satisfaction with e-grocery shopping. In their research, they also looked at the dimension of convenience, in the same way Hanus (2016) did. However, in this study, they also look at the perceived value, product- & service quality, risk, and value for time (Ali and Naushad, 2021). Two of these dimensions, product- & service quality, were also found in the e-service quality dimensions of paragraph 2.3, product quality was seen here as fulfilment. The dimensions in this study were positively associated with customer satisfaction (Ali and Naushad, 2021).

For the purposes of this study, the variables of Order Fill Rate and Convenience were selected based on the literature. Order fill rate, as identified by De Magalhães (2021), and convenience which is derived from the studies by Ali & Naushad (2021) and Hanus (2016). The order fill rate is seen as a critical variable influencing the demand for online grocery shopping, and the ability to complete their grocery shopping in one place (De Magalhães, 2021). De Magalhães (2021), emphasised in their limitation the need to include pre and post-transaction variables, so this study includes these factors (for example Website Design and Fulfilment). The variable of convenience consists of multiple underlying dimensions that together represent the customer's ease and efficiency of online grocery shopping (Ali and Naushad, 2021; Hanus, 2016). Although the study by Hanus (2016) identified convenience as a critical factor, the study did not make use of a specific measurement scale to test the convenience variable in detail. Therefore, the current study will test the variable of convenience with a specific measurement scale to fill this gap and to evaluate the convenience factor.

Table 3: Studies that examine online grocery shopping

Authors, Theoretical foundation, and research aim	Context and key variables	Findings	Limitations
De Magalhães (2021) focuses on the significance of factors that significantly influence logistics and the final consumer decision for online grocery shopping.	- Consumer decision-making / e-grocery shopping context - Customer Satisfaction - Wide variety of products, Order Fill rate, Pricing decisions, Concerning lead time, Order fulfilment, and Aftersales/Return handlings.	- The order fill rate (OFR) was found to be the most relevant and consistent variable, followed by the price of service also intuitively consistent. - The positive effect for the variable age in the logit model indicates that younger people are less willing to use e-grocery. - People aged less than around 30 years are more sensitive to free delivery service. - Customer satisfaction with order fulfilment is the greatest for convenience goods (e.g. groceries).	- A more representative sample should be collected to take into account other socio-economic and demographic variables, such as the location of the residence, composition of the household, level of education, car ownership, and income, to help define market niches. - Further studies could also explore the components of the Pre-Transaction and Post-Transaction phases, to enlarge the understanding of the customer's decision-making to buy groceries online.
In the research of Ali & Naushad (2021), they investigated the factors that influence consumer satisfaction with e-grocery shopping.	- Customer satisfaction / E-commerce within the online grocery context - Perceived Convenience, -Value, -Product quality, -Risk, -Service quality, Value for time	- This study has confirmed that perceived convenience, - value, - product quality, - risk, and value for time are positively associated with customer satisfaction. - Product quality is the most influential determinant of customer satisfaction. - Customers are highly concerned about the time they spend on shopping for products; they prefer to spend minimum time in retailers and searching for products (website organization/design/navigation).	This study does not indicate limitations or future research.

Hanus (2016) presented the conditions of online grocery shopping and the customers' attitudes toward buying their food via the Internet. This is based on secondary information sources.	- Online grocery shopping / E-commerce context.
	
	- Convenience and time-saving.
	
	- Security/Privacy, Website Design, and Perishability anxiety.
		- Increasing popularity of online grocery shopping.
		
		The main advantage, according to customers, is the ability to save time and convenience.
		
		- Risks:
		  - Certain products are rated incorrectly due poor presentation on the website.
		  - Fear of selecting and handling perishable products on the expiry date
		  - Doubts about payment systems that are not safe.
			- The study only makes use of secondary data to make up the research.
			
			- The study did not provide any specific measurement scales.

The above discussed studies contribute to the understanding of customer satisfaction, e-service quality, and online grocery shopping. However, several gaps remain across the studies. Firstly, many studies that deal with e-service quality dimensions, fail to contextualize their findings within a specific market segment or industry, limiting the generalizability of their conclusion. Secondly, some

of the studies were not tested on a specific measurement scale, like a quantitative study, to indicate the importance of determinants. Finally, while some studies explore consumer behaviour in online grocery stores, there is a lack of integration with the e-service quality dimensions discussed in paragraph 2.3 and there was also a lack of measurement scales. Therefore, in this research, these three pieces can be connected for a deeper investigation.

Based on the discussed studies in the literature review, a conceptual model is proposed to test the relationship among the different variables. So to test the relationship of eight different e-service factors that influence the total e-service quality within an online grocery context, that influence the customer satisfaction of online grocery customers. The conceptual model can be seen below in Figure 1.
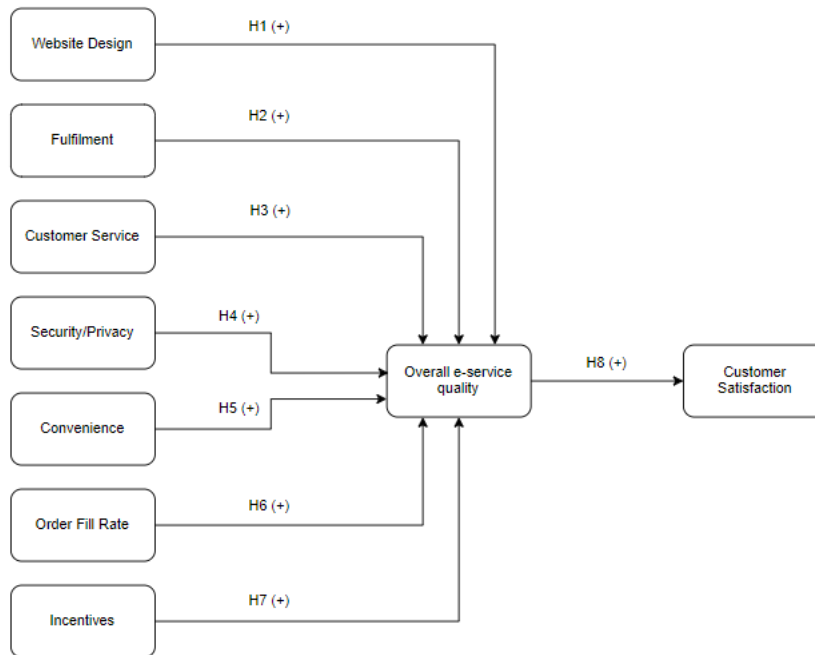
Figure 1: Conceptual model

2.4 Hypotheses development

This study sets out to examine the hypotheses governing the investigation into the interaction between e-service quality dimensions and customer satisfaction within the context of online grocery shopping. The hypotheses will serve as the theoretical framework upon which the research is structured, guiding the systematic exploration of the relationships among the variables in this digital retail context. In addition, this section of hypotheses development will propose eight different hypotheses.

2.4.1 Website design influences the overall e-service quality.

According to Rita et al. (2019), the website design of an online website must be of good quality, because customers evaluate their website experience to assess an online store's overall service quality. The website design of an online store should be visually appealing, easy to read, and provide sufficient product information, to ensure superior service quality (Rita et al., 2019). Website design is one of the four most important dimensions of e-service quality (Blut et al., 2015). Attributes that are associated with website design play a crucial role during the early stages of the shopping process (Blut, 2016). This dimension is an important driver of satisfaction, with multiple benefits, like being informative, easy and enjoyable to use, and well organized for the customer (Holloway and Beatty, 2008). The website design and content are similar to the physical stores, this is because the environment and atmosphere of physical stores influence the customers' perception, and in website design, the design and atmosphere of the website attracts or deters customers to continue visiting the

webpage (Sohn and Tadisina, 2008). According to Ranganathan and Ganapathy (2002), website design plays an important role in attracting, retaining, and maintaining customers on the website. In this way, it is proposed that:

H1. Website design has a positive influence on the overall e-service quality.

2.4.2 Fulfilment influences the overall e-service quality

Fulfilment is a critical attribute because this factor can only be evaluated after payment has been made, customers cannot see and evaluate the product directly when making a purchase, and this can only be based on pictures (Rita et al., 2019). Particularly in the e-commerce world, an important issue is the timely and accurate delivery of products, this is less important in the physical stores (Blut et al., 2015). Therefore, the fulfilment dimension should be relatively more important for the selling of online products (Blut et al., 2015). For customers who purchase products from companies that offer online shopping, the accuracy of being able to make online purchases is important (Santos, 2003). In the study by Sahadev and Purani (2008), it was found that fulfilment plays a central role in developing the trust of a customer in a website. According to Pearson et al. (2012), for a company to achieve e-service quality, the website must prioritize the fulfilment dimension, as it has the greatest impact on e-service quality. Where San et al. (2020) say, if the website's fulfilment is of good quality, this will create a positive experience for the customer, which will increase customer satisfaction. Thus, it is proposed that:

H2. Fulfilment has a positive influence on the overall e-service quality.

2.4.3 Customer Service influences the overall e-service quality

According to Holloway and Beatty (2008), customer service consists of two categories, namely service level and return/handling policies. If a website wants to provide good, reliable customer service, along with fair, and clearly communicated return/handling policies it is important to have the opportunity to contact customer service on the website (Holloway and Beatty, 2008). Santos (2003) suggests that offering user-friendly guidelines, help pages, and FAQs represents initial steps for providing effective service support. Whereas others prefer to get personal advice or help through e-mail or phone calls (Santos, 2003). Internet websites should respond quickly to all customer questions and problems, but also that customers can easily find return/handling policies and that their e-mail systems are always working properly (Ladhari, 2010). The quality of customer service contributes to the customer's overall perception of the online store when they give their overall opinion about the online store (Blut, 2016). In conclusion, Lee and Lin (2005) showed that the dimension of responsiveness, which is comparable to customer service, affects overall service quality and customer satisfaction. Therefore, it is proposed that:

H3. Customer service has a positive influence on the overall e-service quality.

2.4.4 Security/Privacy influences the overall e-service quality

Customers who make online purchases use credit cards or other online payment methods, but they avoid online stores if they feel that their personal or credit card information is insecure and that these are no longer private during or after the payment is made (Blut, 2016). Most customers are worried about the website's security measures against fraud following a completed transaction (Rita et al., 2019). To address customer concerns and fears, many websites today offer individual accounts with login IDs and passwords (Ranganathan and Ganapathy, 2002). Moreover, to ensure the security/privacy of customers, websites should incorporate security measures and privacy practices to build more trust in customers about their personal information (Ranganathan and Ganapathy, 2002). According to the results of the study by Pearson et al. (2012), privacy positively impacted the perceived e-service quality of a website. Therefore websites need to secure the private information of their customers and in this way, it is proposed that:

H4. Security/Privacy has an influence effect on the overall e-service quality.

2.4.5 Convenience influences the overall e-service quality

According to Hanus (2016) customers who do their grocery shopping online experience great convenience from it. Therefore, customers claim that the most important determinant and advantage of online business success is the huge and great impact of convenience during online shopping (Hanus, 2016). It provides customers with the opportunity now to order groceries from home and to save time by making visits to a traditional, physical store redundant (Verhoef & Langerak, 2001). Ali and Naushad (2021) argue that customers prioritize saving time and cost, and online grocery shopping facilitates this by allowing customers to view multiple products with one single click. Customers can easily place orders at any time they want, even when the usual traditional stores are already closed (Ali and Naushad, 2021). To retain and maintain customers, offering excellent convenience during online shopping has emerged as a key driver for online web stores (Almarashdeh et al., 2019). Therefore, it is assumed that:

H5. Convenience has a positive influence on the overall e-service quality.

2.4.6 Order Fill Rate influences the overall e-service quality

According to the study by De Magalhães (2021), the percentage of products ordered by the customers that can be met from the stock of the online grocery store is the OFR. From a customer perspective, it is important to have a wide variety of products, because customers like to vary some different types of products for example 5 different brands of yogurt or soda drinks (De Magalhães, 2021). Furthermore, customers prefer to buy everything they need and want to buy in just one place (Olsen, 2018). In this way companies need to have enough space, to accommodate a large variety of products and inventory of products to fulfill most of the customers' orders (De Magalhães, 2021). Otherwise, if the companies don't have a great OFR, the customers would still need to use the physic stores (Olsen, 2018). The results of Rao et al. (2011) show evidence that customers react negatively when websites cannot meet order fulfilment (OFR) promises. However, if a retailer can meet a high fill rate, it shows that there is a low level of unsatisfied demand, allowing them to keep their customers satisfied, and thus reduce the number of product substitutions (Wan et al., 2012). In this way, it is assumed that:

H6. The order fill rate has a positive influence on the overall e-service quality.

2.4.7 Incentives influence the overall e-service quality

Incentives are the encouragements offered by online web providers to encourage customers to browse, use, and buy something in the webstore (Santos, 2003). By doing this, customers can get some rewards, in the way of discounts, free shipping, good bargains, or personalized recommendations (Santos, 2003; Xu et al., 2017). Retailers also often try to increase customers' transaction sizes by incentivizing them to make unplanned purchases during shopping trips, for example, reminding them how much they need to spend more for free shipping (Kulkarni et al., 2019). The incentives that are offered by the companies can increase customers' utility, and motivate the customer to behave in the company their interest, e.g. continue to use the website and eventually buy from the company (Bhattacherjee, 2001). If a company offers live high-quality commerce incentives, it can help by improving the customer experience and increasing their desire to buy something on the website (Zhang et al., 2022). Incentives can attract and retain online customers to come again to the website (Santos, 2003). Therefore, it is assumed that:

H7. Incentives have a positive influence on the overall e-service quality.

2.4.8 The overall e-service qualities influence the customer satisfaction

One of the primary challenges for online companies is to deliver valuable and unique terms to meet customers' needs, and to maintain satisfaction among these customers (Rita et al., 2019;

Biesok and Wyród-Wróbel, 2011). Within the business-to-consumer online environment, customer satisfaction stands out as one of the most critical measures of success (Shin et al., 2013). To obtain customer satisfaction from customers, a key and important success factor is the strategy that focuses on e-service quality (Rita et al, 2019). The overall e-service quality is a critical factor that connects the factors and their dimensions with customer satisfaction (Blut et al, 2015). So, if a company provides good e-service quality to their customers, it will enhance customer satisfaction by these customers (Rita et al., 2019). Based on this it is assumed that:

H8. The overall e-service qualities have a positive influence on customer satisfaction.

3. Research design

3.1 The aim of the study

The internet has enabled consumers to shop for almost everything online, with online nutritional and grocery shopping emerging as extremely popular (Hanus, 2016). Information technologies and the internet have increasingly become vital for delivering services by offering effective e-services (Kayabaşı, et al., 2013). Traditional groceries, such as Albert Heijn, Jumbo, PLUS, COOP, and many more, have increasingly started selling their products over the internet in recent years. In addition, there are more and more online grocery stores like Picnic, Flink, and Gorillas (Giamboi, 2021). Unlike traditional stores, these online grocery stores only operate online, without any physical stores. Therefore, it is extremely critical to deliver high e-service quality to customers, to achieve customer satisfaction. Since there is a substantial number of companies within the industry, customers can easily compare and switch to competitors for their needs if they are dissatisfied with their current supplier (Shafiee and Bazargan, 2018). This study aims to analyze the relationship of various factors of e-service quality within the online grocery shopping industry, and the impact on customer satisfaction.

3.2 The research design

Research is the systematic process of collecting, analyzing, and interpreting information, and data, to get an understanding of phenomena of interest (Leedy and Ormrod, 2016). The phenomena of interest is the research question, mentioned in Chapter 1, which is: "Which of the e-service factors influence the customer satisfaction, within the online grocery market in the Netherlands?".

There are three approaches to conduct a research, these are quantitative, qualitative, and mixed methods. To answer the research question in this study, a quantitative research approach is applied. In quantitative research, data collection involves numerical data, and mathematical models are used as the methodology of data analysis (Williams, 2007).

The data that will be used in this research is numeric, and this data will be obtained by conducting an online survey. So, a quantitative study will be conducted. A quantitative study serves to test objective theories by exploring the relationships between the variables. These variables are measurable, allowing the numerical data to be analyzed using statistical procedures (Creswell, 2009).

3.3 Data collection

As discussed earlier, this study employs a quantitative approach to gather data on the relationship between e-service quality and customer satisfaction in the online grocery shopping industry. The primary method of data collection involves the distribution of a structured questionnaire via the online survey platform of Qualtrics. The respondents targeted for this survey are individuals living in the Netherlands who are 18 years or older and have engaged in online grocery shopping at least once. This ensures that only individuals with experience and familiarity with the online grocery shopping process participate in the study. Those who do not meet these three criteria will be filtered out of the survey.

According to Coy (2019), a traditional quantitative method involves examining opinions, attitudes, or experiences of one or more groups of individuals. The quantitative study starts with hypotheses and employs measures to focus on testing established theories and test the hypotheses. The characteristics of the study are predetermined and participants respond to the categories to be tested in an interview or on a survey, in this study a survey will be used. The research will use a large, representative sample of participants to provide information on the topic and gain insights into the broader population around the world (Coy, 2019).

To ensure the inclusion of the appropriate respondents, screening questions will be prepared in advance to filter out ineligible participants. This survey targets respondents who are from the Netherlands, who are 18 years or older and have engaged in online grocery shopping at least once. The first questions will therefore focus on these criteria. If a respondent does not meet any of the three criteria, they will be immediately directed to the end of the survey and excluded from participation.

This approach ensures that only suitable respondents remain in the survey.

Ethical considerations play a crucial role in this study. Respondents should feel safe while completing the survey. Therefore, they will be required to sign an "Informed Consent Statement". This statement will present several items for respondents to read and agree to, including voluntary consent to participate, and agreement to participate. Approval to publish the survey online will have to be obtained from UTwente's ethics committee. The confidentially of participants will be ensured as the survey is completely anonymous, and no personal questions that could identify the respondents will be asked. Additionally, their responses will only be used for this research, and the data will be deleted after the study is completed. This ensures that respondents are fully informed about the survey and understand what will happen to their responses afterwards.

3.4 Data analysis

Quantitative data produce numbers that should be interpreted before conclusions can be drawn about the data. The data, obtained through the online survey, can be entered, stored, and analyzed in an electronic database, for example SPSS, which will be used in this study. The process of analyzing the data can be carried out in different ways. Typically, data analysis is performed using a set of analyses known as inferential statistics, to draw inferences about the population as a whole. An important criterion in inferential statistics is whether the results are statistically significant. Implying that the observed effects are likely due to the treatment being tested or that the observed relationship between variables is real (Watson, 2015).

The collected data from the online survey will undergo a comprehensive statistical analysis to uncover insights into the relationship between e-service quality dimensions in the online grocery industry and customer satisfaction. The analytical process will encompass two different statistical techniques to derive meaningful conclusions from the data.

The first one is about descriptive statistics, where the characteristics of a group of observations are illustrated and summarized (Marshall and Jonker, 2010). According to Allua and Thompson (2009), the second technique is inferential statistics and will be calculated to generalize the findings from the sample to the broader population of interest. In this study, the focus will be on the relationship between e-service quality dimensions and customer satisfaction. The inferential techniques include for example KMO, Cronbach Alpha, AVE, Composite Reliability, ANOVA, Pearson's R, and Multiple regression, (Allua and Thompson, 2009). This inferential process will happen with the use of SPSS.

To ensure the validity and reliability of the findings, appropriate measures will be taken throughout the data analysis process. This includes checking the completeness and consistency of the data and assessing the internal consistency of measurement scales.

3.5 Measurement of the variables

Section 2.4 discussed the conceptual model based on the literature review of that chapter. As already discussed, e-service quality consists of many different dimensions. When creating the conceptual model, some of these dimensions were chosen that can fall within the online grocery industry, this was also done based on several articles that dealt with online grocery service. This chapter discusses how the different dimensions, of the conceptual model, will be measured within the current study.

The measurement of the attributes, website design, fulfilment, customer service, security/privacy, and overall e-service quality are adapted from Blut (2016) and Holloway and Beatty (2008). The measurement of convenience is adapted from Jiang et al. (2013). The dimensions they created come from the focus group interviews, where key coding words are created to capture critical factors of online shopping convenience, limited to the dimensions of access, search, evaluation, and transaction convenience (Jiang et al., 2013). There is a lack of information about the order fill rate and how to measure it. Given the absence of existing measurement tools for this attribute, self-formulated survey questions are chosen. These questions are designed with attention to relevance, consistency,

and reliability, based on literature from the hypothesis, De Magalhães (2021), Olsen (2018), and Rao et al. (2011). To measure the dimension of incentives, the measurement of Zhang et al. (2022) is adopted. They measure the promotional incentives during online shopping, which can help improve the customers' experience at the website (Zhang et al., 2022). Lastly, to measure customer satisfaction, the measurement of Rita et al. (2019) and Fornell (1992) is adopted. A detailed overview of the measurement of variables and structure of the online survey can be found in Appendix 1.

4. Data analysis and results

The following section presents the data analysis and results from the data collected through the online survey. All the survey questions about e-service factors (website design, fulfilment, customer service, security & privacy, convenience, order fill rate, and incentives), overall e-service quality, and customer satisfaction, are measured with a 7-point Likert scale, ranging from "1 = strongly disagree" to "7 = fully agree". The results are organized to address the research question, which was outlined in the introduction. First, descriptive statistics will provide an overview of the respondents' demographics observed in the data. Following this, inferential statistical analyses are conducted to examine the relationships between e-service quality dimensions and the customer satisfaction of customers in the online grocery industry. The findings are discussed in detail, where the variables highlighted with significance and what impact these variables have on customer satisfaction.

4.1 Demographics of the Respondents

The data is collected through the online survey platform Qualtrics, where the survey was administered from May 1st to the 21st of May. In total, 297 respondents have filled in the online survey. However, some respondents did not go through the whole survey, because they couldn't make it through the screening questions before the survey. So after removing these respondents, 242 respondents remained. Having removed the respondent from the analysis who did not meet the screening questions, we can now look at the missing values. Some persons stopped the survey in the interim, which means fully completed surveys and information are missing. As a result, these persons must also be excluded from further analysis and the number of respondents remaining is 181.

So after checking the data, a total of 181 respondents remained in the analysis. These respondents are living in the Netherlands, are 18 years or older, and have ever made a purchase for their groceries online. Looking at these respondents, 30.4% were male (55), 69.1% female (125), and 0.6% of the respondents identified themself as other (1).

In terms of age, the respondents were quite young: 61.9% of them were between 18-24 years old (112), 21.5% were between 25-34 years old (39), 6.1% were between 35-44 years old (11), 7.2% were between 45-54 years old (13), 3.3% were between 55-64 years old (6), and none of the respondents was 65 years or older (0).

Looking at the employment status of these respondents, 26% of respondents reported being employed (47), with 13.3% being full-time workers (24) and 12.7% being part-time workers (23). However, the largest group of respondents identified as students, comprising 72.9% of them (132). Lastly, 0.6% of respondents identified themselves as a housewife/househusband (1), and 0.6% identified themselves as other (1).

Lastly, regarding the annual income of the respondents, 56.9% of respondents reported an income up to €15,000 (103), 23.8% had an income between €15,001 and €30,000 (43), 8.8% earned between €30,001 and €45,000 (16), 8.3% reported having an income between €45,001 and €60,000 (15), 0.6% had an income between €60,001 and €75,000 (1), and 1.7% reported earning more than €75,000 (3).

Table 4 provides an overview of the demographic characteristics of the respondents.

Table 4: demographics of the respondents

Characteristic	Category	Percentage (%)	Number (N)
Gender	Male	30.4	**55**
	Female	69.1	**125**
	Other	0.6	**1**
Age	18-24 years	61.9	**112**
	25-34 years	21.5	**39**
	35-44 years	6.1	**11**
	45-54 years	7.2	**13**
	55-64 years	3.3	**6**
	65 years or older	0	**0**
Employment status	Full-time worker	13.3	**24**
	Part-time worker	12.7	**23**
	Student	72.9	**132**
	Housewife/Househusband	0.6	**1**
	Other	0.6	**1**
Annual income	Up to €15,000	56.9	**103**
	€15,001 - €30,000	23.8	**43**
	€30.001 - €45,000	8.8	**16**
	€45,001 - €60,000	8.3	**15**
	€60,001 - €75,000	0.6	**1**
	Above €75,000	1.7	**3**

4.2 Exploratory Factor Analysis (EFA)

The Exploratory Factor Analysis (EFA) is a commonly used technique, to investigate the correlative relationships between observed variables and to model these relationships using one or more latent variables (Goretzko et al., 2021; Govindasamy et al., 2024). Hooper (2012) explains that it reduces the variables or items in smaller groups, that belong to each other, which are known as the factors. The factors in this analysis include variables that are interrelated and typically have similar content or meaning (Hooper, 2012). In this research, there are 9 sections, with 24 constructs, and 75 items. Tables 5, 6, 7, and 8 present the loadings, significance level, Cronbach's Alpha, KMO, AVE, and Composite Reliability of the different variables.

Looking at Tables 5, 6, 7, and 8 the loadings of most of the variables did meet the threshold, yet there is one variable that does not meet the threshold. The minimum for a factor loading is between 0,30 and 0,40, but a factor loading of 0,50 or higher is normally seen as necessary for the practical significance of the variables (Hair et al., 2010). The variable "OFR.4" has a value of 0,386 and this is below the threshold of 0,50. This variable is therefore deleted from the analysis, and the construct of Order Fill Rate will now consist of three items, namely OFR.1, OFR.2, and OFR.3. The loadings of the other variables are all above the threshold of 0,50.

Reviewing the Kaiser-Meyer-Olkin (KMO), this value needs to be close to 1 or higher than 0,50, where 0,50 the minimum is (Hair et al., 2010). The overall KMO is 0,865, where it meets the threshold. Next, review all the other KMO values within each construct. All the KMOs in the current study are between 0,500 and 0,850, so they meet the threshold of 0,50.

Another indicator to review is Barlett's Test of Sphericity. A p-value lower than 0,05 indicates that there is sufficient correlation between the variables (Hair et al., 2010). The value for all the variables together is <0,001, so this is acceptable. Looking at the values of the sections and constructs separately, it can be seen that these values are also significant, as they are <0,001.

The next step in the factor analysis is to review Cronbach's Alpha, this value needs to be

higher than the threshold of 0,70 (Hair et al., 2010). Looking at the results, most of the constructs did meet the threshold. However, the constructs of "purchase process", "product selection", and "system availability", did not pass the threshold of 0,7. Excluding certain variables from the study can ensure that Cronbach's Alpha does reach the threshold. Firstly, reviewing the construct of the purchase process, by excluding PP.3 ("It is easier to use the website of the online grocery store to complete my task with the company than it is to call or mail a representative") from the study, the Cronbach's Alpha increased from 0,649 to 0,718 and exceeds the threshold of 0,70. Secondly, reviewing the product selection, by excluding PS.1 ("All my business with the online grocery store can be completed via the website") from the analysis, Cronbach's Alpha increased from 0,682 to 0,760 and exceeded the threshold. Thirdly, reviewing the system availability, Cronbach's Alpha is below the threshold. Since system availability only consists of two variables, no variables can be excluded from the analysis, as it must consist of at least two variables. As a result, system availability SA.1 and SA.2 ("When I use the online grocery store, there is very little waiting time between my actions and the website's response", "The website of the online grocery store loads quickly") will no longer be included in the analysis because these variables did not meet the threshold and it has only two variables.

Finally, it is important to review the Average Variance Extracted (AVE) and the Composite Reliability. To calculate these two values, the calculation of Fornell and Larcker (1981) will be used. The threshold of these values is for AVE a minimum of 0,50 and for the Composite Reliability is a minimum of 0,70 (Ali et al., 2018; Fornell and Larcker, 1981). In this study, the Composite Reliability for all the constructs did meet the threshold and only one variable did not meet the threshold of AVE. This is the AVE of incentives, with a value of 0,496, it is very close to the threshold. Unless it is below the threshold, the construct will still consist in the analysis. In the study by Shrestha et al. (2023), they also faced a construct that did not meet the AVE threshold of 0,50. They had also a value of 0,496, however, they decided to include it in their study. In the study by Ali & Naushad (2021), it was argued that some researchers accept AVEs below the threshold of 0,50. This is only accepted if Cronbach's Alpha and Composite Reliability are greater than 0.70. For the construct of incentives, these values are 0,742 and 0,831. Therefore, based on these criteria, the AVE of this construct is acceptable.

Table 5: Loading & Reliability tests

KMO overall over hole dataset= 0,865	Loading	Sign.	Cronbach Alpha
A1. Website Design		<0,001	0,958
Information quality **(KMO= 0,658 AVE= 0,711 Composite Reliability = 0,880)**		<0,001	0,792
IQ.1 The information on the website of the online grocery store is pretty much what I need to do for my groceries.	0,859		
IQ2. The website of the online grocery store adequately meets the information needs.	0,897		
IQ3. The information on the website of the online grocery store is effective for me.	0,768		
Website Aesthetics **(KMO= 0,686 AVE= 0,739 Composite Reliability= 0,895)**		<0,001	0,819
WA.1 The website of the online grocery store is visually pleasing to do grocery shopping.	0,855		
WA.2 The website of the online grocery store displays a visually pleasing design to do grocery shopping.	0,903		
WA.3 The website of the online grocery store is visually appealing to grocery shopping.	0,819		
Purchase Process **(KMO= 0,500 AVE= 0,780 Composite Reliability= 0,876)**		<0,001	0,718
PP.1 The website of the online grocery store has no difficulties with making a payment for the groceries.	0,883		
PP.2 The purchasing process was not difficult.	0,833		

Table 6: Loadings & Reliability (Continued part 1)

Website Convenience **(KMO= 0,688 AVE= 0,700 Composite Reliability= 0,875)**		<0,001	0,779
WC.1 The website of the online grocery store displays visually pleasing easy-to-read content for me.	0,835		
WC.2 The text on the website of the online grocery store is easy to read for me.	0,872		
WC.3 The website of the online grocery store labels is easy to understand for me.	0,802		
Product Selection **(KMO= 0,500 AVE= 0,806 Composite Reliability= 0,893)**		<0,001	0,760
PS.2 The website of the online grocery store has a good product selection for my grocery shopping.	0,898		
PS.3 The website of the online grocery store has a wide variety of products that interest me for my grocery shopping.	0,898		
Offerings **(KMO= 0,500 AVE= 0,808 Composite Reliability = 0,894)**		<0,001	0,749
OF.1 The website of the online grocery store has low prices for the products.	0,899		
OF.2 The website of the online grocery store has lower prices than psychic grocery stores.	0,899		
Personalization **(KMO= 0,726 AVE= 0,770 Composite Reliability= 0,910)**		<0,001	0,851
PN.1 The website of the online grocery store allows me to interact with them to receive tailored information about groceries.	0,896		
PN.2 The website of the online grocery store has interactive features, which help me accomplish my task of doing grocery shopping.	0,872		
PN.3 I can interact with the website of the online grocery store to get information tailored to my specific needs for groceries.	0,865		
Website Navigation/Organization/Design **(KMO= 0,500 AVE= 0,781 Composite Reliability= 0,877)**		<0,001	0,713
WN.1 Website design/organization is good.	0,884		
WN.2 I don't have technical or navigational problems at the online grocery store during my shopping.	0,884		
A2. Fulfilment		<0,001	0,865
Timeliness of delivery **(KMO= 0,698 AVE= 0,691 Composite Reliability= 0,870)**		<0,001	0,777
TD.1 The products are delivered by the time promised by the online grocery store.	0,836		
TD.2 This online grocery website makes items available for delivery within a suitable time frame.	0,848		
TD.3 It quickly delivers what I have ordered.	0,810		
Order Accuracy **(KMO= 0,688 AVE= 0,685 Composite Reliability= 0,867)**		<0,001	0,800
OA.1 I get what I have ordered from this online grocery store.	0,833		
OA.2 The online grocery store sends out the items I have ordered.	0,845		
OA.3 The online grocery store is truthful about its offerings.	0,805		
Delivery conditions **(KMO= 0,735 AVE= 0,823 Composite Reliability= 0,933)**		<0,001	0,889
DC.1 The products were not damaged during delivery.	0,893		
DC.2 The ordered products arrived in good condition.	0,929		
DC.3 The products arrived with no major damage.	0,899		
A3. Customer Service		<0,001	0,840
Service Level **(KMO= 0,655 AVE= 0,629 Composite Reliability= 0,835)**		<0,001	0,704
SL.1 The online grocery store provides a telephone number to reach the company.	0,835		
SL.2 The online grocery store has customer service representatives available online.	0,740		
SL.3 The online grocery store offers the ability to speak to a live person if there is a problem.	0,801		

Table 7: Loadings and Reliability tests (Continued part 2)

Return handling/policies **(KMO=0,707 AVE= 0,800 Composite Reliability= 0,923)**		<0,001	0,875
RH.1 The online grocery store provides me with convenient options for returning items.	0,909		
RH.2 The online grocery store handles product returns well.	0,927		
RH.3 The online grocery store offers a meaningful guarantee.	0,846		
A4. Security & Privacy		<0,001	0,841
Security **(KMO= 0,673 AVE= 0,662 Composite Reliability= 0,855)**		<0,001	0,740
SY.1 I feel safe in my transactions with the online the online grocery store.	0,824		
SY.2 The online grocery store has adequate security features.	0,848		
SY.3 This website of the online grocery store protects information about my credit card/payment.	0,768		
Privacy **(KMO= 0,664 AVE= 0,748 Composite Reliability= 0.898)**		<0,001	0,824
PY.1 I trust the online grocery store to keep my personal information safe.	0,905		
PY.2 I trust the website of the online grocery store administrators will not misuse my personal information.	0,911		
PY.3 The website of the online grocery store protects information about my web-shopping behavior.	0,771		
A5. Convenience		<0.001	0,906
Access Convenience **(KMO= 0,709 AVE= 0,737 Composite Reliability= 0,894)**		<0,001	0,822
AC.1 I could shop anytime I wanted at the online grocery store.	0,862		
AC.2 I could order products wherever I am at the online grocery store.	0,883		
AC.3 The website of the online grocery store is always accessible.	0,830		
Search Convenience **(KMO= 0,850 AVE= 0,553 Composite Reliability=0,880)**		<0,001	0,834
SC.1 The website of the online grocery store is easy to understand and navigate through the website.	0,787		
SC.2 I can find desired products quickly on the website of the online grocery store.	0,753		
SC.3 The product classification is easy to follow on the website of the online grocery store.	0,819		
SC.4 The online grocery store has an attractive website.	0,690		
SC.5 The online grocery store has a user-friendly website for making purchases.	0,766		
SC.6 The website of the online grocery store has a wide variety of search options to find the same products.	0,630		
Evaluation Convenience **(KMO= 0,677 AVE= 0,645 Composite Reliability=0,845)**		<0,001	0,723
EC.1 The website of the online grocery store provides product specifics.	0,827		
EC.2 The website of the online grocery store uses both text and graphics of product information.	0,789		
EC.3 The website of the online grocery store uses sufficient information to identify different products	0,793		
Transaction Convenience **(KMO= 0,682 AVE= 0,683 Composite Reliability=0,866)**		<0,001	0,763
TC.1 The website of the online grocery store uses simple and convenient online payment.	0,842		
TC.2 The website of the online grocery store uses flexible payment methods.	0,780		
TC.3 The website of the online grocery store is good in use without difficulty to complete my purchases.	0,856		

Table 8: Loading and Reliability tests (Continued part 3)

A6. Order Fill Rate		<0,001	0,756
Order Fill Rate **(KMO= 0,684 AVE= 0,684 Composite Reliability= 0,866)**		<0,001	0,756
OFR.1 The online grocery store website offers a comprehensive selection of products that meet my grocery needs.	0,850		
OFR.2 The online grocery store provides a diverse range of product options within each product category, allowing for flexibility in my shopping choices.	0,849		
OFR.3 I can find and order all the items I need for my groceries from the online grocery store's website, making it a convenient one-stop shopping destination.	0,780		
A7. Incentives		<0,001	0,742
Incentive information, promotional **(KMO= 0,727 AVE=0,496 Composite Reliability= 0,831)**		<0,001	0,742
IFP.1 I will always pay attention to promotional prices and coupon information released on the website of the online grocery store.	0,700		
IFP.2 When I am buying online groceries, I like to buy promotional products on the website of the online grocery store.	0,719		
IFP.3 Livestreaming promotions on the website of the online grocery store allow me to get a more reasonable consumer price.	0,681		
IFP.4 The price discount on the website of the online grocery store makes me feel very generous.	0,699		
IFP.5 Buying on the website of the online grocery store makes me feel more affordable	0,721		
A8. Overall e-service quality		<0,001	0,871
Overall e-service quality **(KMO=0,732 AVE= 0,796 Composite Reliability= 0,921)**		<0,001	0,871
OSQ.1 Overall, my purchase experience with the online grocery store is excellent.	0,892		
OSQ.2 The overall quality of the service provided by the online grocery store is excellent.	0,911		
OSQ.3 My overall feelings toward this online grocery store are very satisfied.	0,873		
A9. Customer Satisfaction		<0,001	0,797
Customer Satisfaction **(KMO= 0,697 AVE= 0,714 Composite Reliability= 0,882)**		<0,001	0,797
CS.1 I am satisfied with the online grocery store.	0,807		
CS.2 The online grocery store is getting close to the ideal online grocery store.	0,856		
CS.3 The online grocery store always meets my needs.	0,870		

4.3 Factor Analysis

In the previous section, the EFA was calculated. So, the Loadings, Significance level, Cronbach's Alpha, KMO, AVE, and Composite Reliability. It is important to examine the factor analysis in Tables 9 and 10 to determine the number of factors in the data set for each construct.

Table 9: Factors

Construct	Components (Eigen value > 1)	Extraction Sum of Squared Loadings		
		Total	% of Variance	Cumulative %
IQ	1 (Eigen Value 2,131)	2,131	71,037	71,037
WA	1 (Eigen value 2,198)	2,198	73,251	73,251
PP	1 (Eigen value 1,562)	1,562	78,119	78,119
WC	1 (Eigen value 2,102)	2,102	70,066	70,066
PS	1 (Eigen value 1,586)	1,586	79,317	79,317
OF	1 (Eigen value 1,627)	1,627	81,340	81,340
PN	1 (Eigen value 2,296)	2,296	76,535	76,535
WN	1 (Eigen value 1,564)	1,564	78,220	78,220
TD	1 (Eigen value 2,081)	2,081	69,365	69,365
OA	1 (Eigen value 2,122)	2,122	70,726	70,726
DC	1 (Eigen value 2,428)	2,428	80,929	90,929
SL	1 (Eigen Value 1,869)	1,869	62,285	62,285
RH	1 (Eigen Value 2,405)	2,405	80,170	80,170
SY	1 (Eigen Value 1,975)	1,975	65,849	65,849

Table 10: Factors (Continued)

PY	1 (Eigen Value 2,238)	2,238	74,602	74,602
AC	1 (Eigen Value 2,208)	2,208	73,596	73,596
SC	1 (Eigen Value 3,317)	3,317	55,290	55,290
EC	1 (Eigen Value 1,935)	1,935	64,498	64,498
TC	1 (Eigen Value 2,048)	2,048	68,270	68,270
OFR	1 (Eigen Value 2,053)	2,053	68,429	68,429
IFP	1 (Eigen Value 2,478)	2,478	49,566	49,566
OSQ	1 (Eigen Value 2,387)	2,387	79,582	79,582
CS	1 (Eigen Value 2,140)	2,140	71,332	71,332

So, looking at Tables 9 and 10, each construct of the data consists of 1 factor/component. This is because, the other components were lower than the threshold of Eigen Value > 1 (Hair et al., 2010). So, now after the factors are completed, the multiple regression analysis can start.

4.4 Multiple Regression Analysis

The next section of this study is to look at the multiple regression analysis. To perform this analysis, it is important to fulfil the assumptions of multiple regression. According to Hair et al. (2010), four key assumptions must be met. Firstly, there must be a linear relationship between independent and dependent variables. Secondly, the variance of the error terms should be constant, this condition is known as homoscedasticity. Thirdly, the error term must be independent, meaning that the residuals of the observations are not correlated. Lastly, the error term should be normally distributed (Hair et al, 2010). A more detailed examination of the assumptions tests can be seen in Appendix 2, 3, 4, and 5.

Checking the linear relationship between the independent variables and the dependent variable, all independent variables of the different e-service factors were plotted against the dependent variable overall e-service quality. After this was done, the new independent variable overall e-service quality was plotted against the dependent variable customer satisfaction. The relationship between the independent variables and the dependent variable is linear, so this assumption has been met.

The second assumption is about constant variance of the error term, also called homoscedasticity (Hair et al., 2010). This was done, by plotting the predicted residuals against the standardised residuals (Hair et al., 2010). The plots in Appendix 4 show a normal random pattern and no funnel shapes, so this assumption has been met.

The third assumption is about the independence of the error term. For this assumption, the Durbin-Watson test can help to check the independence of the error term. Looking at Appendix 5 the Durbin Watson values are 1,963 and 1,949. The values need to be close to 2 (Nerlove and Wallis, 1966), so this assumption is also been met.

The last assumption is about the normality of the error term. The simplest and easiest way of checking this assumption is to plot the standardized residuals in a histogram, where the distribution of the histogram is normally distributed (Hair et al., 2010). In Appendix 6, the two histograms can be seen, these are both normally distributed, so the last assumption is also been met.

4.4.1 Regression Analysis E-service Factors and Overall E-service Quality

Having tested and met the assumptions of the multiple regression, the first multiple regression analysis can be started. The regression analysis was conducted to examine the influence of various e-service factors on the overall e-service quality. The results of the multiple regression analysis are summarised in Table 11, 12, 13, and 14.

Table 11: Model Summary[b]

R	R Square	Adjusted R Square	St. Error of the Estimate	Change Statistics					Durbin-Watson
				R Square Change	F Change	df1	df2	Sig. F Change	
,789[a]	,623	,573	,65312431	,623	12,522	21	159	<0,001***	1,963

a. Predictor: (Constant), IFP_Factor, DC_Factor, PN_Factor, WA_Factor, OF_Factor, SL_Factor, PY_Factor, TC_Factor, PS_Factor, TD_Factor, PP_Factor, SY_Factor, RH_Factor, OFR_Factor, IQ_Factor, AC_Factor, OA_Factor, EC_Factor, WN_Factor, WC_Factor, SC_Factor.
b. Dependent variable: OSQ_Factor

Significance levels are indicated as: *: p-value ≤ 0,05; **: p-value ≤ 0,01; ***: p-value ≤ 0,001

The multiple correlation coefficient (R) is 0,789, indicating a strong correlation between the predictors (constructs/factors of e-service quality) and the dependent variable, Overall E-service Quality (Hair et al., 2010). Moreover, the R^2 is 0,623. According to Ibanez et al. (2016), this value indicates the proportion of the data points that align with the multiple regression, and where this number can be interpreted as a percentage (Ibanez et al., 2016). This means that 62,3% of the variance in the dependent variable can be explained by the independent variables. The value can be interpreted as the proportion of data points that fit the regression line, where a higher R^2 value means a better fit (Ibanez et al., 2016). The adjusted R^2 value is 0,524, which can be interpreted the same as the unadjusted R^2. Additionally, it is used to look at the overall model predictive accuracy, which demonstrates a good overall fit (Hair et al., 2010). Finally, the significance level of the model is below 0,001 (p=<0,001), indicating that the regression model is statistically significant.

Table 12 shows the results of the ANOVA analysis. This analysis offers a statistical test for evaluating the overall fit of the model, by using the F-ratio (Hair et al., 2010).

Table 12: ANOVA[a]

	Sum of Squares	df	Mean Square	F	Sig.
Regression	112,175	21	5,342	12,522	<0,001[b]***
Residual	67,825	159	,427		
Total	180,000	180			

a. Dependent variable: OSQ_Factor
b. Predictor: (Constant), IFP_Factor, DC_Factor, PN_Factor, WA_Factor, OF_Factor, SL_Factor, PY_Factor, TC_Factor, PS_Factor, TD_Factor, PP_Factor, SY_Factor, RH_Factor, OFR_Factor, IQ_Factor, AC_Factor, OA_Factor, EC_Factor, WN_Factor, WC_Factor, SC_Factor.

Significance levels are indicated as: *: p-value ≤ 0,05; **: p-value ≤ 0,01; ***: p-value ≤ 0,001

First, examining the Sum of Squares row. The regression sum of squares is 112,175, indicating the variation in the dependent variable explained by the model. The residual Sum of Squares, also called the unexplained variation, is 67,825 (Kutner et al., 2004). Additionally, the ANOVA table provides a statistical test to determine the overall fit of the model by using the F-ratio (Hair et al., 2010). The F-ratio in this table is 12,522 with a significance level of less than 0,001, which indicates that there is at least one independent variable that has a significant influence on the dependent variable overall e-service quality (Hair et al., 2010).

Having established the model as a whole is significant and exhibits a reasonably high R^2 value, the next step is to interpret the individual coefficients to determine which specific e-service factors significantly contribute to the Overall E-service Quality. This can be seen in the coefficient tables 13 and 14.

Table 13: Coefficient Table

Model (1)	Unstandardized Coefficient		Standardized Coefficient			95,0% Confidence Interval for B		Correlations			Collinearity Statistics	
	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
(Constant)	- 0,001	0,049		- 0,018	0,986	- 0,097	0,095					

Significance levels are indicated as: *: p-value ≤ 0,05; **: p-value ≤ 0,01; ***: p-value ≤ 0,001

Table 14: Coefficient Table (Continued)

IQ_Factor	- 0,003	0,071	- 0,003	- 0,038	0,970	- 0,142	0,137	0,481	- 0,003	- 0,002	0,473	2,114
WA_Factor	0,51	0,073	0,052	0,706	0,481	- 0,092	0,194	0,491	0,056	0,034	0,442	2,265
PP_Factor	0,193	0,071	0,196	2,721	0,007**	0,053	0,334	0,562	0,211	0,132	0,456	2,195
WC_Factor	0,067	0,089	0,067	0,751	0,450	- 0,108	0,242	0,569	0,060	0,037	0,299	3,350
PS_Factor	- 0,046	0,067	- 0,046	- 0,689	0,492	- 0,177	0,086	0,419	- 0,055	- 0,034	0,534	1,874
OF_Factor	0,018	0,059	0,018	0,310	0,757	- 0,099	0,136	0,117	0,025	0,015	0,680	1,472
PN_Factor	- 0,037	0,062	- 0,037	- 0,601	0,549	- 0,159	0,085	0,111	- 0,048	- 0,029	0,621	1,610
WN_Factor	0,028	0,081	0,028	0,344	0,732	- 0,133	0,189	0,541	0,027	0,017	0,353	2,834
TD_Factor	- 0,025	0,067	- 0,025	- 0,375	0,708	- 0,158	0,107	0,474	- 0,030	- 0,018	0,524	1,910
OA_Factor	0,299	0,074	0,298	4,034	<0,001***	0,153	0,446	0,635	0,305	0,196	0,435	2,300
DC_Factor	0,085	0,065	0,085	1,302	0,195	- 0,044	0,214	0,462	0,103	0,063	0,556	1,800
SL_Factor	- 0,047	0,066	- 0,048	- 0,717	0,474	- 0,177	0,083	0,212	- 0,057	- 0,035	0,538	1,857
RH_Factor	0,051	0,068	0,052	0,754	0,452	- 0,083	0,186	0,262	0,060	0,037	0,506	1,975
SY_Factor	- 0,033	0,068	- 0,033	- 0,486	0,628	- 0,168	0,102	0,390	- 0,038	- 0,024	0,501	1,996
PY_Factor	0,087	0,072	0,087	1,210	0,228	- 0,055	0,228	0,445	0,096	0,059	0,459	2,178
AC_Factor	- 0,017	0,071	- 0,017	- 0,241	0,810	- 0,156	0,122	0,438	- 0,019	- 0,012	0,467	2,142
SC_Factor	- 0,020	0,090	- 0,020	- 0,233	0,824	- 0,199	0,158	0,565	- 0,018	- 0,011	0,290	3,451
EC_Factor	0,160	0,078	0,160	2,058	0,041*	0,006	0,314	0,574	0,161	0,100	0,392	2,554
TC_Factor	- 0,161	0,066	- 0,161	- 2,448	0,015*	- 0,292	- 0,031	0,365	- 0,191	- 0,119	0,545	1,836
OFR_Factor	0,241	0,070	0,241	3,435	<0,001***	0,103	0,380	0,602	0,263	0,167	0,480	2,081
IFP_Factor	0,140	0,059	0,140	2,355	0,020*	0,023	0,257	0,371	0,184	0,115	0,672	1,489

Significance levels are indicated as: *: p-value ≤ 0,05; **: p-value ≤ 0,01; ***: p-value ≤ 0,001

Reviewing the correlations table, the most important columns in Tables 13 and 14 are the B-coefficient (unstandardized coefficient), the significance level (sig.), and the Variance Inflation Factor (VIF) for checking multicollinearity. This analysis focuses on the different variables of the constructs: website design, fulfilment, customer service, security & privacy, convenience, order fill rate, and incentives. The B-coefficient values represent the mean value of the dependent variable when all the other independent variables/predictors are zero (Hirsch et al., 2020). Memon et al. (2024) explain that a higher T-value indicates that a coefficient is significantly different from zero. The significance level needs to be below the threshold of 0,05, which strengthens the significance of the relationship between the variables (Memon et al., 2024). Lastly, the values of Tolerance and VIF help to check multicollinearity between the variables. The value of Tolerance should not be below 0,1, as this can cause problems of multicollinearity. The VIF value should not be higher than 10, if this is the case, the model has multicollinearity issues (Senaviratna & Cooray, 2019). In the current study, the Tolerance values are not below 0,1 and the VIF value does not exceed 10, indicating that multicollinearity is not an issue in this study.

Website Design

Within the construct of "Website Design" there are eight variables. The following section discusses how these variables score on the dependent variable overall e-service quality. First, the variable of information quality, IQ_Factor. This variable shows a negative coefficient (B) of -0,003 with a significance level of 0,970 and a VIF of 2,114. This indicates a non-significant influence on the dependent variable overall e-service quality. Secondly, the variable of website aesthetics, WA_Factor. This variable shows a coefficient (B) of 0,051 with a significance level of 0,481 and a VIF of 2,265. This variable also shows a non-significance influence on the dependent variable. Thirdly, the variable

of purchase process, PP_Factor. This variable shows a coefficient (B) of 0,193 with a significance level of 0,007 and a VIF of 2,195. This variable has a significant influence on the dependent variable, which indicates that the purchase process significantly will improve the overall e-service quality. Fourthly, the variable of website convenience, WC_Factor. The variables show a coefficient (B) of 0,067 with a significance level of 0,450 and a VIF factor of 3,350. This indicates that the variable has a non-significant influence on the dependent variable. Fifthly, the variable of product selection, PS_Factor. This variable has a negative coefficient (B) -0,046 with a significance level of 0,492 and a VIF of 1,874. This indicates that this variable has also a non-significant influence on the dependent variable. The next variable is offerings, OF_Factor. This variable has a coefficient (B) of 0,018 with a significance level of 0,757 and a VIF of 1,472. This shows that the offerings variable also has a non-significant influence on the dependent variable. Looking at the next variable of personalization, PN_Factor. This variable shows a negative coefficient of -0,037 with a significance level of 0,549 and a VIF of 1,610. Showing no significant impact of this variable on the dependent variable. Lastly, the variable of website navigation, WN_Factor. This variable shows a coefficient (B) of 0,028 with a significance level of 0,732 and a VIF of 2,834. Also, this last result shows a non-significant influence on the dependent variable.

In summary, among the eight different variables representing website design, only the purchase process (PP_Factor) has a significant and positive influence on overall e-service quality. This provides partial support for Hypothesis 1. The other website design variables do not show significant influences, so do not contribute to supporting Hypothesis 1.

Fulfilment

The construct of "Fulfilment" has three variables. The values of these variables can now be discussed to determine their influence on the dependent variable of overall e-service quality. First, the variable of timeliness of delivery, TD_Factor. This variable shows a coefficient (B) of 0,025 with a significance level of 0,708 and a VIF of 1,910. This indicates that the timeliness of delivery does not have a significant influence on the dependent variable. Secondly, the variable order accuracy, OA_Factor. This variable shows a coefficient (B) of 0,299 with a significance level of <0,001 and a VIF value of 2,300. This suggests that order accuracy is a critical factor for the overall e-service quality of customers, this gives support for Hypothesis 2. Lastly, the variable of delivery conditions, DC_Factor. This variable shows a coefficient (B) of 0,299 with a significance level of 0,195 and a VIF of 1,800. This means that the delivery conditions do not have a significant influence on the dependent variable.

In summary, within the construct of fulfilment, only the order accuracy (OA_Factor) has a significant and positive influence on the overall e-service quality, providing some support for Hypothesis 2. This means that order accuracy plays a role in improving the customer's overall e-service quality. Where the other two variables are not significant and therefore do not contribute to support Hypothesis 2.

Customer Service

The construct of "Customer Service" has two variables. The values of these variables can now be discussed to determine their influence on the dependent variable of overall e-service quality. The first variable is service level, SL_Factor. This variable has a negative coefficient (B) of – 0,047 with a significance level of 0,474 and a VIF of 1,857. The second variable is the return handling/policies, RH_Factor. This variable shows a coefficient of 0,051 with a significance level of 0,452 and a VIF of 1,975. Both variables are non-significant, which means these variables do not influence the overall e-service quality and do not contribute to support Hypothesis 3.

Security & Privacy

The construct of "Security & Privacy" consists of two variables. The values of these variables can now be discussed to determine their influence on the dependent variable of overall e-service quality. Firstly, the security variable, SY_Factor. This variable has a negative coefficient (B) of – 0,033

with a significance level of 0,628 and a VIF of 1,996. The second variable is privacy, PY_Factor. This variable shows a coefficient (B) of 0,087 with a significance level of 0,228 and a VIF of 2,178. This means that both variables have no significant influence on the dependent variable. Consequently, Hypothesis 4 is not supported, and the variables do not significantly contribute to the overall e-service quality.

Convenience

The next construct is "Convenience", which consists of four variables. The values of these variables can now be discussed to determine their influence on the dependent variable of overall e-service quality. The first variable is access convenience, AC_Factor. This variable has a negative coefficient (B) of -0,017 with a significance level of 0,810 and a VIF of 2,142. This means that access convenience does not have a significant influence on the dependent variable. The next variable is search convenience, SC_Factor. This variable has, like the previous variable, a negative coefficient (B) of – 0,020 with a significance level of 0,824 and a VIF of 3,451. This also demonstrates that search convenience does not have a significant influence on the dependent variable. The third variable is evaluation convenience, EC_Factor. This variable has a coefficient (B) of 0,160 with a significance level of 0,041 and a VIF of 2,554. This indicates that evaluation convenience has a significant and positive influence on the dependent variable. Finally, the variable of transaction convenience, TC_Factor. This variable shows a negative coefficient (B) of -0,161 with a significance level of 0,015 and a VIF of 1,836. This indicates that the variable has a significant, but negative influence on the dependent variable.

In summary, the analysis of the four variables representing the construct of convenience, reveals that only the variable of evaluation convenience is significant and positive, which gives some support for Hypothesis 5. The variable of transaction convenience is also significant, but the B-coefficient is negative, this is not in line with Hypothesis 5. The other two variables are non-significant and do not support Hypothesis 5. This suggests that evaluation convenience is the only variable that positively contributes to the improvement of the overall e-service quality. While transaction convenience unexpectedly has a negative influence on the dependent variable.

Order Fill Rate

The construct of the "Order Fill Rate", consists of one variable. The value of this variable can now be discussed to determine its influence on the dependent variable, overall e-service quality. The order fill rate, OFR_Factor, has a coefficient (B) of 0,241, with a significance level of <0,001 and a VIF of 2,801. These values indicate that the order fill rate has a significant and positive influence on the dependent variable.

In summary, the analysis of the order fill rate variable gives full support for Hypothesis 6. This suggests that a high order fill rate plays a crucial role in improving the overall e-service quality.

Incentives

The last construct of the e-service factors is the construct of "Incentives". The value of this variable can now be discussed to determine its influence on the dependent variable, overall e-service quality. The incentives variable, IFP_Factor, shows a coefficient (B) of 0,140 with a significance level of 0,020 and a VIF of 1,489. This indicates that the Incentives variable has a significant and positive influence on the dependent variable.

In summary, this means that incentives on the website of an online grocery store play an important role in the improvement of the overall e-service quality. This analysis provides full support for Hypothesis 7.

Summary of the E-service Factors affecting the Overall E-service Quality

To conclude this subchapter on the multiple regression analysis for the various e-service factors influencing the overall e-service quality, the different outcomes will be examined.

Hypothesis 1: website design has a positive influence on the overall e-service quality. This hypothesis is partially supported by the purchase process. The hypothesis is not supported by the rest

of the variables; information quality, website Aesthetics, website convenience, product selection, offerings, personalization, and website navigation/organization/design.

Hypothesis 2: fulfilment has a positive influence on the overall e-service quality. This hypothesis is also partially supported, but now with the variable order accuracy. It is not supported by the rest of the variables; timeliness of delivery and delivery conditions.

Hypothesis 3: customer service has a positive influence on the overall e-service quality. This hypothesis is not supported by both variables; service level and return handling/policies.

Hypothesis 4: security & privacy have an influence effect on the overall e-service quality. This hypothesis is not supported by both variables; security and privacy.

Hypothesis 5: convenience has a positive influence on the overall e-service quality. This hypothesis is partially supported by evaluation convenience. The variable transaction convenience is significant, but the influence on the overall e-service quality is negative, and this is not in line with the hypothesis. The hypothesis is not supported by the other two variables; access convenience and search convenience.

Hypothesis 6: the order fill rate has a positive influence on the overall e-service quality. This hypothesis is supported by the variable of order fill rate.

Hypothesis 7: incentives have a positive influence on the overall e-service quality. This hypothesis is supported by the variable incentive information, promotional.

After the analysis, it gives the following regression equation:

Y (Overall E-service Quality) = β_0 (Intercept) + β_1 (Purchase Process) + β_2 (Order Accuracy) + β_3 (Evaluation Convenience) + β_4 (Order Fill Rate) + β_5 (Incentives information, promotional) + ϵ

4.4.2 Regression Analysis Overall E-service Quality and Customer Satisfaction

After conducting the initial multiple regression analysis to examine the influence of various e-service factors on the overall e-service quality, the focus now shifts to a multiple regression analysis for customer satisfaction. In this analysis, overall e-service quality serves now as the independent variable, while customer satisfaction is the dependent variable. The results of this analysis are summarised in the Table 15, 16, and 17.

Table 15: Model Summary[b]

R	R Square	Adjusted R Square	St. Error of the Estimate	Change Statistics					
				R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
0,725[a]	0,526	0,524	0,69015022	0,526	198,907	1	179	<0,001***	1,959

a. Predictor: (Constant), OSQ_Factor
b. Dependent variable: CS_Factor

Significance levels are indicated as: *: p-value ≤ 0,05; **: p-value ≤ 0,01; ***: p-value ≤ 0,001

The multiple correlation coefficient (R) is 0,725, indicating a strong correlation between the predictor (construct/factor) of overall e-service quality and the dependent variable of customer satisfaction (Hair et al., 2010). Additionally, the R^2 is 0,526. This value indicates the proportion of the data points that align with the multiple regression, and where this number can be interpreted as a percentage (Ibanez et al., 2016). This means that 52,6% of the variance in the dependent variable can be explained by the independent variable. This value can be interpreted as the proportion of data points that fit the regression line, where a higher value of the R^2 means a better fit (Ibanez et al., 2016). The adjusted R^2 value is 0,524, which can be interpreted the same as the unadjusted R^2. Additionally, it is used to look at the overall model predictive accuracy, which demonstrates a good overall fit (Hair et al., 2010). Finally, the significance level of the model is below 0,001 (p=<0,001), indicating that the regression model is statistically significant.

Table 16 shows the results of the ANOVA analysis. This analysis offers a statistical test for evaluating the overall fit of the model, by using the F-ratio (Hair et al., 2010).

Table 16: ANOVAᵃ

	Sum of Squares	df	Mean Square	F	Sig.
Regression	94,741	1	94,741	198,907	<0,001ᵇ***
Residual	85,259	179	0,476		
Total	180,000	180			
a. Dependent variable: CS_Factor					
b. Predictor: (Constant), OSQ_Factor					

Significance levels are indicated as: *: p-value ≤ 0,05; **: p-value ≤ 0,01; ***: p-value ≤ 0,001

First, examining the Sum of Squares row. The regression sum of squares is 94,741, indicating the variation in the dependent variable explained by the model. The residual sum of squares, also called the unexplained variation, is 85,259 (Kutner et al., 2004). Additionally, the ANOVA table provides a statistical test to determine the overall fit of the model by using the F-ratio. The F-ratio in this table is high, with a value of 198,907 and a significance level of less than 0,001. Therefore, this strongly indicates that the overall e-service quality is a significant predictor of the dependent variable customer satisfaction (Hair et al., 2010).

Having established and interpreted the model summary and ANOVA tables, the next step is to delve into the interpretation of the coefficient to find out if the independent variable, overall e-service quality, significantly influences customer satisfaction. This can be seen in the coefficient table.

Table 17: Coefficient Table

	Unstandardized Coefficient		Standardized Coefficient			95,0% Confidence Interval for B		Correlations			Collinearity Statistics	
Model (1)	**B**	**Std. Error**	**Beta**	**t**	**Sig.**	**Lower Bound**	**Upper Bound**	**Zero-order**	**Partial**	**Part**	**Tolerance**	**VIF**
(Constant)	7,165E-17	0,051		0,000	1,000	- 0,101	0,101					
OSQ_Factor	0,725	0,051	0,725	14,103	<0,001***	0,624	0,827	0,725	0,725	0,725	1,000	1,000

Significance levels are indicated as: *: p-value ≤ 0,05; **: p-value ≤ 0,01; ***: p-value ≤ 0,001

Examining the correlations table allows for the interpretation of the different values. The most important columns in Table 17 are the B-coefficient (unstandardized coefficient), the significance level (sig.), and the Variance Inflation Factor (VIF) for assessing multicollinearity. First, consider the constant variable, the dependent variable. The B-coefficient for the constant variable is $7,16^{-17}$. This value represents the mean value of the dependent variable when all the independent variables or predictors are zero (Hirsch et al., 2020). Next, consider the predictor variable, overall e-service quality. The B-coefficient is 0,725, which indicates for each unit that increases in the independent variable, the customer satisfaction is expected to increase by 0,725. This demonstrates the strength of the relationship between the independent variable and the dependent variable. The coefficient of the T-value is high with a value of 14,103, which implies that the coefficient is significantly different from 0 (Memon et al., 2024). Furthermore, the significance level is below the threshold of 0,05, specifically less than 0,001. This strengthens the significance of the relationship between these variables (Memon et al., 2024). Lastly, the values of Tolerance and VIF are essential for checking multicollinearity between the variables. The Tolerance value should not be less than 0,1 as the values below this can cause problems of multicollinearity. The value for the VIF should not exceed 10, values of VIF above this indicate multicollinearity issues (Senaviratna & Cooray, 2019). In the current study, the Tolerance value is not below 0,1 and the VIF value does not exceed 10, indicating that multicollinearity is not an issue in this study.

Summary of the Overall E-service Quality affecting the Customer Satisfaction

To conclude this subchapter on the multiple regression analysis of overall e-service quality influencing customer satisfaction, the following outcomes are examined.

The R-square (R^2) indicates that 52,6% of the variance in Customer Satisfaction can be explained by the overall e-service quality. The F-value is high (198,907) and significant (<0,001), indicating that overall e-service quality is a predictor of customer satisfaction.

The B-coefficient for overall e-service quality is significant and positive (<0,001 and 0,725), which indicates that if the overall e-service quality increases by one step, the customer satisfaction increases with 0,725.

Lastly, there are no multicollinearity issues in the model. This is indicated by the Tolerance and VIF values.

Therefore, the results support Hypothesis 8 of "the overall e-service qualities have a positive influence on the customer satisfaction".

After the analysis, it gives the regression equation: *Y* (Customer Satisfaction) = ß0 (Intercept) + ß1 (Overall E-service Quality) + ε. The visualisation of the linear regression can be seen in Figure 2.
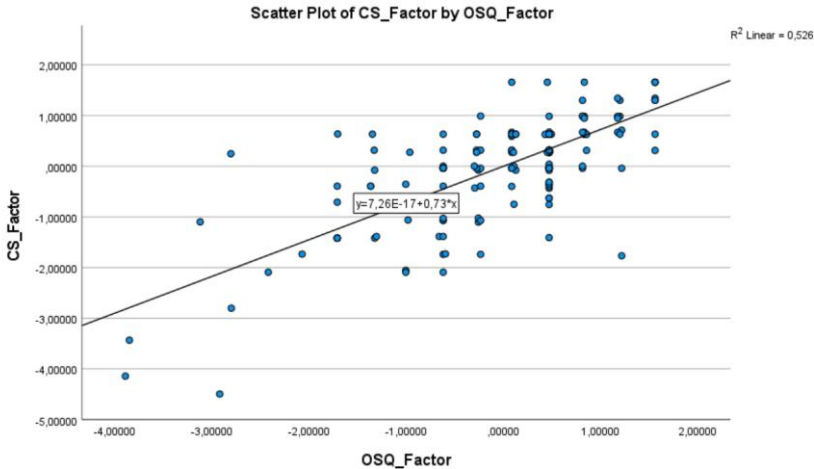

Figure 2: Visualisation linear regression

5. Discussion

This study In the following chapter, the different hypotheses will be discussed again, but the findings will also be discussed with previous theories from the literature review.

5.1 Website Design

Hypothesis 1: Website design has a positive influence on the overall e-service quality.

This study finds that only one variable of website design, the purchase process, has a significant and positive influence on the overall e-service quality, which provides limited support for Hypothesis 1. This finding aligns with the study by Blut (2016), who stated that "attributes that are associated with website design play a crucial role during the early stage of the shopping process". The purchase process is one of these attributes, that can play a significant influence on customers doing their groceries online. However, Rita et al. (2019) identified that the entire construct of website design was essential for superior e-service quality. The association of Rita et al. (2019) is further supported by Daffodil and De Rose (2023), who confirmed that all elements of the website design have a significant impact on the customer satisfaction. They suggest that companies need to focus on the website design elements, including personalization, a user-friendly website, fast loading of webpages, product images and descriptions, this will influence the customer satisfaction (Daffodil and De Rose, 2023). Conversely, Zhou et al. (2009) argued in their study a high-quality website design is no longer the factor that differentiates an e-commerce website from its competitors, which is in contradiction with the previously mentioned studies. Instead, they suggested that e-commerce companies should focus more on other service qualities because most e-commerce website designs are now easy to use and perform well (Zhou et al, 2009). This finding is supported by the study conducted by Jia et al. (2014). Their research argues that e-commerce stores need to focus on the information and service quality of their website. This shift from focusing on website design to emphasizing information and service quality can be attributed to the growing similarity of e-commerce websites, making website design no longer a critical dimension of the customer's shopping experience (Jia et al., 2014). These perspectives may explain why website design is not perceived as an important e-service factor in the online grocery industry, indicating that these companies need to focus on other e-service factors. The findings of the current study, support the findings of Zhou et al. (2009), suggesting that respondents may place less value on website design while doing their online shopping.

5.2 Fulfilment

Hypothesis 2: Fulfilment has a positive influence on the overall e-service quality.

This study finds that similar to the previous factor, only one variable of fulfilment has a significant and positive influence on the overall e-service quality. This was about the variable of the order accuracy and provides some limited support for Hypothesis 2. The positive influence of order accuracy aligns partially with the study by Blut et al. (2015), who identified that timely and accurate delivery of products is a critical factor in the online retail world. However, the current study found that only an accurate order is important for customers since the timelines of delivery was non-significant. Additionally, Santos (2003) emphasized the importance of order accuracy, stating that customers who buy their products online, give high importance to the order accuracy. This can be confirmed by Jalil (2018), their results show that order accuracy tends to satisfy online customers. Conversely, Rita et al. (2019) argued that the entire construct of fulfilment was seen as essential for superior e-service quality. The findings of the current study contradict those of Rita et al. (2019), which suggest that fulfilment as an entire construct, is not essential in the context of online grocery shopping. The results indicate that order accuracy is a critical measure of e-service to the customers. A reason for this finding is that incomplete orders lead to annoyed or dissatisfied customers (Bartholdi and Hackman, 2008). Consequently, customers within the online grocery industry may place more value on the accuracy of their orders than on the delivery time of their groceries.

5.3 Customer Service

Hypothesis 3: Customer service has a positive influence on the overall e-service quality.

This study finds that none of the variables of customer service have a significant and positive influence on the overall e-service quality. Therefore Hypothesis 3 is not supported by the findings. The results of the current study are consistent with previous studies by Farisa (2018) and Rita et al. (2019), which both found that customer service was not significantly related to building superior e-service quality (Farisa, 2018; Rita et al., 2019). In contrast, other studies have suggested that customer service is associated with the overall e-service quality (Blut et al., 2015) and directly influences the customer satisfaction (Andreassen and Olsen, 2008). Additionally, Lee and Lin (2005) identified responsiveness, which is comparable to customer service, as an important variable that affects the e-service quality. However, in the context of online grocery shopping, the results of this study show that customer service is of less importance. Wolfinbarger and Gilly (2003) suggest that extensive customer service may be not necessary if a grocery website is of good quality, as they find customer service is only slightly related to the quality of a website. This could explain why customer service is of less importance in this context.

5.4 Security & Privacy

Hypothesis 4: Security & Privacy have an influence effect on the overall e-service quality.

This study finds that none of the variables from security & privacy have a significant and positive influence on the overall e-service quality. Therefore, Hypothesis 4 is not supported by the findings. These results contrast with earlier studies by Blut et al. (2015), Hanus (2016), Pearson et al. (2012), and Rita et al. (2019), which identified the critical role of security & privacy as determinants of e-service quality. Previous research highlighted that security & privacy are very important to customers because they are often concerned and have doubts about payment systems and misuse of personal information (Rita et al., 2019; Hanus, 2016). Moreover, security & privacy are significantly associated with the perceived e-service quality of a website (Blut et al., 2015; Pearson et al., 2012). Given the results of the current study, the context of online grocery shopping appears to differ from other e-commerce sectors where security & privacy are of greater importance. This study suggests that customers who frequently purchase groceries online may place less emphasis on security & privacy concerns, possibly because of the convenience of paying upon the delivery (Jumbo, 2024; Albert Heijn, n.d.; PLUS, n.d.). Additionally, customers may have greater confidence and trust in well-established companies, which reduces the uncertainty of their purchase (Smith and Park, 1992), and may increase their comfort level in sharing their personal information.

5.5 Convenience

Hypothesis 5: Convenience has a positive influence on the overall e-service quality.

This study finds two variables that significantly influence the dependent variable. However, their influence differs: one variable has a negative influence and the other one has a positive influence. Transaction convenience has a significant, but negative influence on the overall e-service quality, which does not support Hypothesis 5. Conversely, evaluation convenience has a significant and positive influence on the overall e-service quality, supporting Hypothesis 5. The other variables, access- and search convenience, did have a non-significant influence on overall e-service quality. These findings contrast with prior research. For instance, Zeqiri et al. (2023) argue that the perceived convenience of online shoppers is considered as a critical factor in creating a positive value for customers and influencing their shopping intention. Similarly, Almarashdeh et al. (2019) emphasized that providing high levels of convenience during online shopping is a key strategy to retain and maintain customers. However, the current study suggests that not all dimensions of convenience hold equal importance in online grocery shopping, specifically, only the evaluation convenience dimension. This aligns with Ali and Naushad (2021) and Hanus (2016), who argued that customers prioritize time and cost savings. Additionally, customers value the ability to view multiple products with a single click and can compare and evaluate them on details, prices, pictures, and reviews to make informed

buying decisions (Ali and Naushad, 2021; Hanus, 2016; Le-Hoang, 2020). Le-Hoang (2020) further argued that evaluation convenience is a strong factor influencing the customer satisfaction. The negative impact of transaction convenience could be explained by the perceived complexity of the transaction process. Online grocery store needs to provide a variety of flexible, convenient, and simple payment methods to mitigate these complexities (Pham et al., 2018). Failure to do so could negatively influence the customers' overall perception of e-service factors.

5.6 Order Fill Rate

Hypothesis 6: The order fill rate has a positive influence on the overall e-service quality.

This study finds that the order fill rate had a significant and positive influence on the overall e-service quality, which supports Hypothesis 6. This study suggests that a high order fill rate, allows online grocery stores to serve more customers, and to fulfil most of the orders, which is in line with the study by De Magalhães (2021). If the online grocery store has a high order fill rate, customers don't need to use the traditional grocery stores any more (Olsen, 2019), nor need to split their demand between different stores (Wan et al., 2012), and will react positively (Rao et al., 2011). Customers give priority to the biggest online retail stores because they want to purchase all the products in one place, to make it a complete shopping experience (Naushad and Siddiqui, 2019). Therefore, an online grocery store needs to have enough space to accommodate the products (De Magalhães, 2021). This could potentially lead to more efficient inventory management if they have enough space for the products to be properly arranged. The previous studies confirm the current research findings that a (high) order fill rate positively impacts customer satisfaction.

5.7 Incentives

Hypothesis 7: Incentives have a positive influence on the overall e-service quality.

This study finds that incentives significantly and positively influence overall e-service quality, supporting Hypothesis 7. The findings suggest that online grocery stores can strategically employ incentives on their website to encourage customer engagement and facilitate buying behavior. The findings of the current study align with the proposal of Santos (2003), who emphasized that incentives can help to enhance customer satisfaction. Incentives can attract and retain online customers to come back to the website, and motivate them to behave in the company's interest (Santos, 2003; Bhattacherjee, 2001). The opportunity to get an incentive on the website positively influences consumer behavior (Hollaus and Schantl, 2022). Zhang et al. (2022) further argued that high-quality live incentives, effectively stimulate purchase desire. Additionally, Hanus (2016) emphasised that online grocery shoppers perceive missing out on special bargains in the traditional store as a disadvantage of online grocery. Therefore, this study confirms the potential of incentives in the context of online grocery stores to effectively incentivize, guide, and reward customers, ultimately fostering increased spending.

5.8 Overall E-service Quality

Hypothesis 8: the Overall E-service Qualities have a positive influence on the customer satisfaction.

This study finds that the overall e-service quality has a significant and positive influence on the customer satisfaction of online grocery shoppers, supporting Hypothesis 8. This finding aligns with previous studies. For instance, Wolfinbarger and Gilly (2003) argued that e-service quality is the variable that is closely related to the customer satisfaction. To improve and satisfy customers, a strategy that focuses on e-service qualities is a means for this (Brady and Robertson, 2001; Rita et al., 2019). Similarly, Ribbink et al. (2004), found that the e-service qualities of a web shop directly and positively influence customer satisfaction. The current study suggests that online grocery stores should give priority to the improvement of their e-service qualities, which are significantly and positively associated with customer satisfaction. Specifically, the variables of the purchase process, order accuracy, evaluation convenience, order fill rate, and incentives can lead to increased customer satisfaction. By focusing on these areas online grocery stores can better fulfil customer needs and expectations.

6. Conclusions

This chapter presents the conclusions of the current study. It begins with addressing the research question, followed by the study's limitations, recommendations for future research, and concludes with the academic and practical relevance of this study.

6.1 Answering research question

The research question introduced in Chapter 1 was: "Which of the e-service factors influence the customer satisfaction, within the online grocery market in the Netherlands?".

Throughout the study, nine different constructs were examined: website design, fulfilment, customer service, security & privacy, convenience, order fill rate, incentives, overall e-service quality, and customer satisfaction. As previously discussed, certain items were excluded from the analysis, because they did not meet specified thresholds. Specifically, one item from the purchase process (PP.3), one item from product selection (PS.1), and one from order fill rate (OFR.4) were deleted from the analysis. Both items (SA.1 and SA.2) and consequently the entire variable of system availability was deleted.

Based on the results of the multiple regression analysis, the following conclusions can be drawn. Within the construct of website design, only the variable of the purchase process had a significant and positive influence (B= 0,193 and p= 0,007) on the overall e-service quality (H1). All the other variables were found to be non-significant. Similarly, within the fulfilment construct, only the variable of order accuracy had a significant and positive influence (B= 0,299 and p= <0,001) on the overall e-service quality (H2), with other variables being non-significant. Moving to the constructs of customer service and security & privacy, both constructs had a non-significant influence on overall e-service quality (H3 and H4). Within the convenience construct, only the evaluation convenience factor had a significant and positive influence (B= 0,160 and p= 0,041) on the overall e-service quality (H5), while other factors within the construct were non-significant. The order fill rate construct showed a significant and positive influence (B= 0,241 and p= <0,001) on the overall e-service quality (H6). The incentives construct also demonstrated a significant and positive influence (B= 0,140 and p= 0,020) on the overall e-service quality (H7). Lastly, the influence of the overall e-service quality on customer satisfaction was found to be significant and positive (B= 0,725 and p= <0,001).

In conclusion, to answer the research question, "Which of the e-service factors influences the customer satisfaction, within the online grocery market in the Netherlands?" the study found that the variables of the purchase process, order accuracy, evaluation convenience, order fill rate, and incentives are the key factors influencing customer satisfaction in this industry.

6.2 Limitations

While this study provides valuable insights into the impact of various e-service factors on the overall e-service quality and customer satisfaction within the online grocery market in the Netherlands, several limitations should be acknowledged.

Firstly, the sample was limited to Dutch customers, which may not be seen as representative of other countries, regions or cultures. Different countries, regions or cultures may have different e-service expectations and perceptions of customer satisfaction. Additionally, while the initial sample size of 297 respondents seemed substantial, it was reduced to 181 after cleaning the data (removing respondents who did not meet the search criteria or did not complete the survey and got missing data). A larger and more diverse sample could potentially yield more generalizable and reliable outcomes.

Secondly, the study focused specifically on certain e-service factors, but did potentially overlooked other relevant factors such as linkage (Santos, 2003), availability of products (Blut et al., 2015), perceived product quality (Ali and Naushad, 2021) and risk (Ali and Naushad, 2021; Hanus, 2016). These variables were not included in the current study for several reasons. Firstly, the factors mentioned in the limitations section are less directly associated with the e-service factors compared to the chosen variables of this study. For example, website design, fulfilment, customer service, and security & privacy, have been studied extensively in prior research studies by Blut et al., (2015) and

Rita et al. (2019), providing a theoretical foundation within online e-commerce. Therefore, the variables of this study were selected based on their relevance and impact. Moreover, to maintain feasibility and focus, the study made a conscious decision to focus on these variables. This approach allowed for a more in-depth investigation of their specific influences on customer satisfaction, within the targeted industry.

6.3 Future Research

Future research could extend this current study to other countries, regions, or cultures, such as other European countries, to understand the cultural differences in e-service quality expectations and customer satisfaction. This would provide new insights into how cultural contexts shape perceptions of e-service quality and their influence on customer satisfaction.

To increase the generalizability and reliability of the results, future studies could aim for a larger and more diverse sample size. Including participants with varied backgrounds in terms of age (the current study had a relatively young sample), gender (the majority of respondents were women), and income (probably due to the young age, income levels were quite low) would provide a more robust dataset and detailed analysis. Examining these demographic factors could reveal moderate relationships between e-service factors and customer satisfaction, which can help online businesses to develop strategies for different customer segments.

Lastly, future research could investigate other e-service factors that were not tested and analysed in this study, for example, linkage (Santos, 2003), availability of products (Blut et al., 2015), perceived product quality (Ali and Naushad, 2021) and risk (Ali and Naushad, 2021; Hanus, 2016). Exploring these factors or other factors could provide a better understanding of their influence on customer satisfaction within the online grocery industry.

6.4 Academic Implications

The current study contributes to the existing literature on e-service quality and customer satisfaction, by providing a unique perspective focused on the online grocery industry.

Firstly, previous studies such as Rita et al. (2019), Blut et al. (2015), Blut (2016) and Holloway & Beatty (2008), have researched e-service factors within the broader e-commerce setting. These studies specifically investigated the four factors of website design, fulfilment, customer service, and security & privacy, but not in a specific industry. In contrast, the current study looked at a specific industry, namely the online grocery industry. Variables such as convenience and incentives lacked a specific measurement scale in prior research. For instance, Santos (2003) identified factors through qualitative group interviews, which indicates the need for quantitative research to test the factors, in this study the incentives factor was tested quantitatively. Similarly, in the study by Hanus (2016) there was also no specific measurement scale, only secondary data was used. Therefore, the current study tested also the variable of convenience quantitatively. Lastly, while De Magalhães (2021) statistically tested the order fill rate, the study did not comprehensively examine its influence on the overall e-service quality and customer satisfaction, whereas the current study did. Moreover, the current study integrates multiple theoretical perspectives including e-commerce, e-service factors, online (grocery) shopping, and customer satisfaction. This comprehensive approach enhanced a broader understanding of different contexts.

Lastly, focusing specifically on the online grocery industry fills the gap in the current literature. The rise of online grocery shopping is mainly due to the COVID-19 pandemic, this underscores the importance of research this specific industry is essential and interesting. This study provides sector-specific insights and is valuable for researchers to understand which e-service factors drive customer satisfaction in this industry.

6.5 Practical implications

The study and its findings offer practical implications specifically for online grocery stores to improve their e-service qualities and customer satisfaction on their website. The findings of this study indicate that online grocery stores need to focus on the purchase process, order accuracy, evaluation

convenience, order fill rate, and incentives.

Firstly, the findings show that the e-service factor of the purchasing process is important. Online grocery stores should focus on streamlining and simplifying the purchasing process for customers. Improvements can include implementing a streamlined checkout system, where customers can easily pay and complete their purchases without any problems, and ensuring transparency in clear product information and prices. With these streamlined buying processes, the chances of customers completing their purchase without dropping out with a filled shopping basket can increase.

Secondly, improving order accuracy is crucial for customer satisfaction. Online grocery stores must ensure that customers receive what they have ordered, without any errors or issues, and that everything is in good condition upon delivery. A good inventory management system can contribute to achieving order accuracy for customers. Consistently fulfilling orders builds trust with customers in the online supermarket and reduces complaints. Clear communication with customers about their order status helps manage expectations and maintains satisfaction levels. If any issues arise during the order process, communicating with the customer and offering solutions is crucial.

Thirdly, evaluation convenience was identified as an important factor. Online grocery stores need to make it easy for consumers to search, compare, and evaluate different products on the website. This can be achieved by improving the website to include more detailed product pages with additional information such as calories, Nutri-Scores, recipes with the product(s), and customer ratings. Additionally, implementing a comparison tool for different brands of a specific product segments can enhance the shopping experience and ultimately improve the customer satisfaction.

Fourth, the order fill rate was identified as a significant factor. Building on the importance of order accuracy and effective inventory management, it is crucial for online grocery stores to maintain a high order fill rate. Online grocery stores need to have and accommodate a large range of products (De Magalhães, 2021), to minimize customer disappointment when products are no longer available, which can result in lost sales. An improvement could involve grocery stores implementing real-time tracking systems within the inventory. This would enable products scanned out in the online stores or distribution centres to update the website immediately, allowing customers to more easily and quickly identify that a product is out-of-stock before completing their purchase.

The last factor that online grocery stores could implement is the incentives factor. Offering attractive incentives, both promotional and informative, can enhance satisfaction among customers. Customers often fear missing out on special deals that are exclusive to traditional physical stores, so implementing incentives or exclusive deals for online grocery stores is crucial (Hanus, 2016). For example, by offering loyalty programs, promotions, personalized recommendations, bundled offers, informative content, and daily or flash deals, which differ from the deals in physical supermarkets. This approach could make customers more likely to choose online supermarkets over physical supermarkets.

Source list

Albert Heijn. (n.d.). Hoe Kan Ik Mijn Online Boodschappen Betalen?
https://www.ah.nl/klantenservice/online-bestellen/betalen#hoe-kan-ik-mijn-online-boodschappen-betalen

Ali, F., Rasoolimanesh, S. M., Sarstedt, M., Ringle, C. M., & Ryu, K. (2018). An assessment of the use of partial least squares structural equation modeling (PLS-SEM) in hospitality research. *International Journal of Contemporary Hospitality Management*, 30(1), 514–538. doi:10.1108/ijchm-10-2016-0568

Ali, I., & Naushad, M. (2021). Determinants of customer satisfaction in online grocery shopping. *International Journal of Data and Network Science*, 5(3), 383-390. DOI: 10.5267/j.ijdns.2021.5.005

Allua, S., & Thompson, C. A. (2009). Inferential statistics. *Air Medical Journal*, 28(4), 168–171. https://doi.org/10.1016/j.amj.2009.04.013

Almarashdeh, I., Jaradat, G., Abuhamdah, A., Alsmadi, M., Alazzam, M. B., Alkhasawneh, R., & Awawdeh, I. (2019). The difference between shopping online using mobile apps and website shopping: A case study of service convenience. *International Journal of Computer Information Systems and Industrial Management Applications*, 11, 151-160. https://www.researchgate.net/The_Difference_Between_Shopping_Online_Using_Mobile_Apps_a_nd_Website_Shopping_A_Case_Study_o_f_Service_Convenience

Anderson, E. W., & Sullivan, M. W. (1993). The antecedents and consequences of customer satisfaction for firms. *Marketing science*, 12(2), 125-143. https://www.jstor.org/stable/184036

Anderson, E. W. (1996). Customer satisfaction and price tolerance. *Marketing Letters*, 7(3), 265–274. https://doi.org/10.1007/bf00435742

Andreassen, T. W., & Olsen, L. L. (2008). The impact of customers' perception of varying degrees of customer service on commitment and perceived relative attractiveness. Managing Service Quality: *An International Journal*, 18(4), 309–328. DOI: 10.1108/09604520810885581

Bartholdi, J. J., & Hackman, S. T. (2008). Warehouse & Distribution Science: Release 0.89 (p. 13). *Atlanta: Supply Chain and Logistics Institute*. https://www.scl.gatech.edu/sites/default/files/downloads/gtscl-warehouse_science_bartholdi.pdf

Bhattacherjee, A. (2001). An empirical analysis of the antecedents of electronic commerce service continuance. *Decision Support Systems*, 32(2), 201–214. https://doi.org/10.1016/s0167-9236(01)00111-7

Biesok, G., & Wyród-Wróbel, J. (2011). Customer satisfaction-Meaning and methods of measuring. *Marketing and logistic problems in the management of organization*, 23-41. https://d1wqtxts1xzle7.cloudfront.net/53698757/

Blut, M., Chowdhry, N., Mittal, V., & Brock, C. (2015). E-Service Quality: A Meta-Analytic Review. *Journal of Retailing*, 91(4), 679–700. https://doi.org/10.1016/j.jretai.2015.05.004

Blut, M. (2016). E-Service Quality: Development of a Hierarchical Model. *Journal Of Retailing*, 92(4), 500–517. https://doi.org/10.1016/j.jretai.2016.09.002

Bolton, R. N. (1998). A Dynamic Model of the Duration of the Customer's Relationship with a Continuous Service Provider: The Role of Satisfaction. *Marketing Science,* 17(1):45-65. https://doi.org/10.1287/mksc.17.1.45

Brady, M. K., & Robertson, C. J. (2001). Searching for a consensus on the antecedent role of service quality and satisfaction: an exploratory cross-national study. *Journal of Business Research*, 51(1), 53–60. https://doi.org/10.1016/s0148-2963(99)00041-7

Centraal Bureau voor de Statistiek. (2023). Bijna 8 op de 10 mensen deden online aankopen in 2023. *Centraal Bureau voor de Statistiek.* https://www.cbs.nl/nl-nl/nieuws/2023/49/bijna-8-op-de-10-mensen-deden-online-aankopen-in-2023

Coy, M. J. (2019). Research methodologies: Increasing understanding of the world. *International Journal of Scientific and Research Publications*, 9(1), 71-77. http://dx.doi.org/10.29322/IJSRP.9.01.2019.p8511

Creswell, J. W. (2009). Research designs. Qualitative, quantitative, and mixed methods approaches. https://www.ucg.ac.me/skladiste/blog_609332/objava_105202/fajlovi/Creswell.pdf

Daffodil, M. I. N., & De Rose, V. J. L. (2023). A study on the impact of website design on customer satisfaction in online grocery shopping. *Journal of Research Administration*, 5(2), 4226-4237. https://journalra.org/index.php/jra/article/view/575/385

De Magalhães, D. J. A. V. (2021). Analysis of critical factors affecting the final decision-making for online grocery shopping. *Research in Transportation Economics*, 87, 101088. https://doi.org/10.1016/j.retrec.2021.101088

Farisa, A. (2018). An Assessment of E-Service Quality, Customer Satisfaction, and Customer Trust on Customer Behavior in Online Shopping (*Master's thesis, ISCTE-Instituto Universitario de Lisboa (Portugal)*). https://repositorio.iscte-iul.pt/bitstream/10071/17263/2/master_almira_farisa.pdf

Fornell, C. (1992). A national customer satisfaction barometer: The Swedish experience. Jo*urnal of marketing*, 56(1), 6-21. https://doi.org/10.1177/002224299205600103

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of marketing research*, 18(1), 39-50. https://doi.org/10.1177/002224378101800104

Giamboi, M. (2021). Online boodschappen thuisbezorgen: alle supermarkten op een rij. *Dyme*. https://dyme.app/blog/bespaartips/online-boodschappen-thuisbezorgen-alle-supermarkten-op-een-rij

Goretzko, D., Pham, T. T. H., & Bühner, M. (2021). Exploratory factor analysis: Current use, methodological developments and recommendations for good practice. *Current psychology*, 40, 3510-3521. https://doi.org/10.1007/s12144-019-00300-2

Govindasamy, P., Isa, N. J. M., Mohamed, N. F., Noor, A. M., Ma, L., Olmos, A., & Green, K. (2024). A systematic review of exploratory factor analysis packages in R software. W*IREs Computational Statistics*, 16(1), e1630. https://doi-org.ezproxy2.utwente.nl/10.1002/wics.1630

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). Multivariate Data Analysis (7th edition). *Upper Saddle River, NJ Prentice Hall.* https://www.drnishikantjha.com/papersCollection/Multivariate%20Data%20Analysis.pdf

Hanus, G. (2016). Consumer behaviour during online grocery shopping. *In CBU International Conference Proceedings* (Vol. 4, pp. 010-013). https://doi.org/10.12955/cbup.v4.737

Hirsch, A., Bieleke, M., Schüler, J., & Wolff, W. (2020). Implicit theories about athletic ability modulate the effects of if-then planning on performance in a standardized endurance task. *International Journal of Environmental Research and Public Health*, 17(7), 2576. https://doi.org/10.3390/ijerph17072576

Holloway, B. B., & Beatty, S. E. (2008). Satisfiers and Dissatisfiers in the Online Environment. *Journal Of Service Research*, 10(4), 347–364. https://doi.org/10.1177/1094670508314266

Hollaus, M., & Schantl, J. (2022). Incentivizing consumers towards a more sustainable online shopping behavior: a study on nudging strategies in B2C E-Commerce. *In Proceedings of the 2022 13th International Conference on E-Education, E-Business, E-Management, and E-Learning* (pp. 372-376). https://doi.org/10.1145/3514262.3514268

Hooper, D. (2012), 'Exploratory Factor Analysis', in Chen, H. (Ed.), Approaches to Quantitative Research – Theory and its Practical Application: A Guide to Dissertation Students, Cork, Ireland: *Oak Tree Press*. https://arrow.tudublin.ie/buschmanbk/8/

Hu, H. Y., Cheng, C. C., Chiu, S. I., & Hong, F. Y. (2011). A study of customer satisfaction, customer loyalty and quality attributes in Taiwan's medical service industry. *African Journal of Business Management*, 5(1), 187. DOI: 10.5897/AJBM10.951

Jumbo. (2024). Zo Werkt het Bestellen van Je Boodschappen. https://www.jumbo.com/boodschappen-bestellen/zo-werkt-het

Ibanez, C. A. G., Carcellar III, B. G., Paringit, E. C., Argamosa, R. J. L., Faelga, R. A. G., Posilero, M. A. V., Zaragosa, G. P., & Dimayacyac, N. A. (2016). Estimating DBH of trees employing multiple linear regression of the best LiDAR-derived parameter combination automated in python in a natural broadleaf forest in the Philippines. *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, 41, 657-662. Doi: 10.5194/isprsarchives-XLI-B8-657-2016

Ivastya, R., & Fanani, Z. (2020). The Impact of E-Service Quality on E-Satisfaction and Implications on B2C shopee.com the online Repurchase: A case study of Indonesia. *International Journal of Advances in Scientific Research and Engineering (IJASRE)*, 6(7), 1-9.
DOI: 10.31695/IJASRE.2020.33842

Jain, V., Malviya, B., & Arya, S. (2021). An overview of electronic commerce (e-Commerce). *Journal of Contemporary Issues in Business and Government*, 27(3), 665-670.
DOI: 10.47750/cibg.2021.27.03.090

Jalil, E. E. (2018). The importance of logistical factors in online shopping behaviour. *Knowledge Management International Conference (KMICe)*, Miri Sarawak, Malaysia.
https://soc.uum.edu.my/kmice/proceedings/2018/pdf/CR70.pdf

Jia, L., Cegielski, C., & Zhang, Q. (2014). The Effect of Trust on Customers' Online Repurchase Intention in Consumer-to-Consumer Electronic Commerce. *Journal of Organizational and End User Computing*, 26(3), 65–86. doi:10.4018/joeuc.2014070104

Jiang, L., Yang, Z., & Jun, M. (2013). Measuring consumer perceptions of online shopping convenience. *Journal Of Service Management*, 24(2), 191–214.
https://doi.org/10.1108/09564231311323962

Kayabaşı, A., Çelik, B., & Büyükarslan, A. (2013). The analysis of the relationship among perceived electronic service quality, total service quality and total satisfaction in Banking sector. *Journal of Human Sciences*, 10(2), 304-325. https://www.j-humansciences.com/ojs/index.php/IJHS/article/view/2659

Kotler, P., & Armstrong, G. M. (2010). Principles of marketing. *Pearson Education India*.
http://lms.aambc.edu.et:8080/xmlui/bitstream/handle/123456789/54/marketing%20pdf.pdf?sequence=1&isAllowed=y

Kulkarni, A., Wang, X. C., & Yuan, H. (2019). Boomerang effect of incentive reminders during shopping trips. *Journal Of Consumer Marketing*, 36(5), 592–599. https://doi.org/10.1108/jcm-07-2018-2783

Kutner, M. H., Nachtsheim, C. J., Neter, J., & Li, W. (2004). Applied Linear Statistical Models (Fifth) [McGraw-Hili Irwin]. *McGraw-Hili Irwin*. https://users.stat.ufl.edu/~winner/sta4211/ALSM_5Ed_Kutner.pdf

Ladhari, R. (2010). Developing e-service quality scales: A literature review. *Journal Of Retailing And Consumer Services*, 17(6), 464–477. https://doi.org/10.1016/j.jretconser.2010.06.003

Lee, G. G., & Lin, H. F. (2005). Customer perceptions of e-service quality in online shopping. *International journal of retail & distribution management*, 33(2), 161-176. https://doi.org/10.1108/09590550510581485

Leedy, P. D., Ormrod, J. E. (2016). Practical Research: Planning and Design (11th edition). *Pearson Education Limited*. https://pce-fet.com/common/library/books/51/2590_%5BPaul_D._Leedy,_Jeanne_Ellis_Ormrod%5D_Practical_Res(b-ok.org).pdf

Le-Hoang, P. V. (2020). The relationship between online convenience, online customer satisfaction, buying intention and electronic word-of-mouth. *Independent Journal of Management & Production*, 11(7), 2943-2966. https://doi.org/10.14807/ijmp.v11i7.1251

Marshall, G., & Jonker, L. (2010). An introduction to descriptive statistics: A review and practical guide. *Radiography*, 16(4), e1–e7. https://doi.org/10.1016/j.radi.2010.01.001

Memon, F. G., Lashari, I. A., Dogar, H., & Phulpoto, S. (2024). Assessing The Role of Ongoing Training Initiatives In Improving Overall Employee Job Performance: A Case of an emerging Economy. *The Asian Bulletin Of Green Management And Circular Economy*, 4(1), 62-73. https://doi.org/10.62019/abgmce.v4i1.62

Naushad, S., & Siddiqui, D. A. (2019). Influence of category management on customer satisfaction: *Evidence from Karachi's retail stores*. http://dx.doi.org/10.2139/ssrn.3510628

Nerlove, M., & Wallis, K. F. (1966). Use of the Durbin-Watson Statistic in Inappropriate Situations. *Econometrica*, 34(1), 235–238. https://doi.org/10.2307/1909870

Olsen, N. S. (2018). A study of the e-grocery market in the region of Stavanger. *Master's thesis, University of Stavanger, Norway*. https://uis.brage.unit.no/uis-xmlui/bitstream/handle/11250/2563956/Master_thesis.pdf?sequence=3

Pearson, A., Tadisina, S., & Griffin, C. (2012). The role of e-service quality and information quality in creating perceived value: antecedents to web site loyalty. *Information Systems Management*, 29(3), 201-215. https://doi.org/10.1080/10580530.2012.687311

Pham, Q. T., Tran, X. P., Misra, S., Maskeliūnas, R., & Damaševičius, R. (2018). Relationship between convenience, perceived value, and repurchase intention in online shopping in Vietnam. *Sustainability*, 10(1), 156. https://doi.org/10.3390/su10010156

PLUS. (n.d.). Hoe Kan Ik Mijn Online Bestelling Betalen Bij Bezorging? https://www.plus.nl/consumentenservice?_gl=1*1o4ujig*_up*MQ..&gclid=CjwKCAjwyo60BhBiEiwAHmVLJX7ZHHt37OsZdpC7hBDCq5lND03JkFEjA7yApDLXIVsc_aHI4a1NORoCjE4QAvD_BwE

Ranganathan, C., & Ganapathy, S. (2002). Key dimensions of business-to-consumer web sites. *Information & Management*, 39(6), 457–465. https://doi.org/10.1016/s0378-7206(01)00112-4

Rao, S., Griffis, S. E., & Goldsby, T. J. (2011). Failure to deliver? Linking online order fulfillment glitches with future purchase behavior. *Journal Of Operations Management*, 29(7–8), 692–703. https://doi.org/10.1016/j.jom.2011.04.001

Ribbink, D., Van Riel, A. C., Liljander, V., & Streukens, S. (2004). Comfort your online customer: quality, trust and loyalty on the internet. Managing Service Quality: *An International Journal*, 14(6), 446-456. DOI: 10.1108/09604520410569784

Rita, P., Oliveira, T., & Farisa, A. (2019). The impact of e-service quality and customer satisfaction on customer behavior in online shopping. *Heliyon*, 5(10), e02690. https://doi.org/10.1016/j.heliyon.2019.e02690

Rust, R. T. (2001). The rise of E-Service. *Journal of Service Research*, 3(4), 283–284. https://doi.org/10.1177/109467050134001

Sahadev, S., & Purani, K. (2008). Modelling the consequences of e-service quality. *Marketing Intelligence & Planning*, 26(6), 605-620. https://doi.org/10.1108/02634500810902857

San, W. H., Von, W. Y., & Qureshi, M. I. (2020). The Impact of E-Service Quality on Customer Satisfaction in Malaysia. *Journal of Marketing and Information Systems*, 3(1), 46-62. DOI: 10.31580/jmis.v3i1.1452

Santos, J. (2003). E-service quality: a model of virtual service quality dimensions. Managing service quality: *An international journal*, 13(3), 233-246. DOI: 10.1108/09604520310476490

Senaviratna, N. A. M. R., & A Cooray, T. M. J. (2019). Diagnosing multicollinearity of logistic regression model. *Asian Journal of Probability and Statistics*, 5(2), 1-9. https://doi.org/10.9734/ajpas/2019/v5i230132

Shafiee, M. M., & Bazargan, N. A. (2018). Behavioral customer loyalty in online shopping: The role of e-service quality and e-recovery. *Journal of theoretical and applied electronic commerce research*, 13(1), 26-38. DOI: 10.4067/S0718-18762018000100103

Shin, J. I., Chung, K. H., Oh, J. S., & Lee, C. W. (2013). The effect of site quality on repurchase intention in Internet shopping through mediating variables: The case of university students in South Korea. *International Journal Of Information Management*, 33(3), 453–463. https://doi.org/10.1016/j.ijinfomgt.2013.02.003

Shrestha, R., Kadel, R., & Mishra, B. K. (2023). A two-phase confirmatory factor analysis and structural equation modelling for customer-based brand equity framework in the smartphone industry. *Decision Analytics Journal*, 8, 100306. https://doi.org/10.1016/j.dajour.2023.100306

Shroff, A., Kumar, S., Martinez, L. M., & Pandey, N. (2023). From clicks to consequences: A multi-method review of online grocery shopping. *Electronic Commerce Research*, 1-40. https://doi.org/10.1007/s10660-023-09761-x

Sirtioglu, D. & Schreijen, S. (2023). Online boodschappen doen steeds meer ingeburgerd: Rabobank Online Food Retail Index. *Rabobank*. https://www.rabobank.nl/kennis/d011397204-online-boodschappen-doen-steeds-meer-ingeburgerd-rabobank-online-food-retail-index

Smith, D. C., & Park, C. W. (1992). The Effects of Brand Extensions on Market Share and Advertising Efficiency. *Journal of Marketing Research*, 29(3), 296–313. https://doi.org/10.1177/002224379202900302

Sohn, C., & Tadisina, S. K. (2008). Development of e-service quality measure for internet-based financial institutions. *Total Quality Management*, 19(9), 903-918. https://doi.org/10.1080/14783360802224412

Verhoef, P. C., & Langerak, F. (2001). Possible determinants of consumers' adoption of electronic grocery shopping in the Netherlands. *Journal Of Retailing And Consumer Services*, 8(5), 275–285. https://doi.org/10.1016/s0969-6989(00)00033-3

Wang, R. J., Malthouse, E. C., & Krishnamurthi, L. (2015). On the Go: How Mobile Shopping Affects Customer Purchase Behavior. *Journal Of Retailing*, 91(2), 217–234. https://doi.org/10.1016/j.jretai.2015.01.002

Wan, X., Evers, P. T., & Dresner, M. (2012). Too much of a good thing: The impact of product variety on operations and sales performance. *Journal Of Operations Management*, 30(4), 316–324. https://doi.org/10.1016/j.jom.2011.12.002

Watson, R. (2015). Quantitative research. *Nursing standard*, 29(31). https://doi.org/10.7748/ns.29.31.44.e8681

Williams, C. (2007). Research methods. *Journal of Business & Economics Research (JBER)*, 5(3). https://doi.org/10.19030/jber.v5i3.2532

Wolfinbarger, M., & Gilly, M. C. (2003). eTailQ: dimensionalizing, measuring and predicting etail quality. *Journal Of Retailing*, 79(3), 183–198. https://doi.org/10.1016/s0022-4359(03)00034-4

Wu, K. W., & Ding, M. C. (2007). Validating the American customer satisfaction index model in the online context: An empirical study of US consumer electronics e-tailers. *International Journal of Business and Information*, 2(2). http://dx.doi.org/10.6702/ijbi.2007.2.2.3

Xu, X., Qi, L., Peng, L., Hsia, T., Huang, C., & Wu, J. (2017). The impact of informational incentives and social influence on consumer behavior during Alibaba's online shopping carnival. *Computers in Human Behavior*, 76, 245–254. https://doi.org/10.1016/j.chb.2017.07.018

Zeithaml, V. A., Parasuraman, A., & Malhotra, A. (2000). A conceptual framework for understanding e-service quality: implications for future research and managerial practice (Vol. 115). *Cambridge, MA: Marketing Science Institute*. https://thearf-org-unified-admin.s3.amazonaws.com/MSI/2020/06/MSI_WP_00-115.pdf

Zeqiri, J., Ramadani, V., & Aloulou, W. J. (2023). The effect of perceived convenience and perceived value on intention to repurchase in online shopping: the mediating effect of e-WOM and trust. *Economic research-Ekonomska istraživanja*, 36(3). https://doi.org/10.1080/1331677X.2022.2153721

Zhang, Z., Zhang, N., & Wang, J. (2022). The influencing factors on impulse buying behavior of consumers under the mode of hunger marketing in live commerce. *Sustainability*, 14(4), 2122. https://doi.org/10.3390/su14042122

Zhou, T., Lu, Y., & Wang, B. (2009). The relative importance of website design quality and service quality in determining consumers' online repurchase behavior. *Information Systems Management*, 26(4), 327-337. https://doi.org/10.1080/10580530903245663

Appendix

Appendix 1 Survey

Informed Consent Statement

Before you begin this survey, please take a moment to read the following information carefully.

Consent: By proceeding with this survey, you are consenting to participate voluntarily. You have the right to withdraw from the survey at any time without any consequences.

Purpose of the Survey: This survey is part of a research study for my master's thesis. The focus is on understanding the key factors that influence your satisfaction while shopping for groceries online.

Survey Structure: The survey consists of 9 sections/topics where questions will need to be answered by you.

Risks: There are no big risks associated with participating in this survey, maybe only a time risk. The estimated time to complete the survey is between 5-7 minutes, but you may take slightly longer.

Time Frame: Your participation will require approximately 5-7 minutes of your time.

Confidentiality: Your voluntary participation and answers are of a great value and will be collected and treated completely anonymously. Therefore, after completing my master thesis, the data will also be deleted. No direct questions will be asked that can lead to your personal identification (e.g., name or address). Instead, general demographic questions such as education, income, age, and gender will be asked.

Agreement to Participate: By continuing with this survey, you acknowledge that you have read and understood the above information and agree to participate voluntarily.
Please proceed only if you consent to participate voluntarily.

- o Yes, I have read and understood the informed consent, and I want to participate in the survey
- o No, after reading the informed consent, I don't want to participate in the survey (> end of the survey)

Introduction before the survey

Dear respondent,

First of all thank you very much for your time and participating in this survey. This survey is part of my research for the master thesis, where the focus is on the understanding of the key factors that influence your satisfaction while doing your groceries online. Your opinion and feedback will help to formulate to improve their services and to create a better experience.

This survey will consist of 9 sections, this will take 5-7 minutes of your time.

Your voluntary participation and answers are of a great value and will be collected and treated completely anonymously. Therefore, after completing my master thesis, the data will also be deleted.

Do you have any questions, don't hesitate to contact me on the following e-mail:
j.g.h.teriele@student.utwente.nl

What remains for me now is to thank you for your participation and I am looking forward to your answers!
Kind regards,
Jacco te Riele

Research survey: The key e-service factors that influence customer satisfaction during online grocery shopping

Screening questions

Do you live in the Netherlands?

- o   Yes
- o   No (--> End of survey) (because we only want persons from the Netherlands, research will take place in Netherlands)

Are you 18 years or older?

- o   Yes
- o   No (--> End of survey) (because we only want persons that are 18 years or older)

Did you ever make a purchase online for groceries?

- o   Yes
- o   No (--> End of survey) (because we only want persons that have ever done grocery shopping online)

Great, you meet the search criteria for this research! You can start the survey now.

Section A – A1. Website Design (These instruments are borrowed from: Blut, 2016; Holloway & Beatty, 2008)

Please read the statements carefully, and give the answer that suits you best.

	Information quality	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
IQ.1	The information on the website of the online grocery store is pretty much what I need to do for my groceries.	1	2	3	4	5	6	7
IQ.2	The website of the online grocery store adequately meets the information needs.	1	2	3	4	5	6	7
IQ.3	The information on the website of the online grocery store is effective for me.	1	2	3	4	5	6	7
	Website Aesthetics							
WA.1	The website of the online grocery store is visually pleasing to do grocery shopping.	1	2	3	4	5	6	7
WA.2	The website of the online grocery store displays a visually pleasing design to do grocery shopping.	1	2	3	4	5	6	7
WA.3	The website of the online grocery store is visually appealing to grocery shopping.	1	2	3	4	5	6	7
	Purchase Process							
PP.1	The website of the online grocery store has no difficulties with making a payment for the groceries.	1	2	3	4	5	6	7
PP.2	The purchasing process was not difficult.	1	2	3	4	5	6	7
PP.3	It is easier to use the website of the online grocery store to complete my task with the company than it is to call or mail a representative.	1	2	3	4	5	6	7
	Website Convenience							
WC.1	The website of the online grocery store displays visually pleasing easy-to-read content for me.	1	2	3	4	5	6	7
WC.2	The text on the website of the online grocery store is easy to read for me.	1	2	3	4	5	6	7
WC.3	The website of the online grocery store labels is easy to understand for me.	1	2	3	4	5	6	7
	Product Selection							
PS.1	All my business with the online grocery store can be completed via the website.	1	2	3	4	5	6	7
PS.2	The website of the online grocery store has a good product selection for my grocery shopping.	1	2	3	4	5	6	7
PS.3	The website of the online grocery store has a wide variety of products that interest me for my grocery shopping.	1	2	3	4	5	6	7
	Offerings							
OF.1	The website of the online grocery store has low prices for the products.	1	2	3	4	5	6	7
OF.2	The website of the online grocery store has lower prices than psychic grocery stores.	1	2	3	4	5	6	7
	Personalization							
PN.1	- The website of the online grocery store allows me to interact with them to receive tailored information about groceries.	1	2	3	4	5	6	7
PN.2	The website of the online grocery store has interactive features, which help me accomplish my task of doing grocery shopping.	1	2	3	4	5	6	7
PN.3	I can interact with the website of the online grocery store to get information tailored to my specific needs for groceries.	1	2	3	4	5	6	7
	System Availability							

SA.1	When I use the online grocery store, there is very little waiting time between my actions and the website's response.	1	2	3	4	5	6	7
SA.2	The website of the online grocery store loads quickly.	1	2	3	4	5	6	7
	Website Navigation/Organization/Design							
WN.1	Website design/organization is good	1	2	3	4	5	6	7
WN.2	I don't have technical or navigational problems at the online grocery store during my shopping.	1	2	3	4	5	6	7

Section A – A2. Fulfilment (These instruments are borrowed from: Blut, 2016; Holloway & Beatty, 2008)

Please read the statements carefully, and give the answer that suits you best.

	Timeliness of delivery	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
TD.1	The products are delivered by the time promised by the online grocery store.	1	2	3	4	5	6	7
TD.2	This online grocery website makes items available for delivery within a suitable time frame.	1	2	3	4	5	6	7
TD.3	It quickly delivers what I have ordered.	1	2	3	4	5	6	7
	Order accuracy							
OA.1	I get what I have ordered from this online grocery store.	1	2	3	4	5	6	7
OA.2	The online grocery store sends out the items I have ordered.	1	2	3	4	5	6	7
OA.3	The online grocery store is truthful about its offerings.	1	2	3	4	5	6	7
	Delivery conditions							
DC.1	The products were not damaged during delivery.	1	2	3	4	5	6	7
DC.2	The ordered products arrived in good condition.	1	2	3	4	5	6	7
DC.3	The products arrived with no major damage.	1	2	3	4	5	6	7

Section A – A3. Customer service (These instruments are borrowed from: Blut, 2016; Holloway & Beatty, 2008)

Please read the statements carefully, and give the answer that suits you best.

	Service level	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
SL.1	The online grocery store provides a telephone number to reach the company.	1	2	3	4	5	6	7
SL.2	The online grocery store has customer service representatives available online.	1	2	3	4	5	6	7
SL.3	The online grocery store offers the ability to speak to a live person if there is a problem.	1	2	3	4	5	6	7
	Return handling/policies							
RH.1	The online grocery store provides me with convenient options for returning items.	1	2	3	4	5	6	7
RH.2	The online grocery store handles product returns well.	1	2	3	4	5	6	7
RH.3	The online grocery store offers a meaningful guarantee.	1	2	3	4	5	6	7

Section A – A4. Security & Privacy (These instruments are borrowed from: Blut, 2016; Holloway & Beatty, 2008)

Please read the statements carefully, and give the answer that suits you best.

	Security	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
SY.1	I feel safe in my transactions with the online the online grocery store.	1	2	3	4	5	6	7
SY.2	The online grocery store has adequate security features.	1	2	3	4	5	6	7
SY.3	This website of the online grocery store protects information about my credit card/payment.	1	2	3	4	5	6	7
	Privacy							
PY.1	I trust the online grocery store to keep my personal information safe.	1	2	3	4	5	6	7
PY.2	I trust the website of the online grocery store administrators will not misuse my personal information.	1	2	3	4	5	6	7
PY.3	The website of the online grocery store protects information about my web-shopping behavior.	1	2	3	4	5	6	7

Section A – A5. Convenience (These instruments are borrowed from: Jiang et al., 2013)

Please read the statements carefully, and give the answer that suits you best.

	Access convenience	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
AC.1	I could shop anytime I wanted at the online grocery store.	1	2	3	4	5	6	7
AC.2	I could order products wherever I am at the online grocery store.	1	2	3	4	5	6	7
AC.3	The website of the online grocery store is always accessible	1	2	3	4	5	6	7
	Search convenience							
SC.1	The website of the online grocery store is easy to understand and navigate through the website	1	2	3	4	5	6	7
SC.2	I can find desired products quickly on the website of the online grocery store.	1	2	3	4	5	6	7
SC.3	The product classification is easy to follow on the website of the online grocery store	1	2	3	4	5	6	7
SC.4	The online grocery store has an attractive website	1	2	3	4	5	6	7
SC.5	The online grocery store has a user-friendly website for making purchases	1	2	3	4	5	6	7
SC.6	The website of the online grocery store has a wide variety of search options to find the same products	1	2	3	4	5	6	7
	Evaluation convenience							
EC.1	The website of the online grocery store provides product specifics	1	2	3	4	5	6	7
EC.2	The website of the online grocery store uses both text and graphics of product information	1	2	3	4	5	6	7
EC.3	The website of the online grocery store uses sufficient information to identify different products	1	2	3	4	5	6	7
	Transaction convenience							
TC.1	The website of the online grocery store uses simple and convenient online payment	1	2	3	4	5	6	7

| TC.2 | The website of the online grocery store uses flexible payment methods. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| TC.3 | The website of the online grocery store is good in use without difficulty to complete my purchases. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Section A – A6. Order fill rate (These instruments are borrowed from: De Magalhães, 2021; Olsen, 2018; Rao et al., 2011)

Please read the statements carefully, and give the answer that suits you best.

	Order fill rate	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
OFR.1	The online grocery store website offers a comprehensive selection of products that meet my grocery needs.	1	2	3	4	5	6	7
OFR.2	The online grocery store provides a diverse range of product options within each product category, allowing for flexibility in my shopping choices.	1	2	3	4	5	6	7
OFR.3	I can find and order all the items I need for my groceries from the online grocery store's website, making it a convenient one-stop shopping destination.	1	2	3	4	5	6	7
OFR.4	How likely is it that you would try another online grocery store if your current online grocery store fails in their promises to deliver all the products in your order.	1	2	3	4	5	6	7

Section A – A7. Incentives (These instruments are borrowed from: Zhang et al., 2022)

Please read the statements carefully, and give the answer that suits you best.

	Incentive information, promotional	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
IFP.1	I will always pay attention to promotional prices and coupon information released on the website of the online grocery store	1	2	3	4	5	6	7
IFP.2	When I am buying online groceries, I like to buy promotional products on the website of the online grocery store	1	2	3	4	5	6	7
IFP.3	Livestreaming promotions on the website of the online grocery store allow me to get a more reasonable consumer price.	1	2	3	4	5	6	7
IFP.4	The price discount on the website of the online grocery store makes me feel very generous.	1	2	3	4	5	6	7
IFP.5	Buying on the website of the online grocery store makes me feel more affordable.	1	2	3	4	5	6	7

Section A – A8. Overall e-service quality (These instruments are borrowed from: Blut, 2016)

Important in the following statements is that it is an overall picture about the previous e-service qualities. Please read the statements carefully, and give the answer that suits you best.

	Overall service quality	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
OSQ.1	Overall, my purchase experience with the online grocery store is excellent	1	2	3	4	5	6	7
OSQ.2	The overall quality of the service provided by the online grocery store is excellent	1	2	3	4	5	6	7
OSQ.3	My overall feelings toward this online grocery store are very satisfied	1	2	3	4	5	6	7

Section A – A9. Customer satisfaction (These instruments are borrowed from: Rita et al, 2019; Fornell, 1992)

You can see the statements as your already entire satisfaction in terms of doing online grocery shopping. Please read the statements carefully, and give the answer that suits you best.

	Customer satisfaction	Strongly disagree	Disagree	Somewhat disagree	Neutral	Somewhat agree	Agree	Strongly agree
CS.1	I am satisfied with the online grocery store.	1	2	3	4	5	6	7
CS.2	The online grocery store is getting close to the ideal online grocery store	1	2	3	4	5	6	7
CS.3	The online grocery store always meets my needs	1	2	3	4	5	6	7

Section B – Demographics

This is the final section regarding to your demographical background.

D1.1 Which of these descriptions applies to you the most?

- o   Student
- o   Full-time employee
- o   Part-time employee
- o   Retired
- o   Unemployed
- o   Housewife/Houseman
- o   Otherwise

D1.2 What is the best description of your annual income?

- o   Up to €15,000
- o   €15,001 – €30,000
- o   €30,001 – €45,000
- o   €45,001 – €60,000
- o   €60,001 – €75,000
- o   Above €75,000

D1.3 What is your gender?

- o   Male
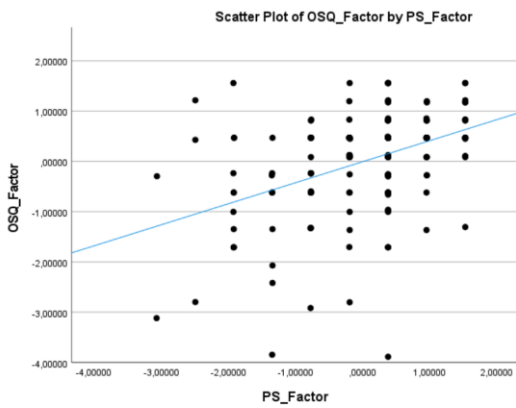- o   Female
- o   Otherwise
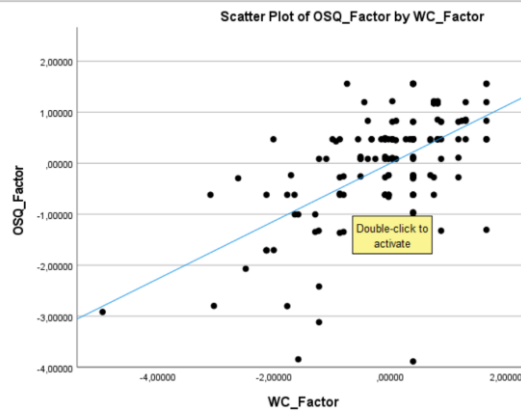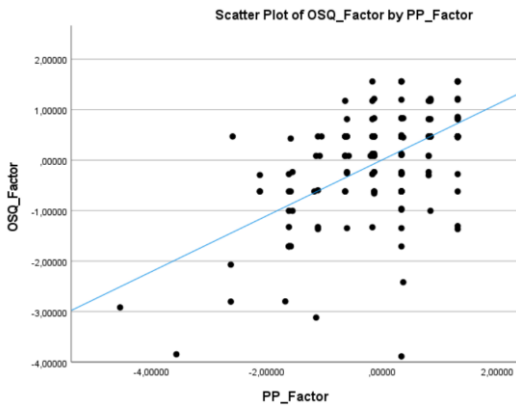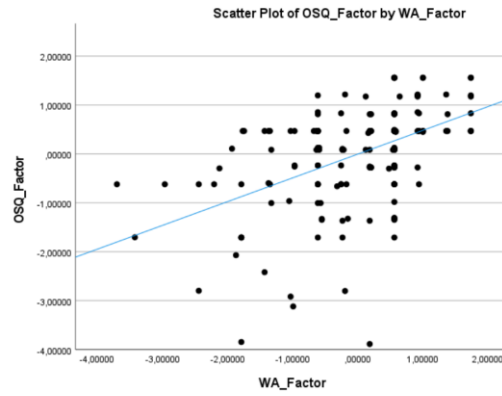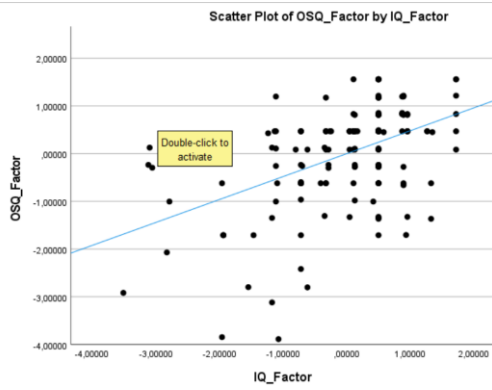
D1.4 What is your age?

- o   18 – 24 years old
- o   25 – 34 years old
- o   35 – 44 years old
- o   45 – 54 years old
- o   55 – 64 years old
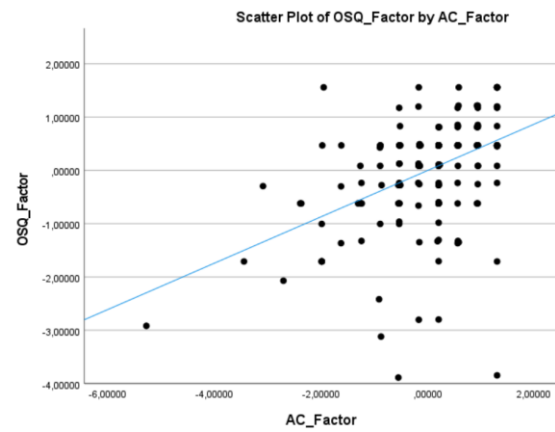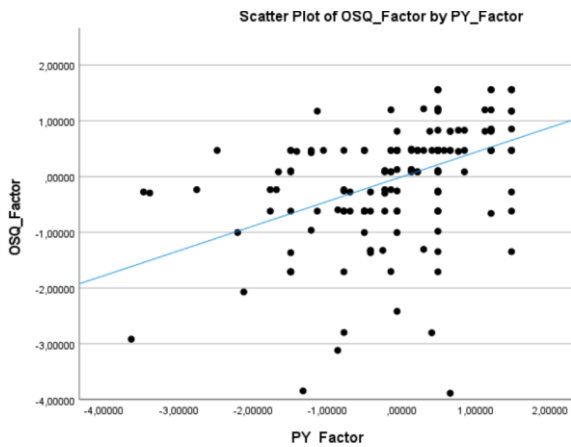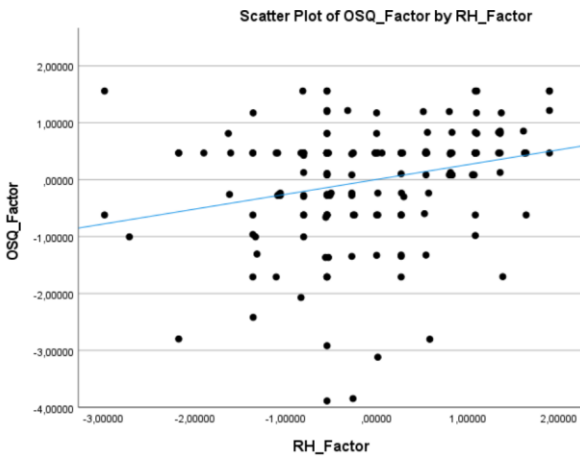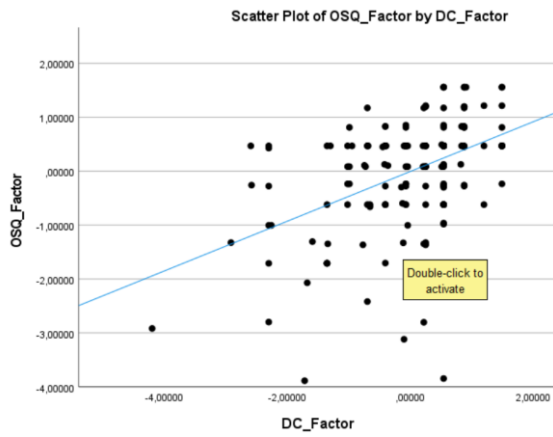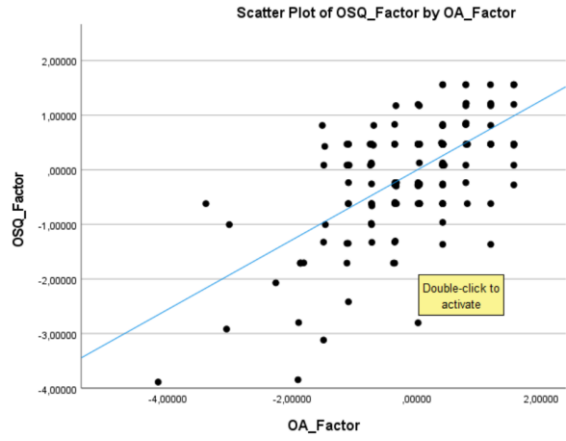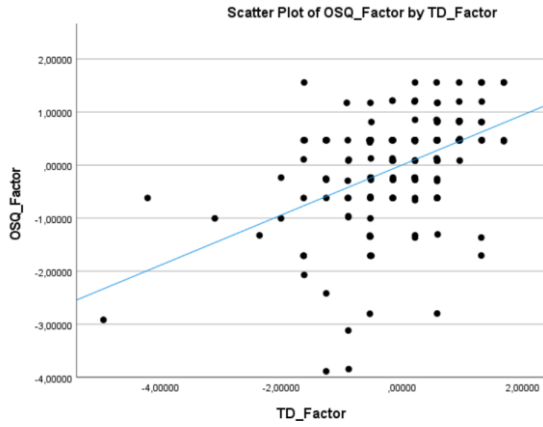- o   65 – 74 years old
- o   75 years or older

This is the end of the survey, I would like to thank you again for your time and effort in completing this survey. Finally, I would like to say again, completing this survey was completely anonymous.
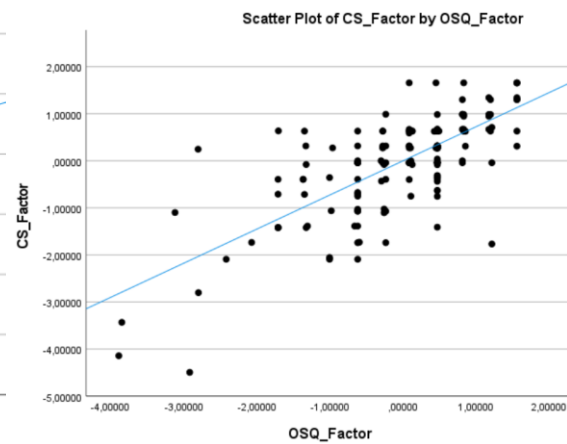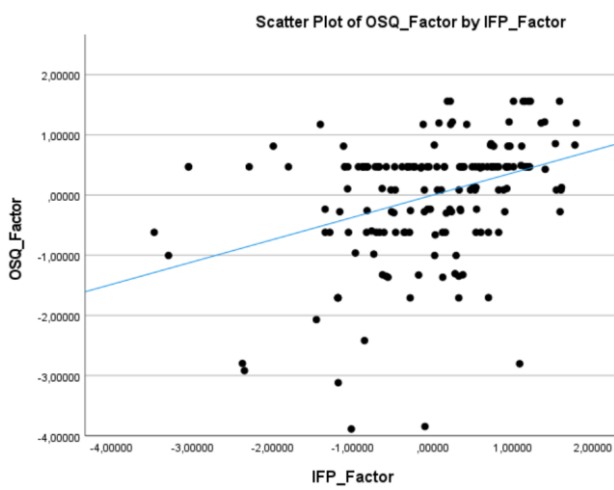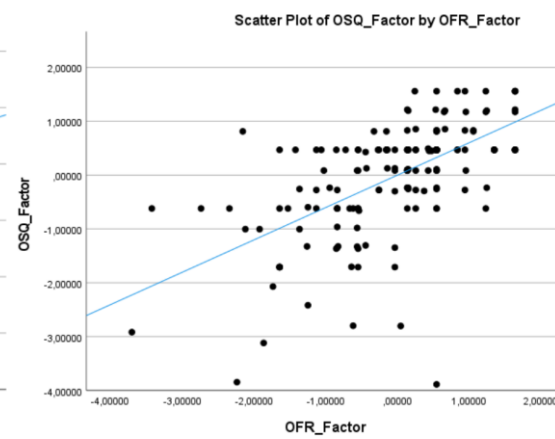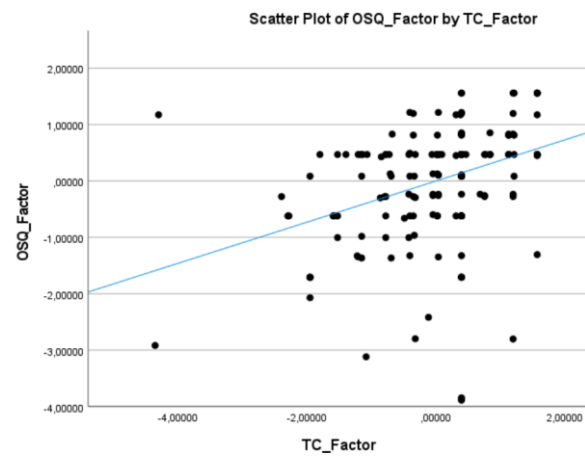
Curious about the results? Then send me an e-mail at the following e-mail address: j.g.h.teriele@student.utwente.nl

Appendix 2 Linear Relationship

Scatter Plot of OSQ_Factor by IQ_Factor

Scatter Plot of OSQ_Factor by WA_Factor

Scatter Plot of OSQ_Factor by PP_Factor

Scatter Plot of OSQ_Factor by WC_Factor

Scatter Plot of OSQ_Factor by PS_Factor

Scatter Plot of OSQ_Factor by OF_Factor

Scatter Plot of OSQ_Factor by PN_Factor

Scatter Plot of OSQ_Factor by WN_Factor

Scatter Plot of OSQ_Factor by TD_Factor

Scatter Plot of OSQ_Factor by OA_Factor

Scatter Plot of OSQ_Factor by DC_Factor

Scatter Plot of OSQ_Factor by SL_Factor

Scatter Plot of OSQ_Factor by RH_Factor

Scatter Plot of OSQ_Factor by SY_Factor

Scatter Plot of OSQ_Factor by PY_Factor

Scatter Plot of OSQ_Factor by AC_Factor

Scatter Plot of OSQ_Factor by SC_Factor

Scatter Plot of OSQ_Factor by EC_Factor

Scatter Plot of OSQ_Factor by TC_Factor

Scatter Plot of OSQ_Factor by OFR_Factor

Scatter Plot of OSQ_Factor by IFP_Factor

Scatter Plot of CS_Factor by OSQ_Factor

Appendix 3 Constant Variance

Scatterplot
Dependent Variable: OSQ_Factor

Scatterplot
Dependent Variable: CS_Factor
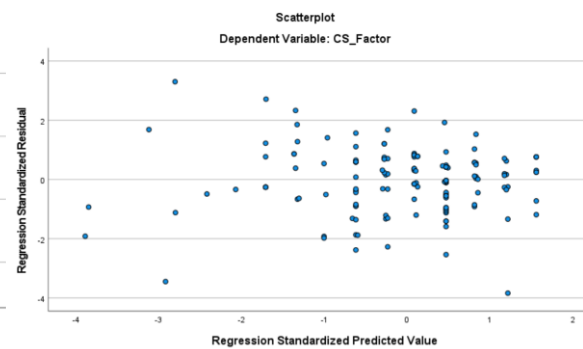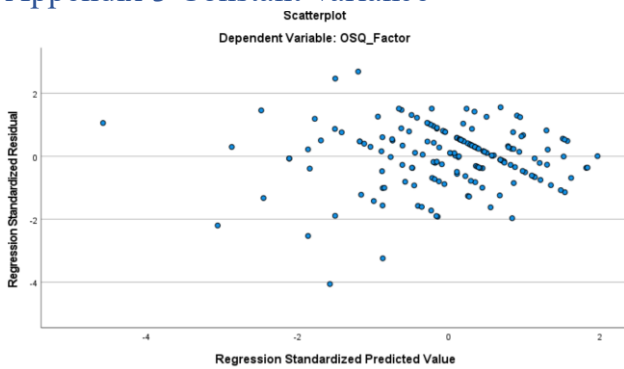
Appendix 4 Independence of error term

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,789^a	,623	,573	,65312431	1,963

a. Predictors: (Constant), IFP_Factor, DC_Factor, PN_Factor, WA_Factor, OF_Factor, SL_Factor, PY_Factor, TC_Factor, PS_Factor, TD_Factor, PP_Factor, SY_Factor, RH_Factor, OFR_Factor, IQ_Factor, AC_Factor, OA_Factor, EC_Factor, WN_Factor, WC_Factor, SC_Factor

b. Dependent Variable: OSQ_Factor

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,725^a	,526	,524	,69015022	1,959

a. Predictors: (Constant), OSQ_Factor

b. Dependent Variable: CS_Factor

Appendix 5 Normality of the error term

Histogram
Dependent Variable: OSQ_Factor

Histogram
Dependent Variable: CS_Factor